



United States
Department
of Agriculture



Natural
Resources
Conservation
Service

In cooperation with the
University of Alaska
Fairbanks, Agricultural
and Forestry Experiment
Station and the U.S.
Department of Interior,
National Park Service



Soil Survey of Denali National Park Area, Alaska



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By:
Mark H. Clark and Michael S. Duffy
United States Department of Agriculture, Natural Resources Conservation Service

In cooperation with:
University of Alaska Fairbanks, Agricultural and Forestry Experiment Station
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Fieldwork by:
Mark H. Clark, Michael S. Duffy, Jess Grunblatt, Darrell Kautz, Beth Koltun, and Michelle Schuman

Issued: July 2006

Maps for this survey are available online at <http://websoilsurvey.nrcs.usda.gov>.
Spatial data is available at <http://soildatamart.nrcs.usda.gov>. Maps are not
available in pdf format due to the excessive size of the files.

Cover photo: The Kichatna River drainage in the southwestern part of Denali National Park with the Cathedral Spires in the background. Map units included in the photo are [9SA4-Alpine Lower Mountain Colluvial Slopes](#) in the foreground with [9MSH-Alpine Mountains](#) in the middle ground and [13F21-Subalpine and Alpine Diorite Flood Plains](#) in the lower left portion of the photo.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and the United States Department of the Interior. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2002. Soil names and descriptions were approved in 2003. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2002. This survey was made cooperatively by the Natural Resources Conservation Service, the University of Alaska Fairbanks Agricultural and Forestry Experiment Station, and the National Park Service.

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Figure 1. Location of the Denali National Park Soil Survey Area in Alaska

Acknowledgements

This project was completed under a Memorandum of Understanding between the United States Department of Interior, National Park Service, the United States Department of Agriculture, Natural Resources Conservation Service, and the University of Alaska Fairbanks.

Mapping a park over 24 million hectares in size requires an amazing amount of energy, resources, and luck. We would like to acknowledge the following people for their valued technical or logistical support during the course of this project.

Alaska Natural Heritage Program: Keith Boggs, Rob Lipkin, and Jerry Tande
Helicopter pilots: Tom Grandguard, Glen Gullick, George Hook, Joe Trudo, and Bill Walsh
Independents: Dominique Collet, George Argus, and Phyllis Kempton
Iowa State University: Donald Farrar
University of Alaska Fairbanks, Museum/Herbarium: Carolyn Parker, Al Batten, Dave Murray, and Gary Laursen
USDA-Arctic Plant Germplasm Repository: David Lanson
USDA-Forest Service: Mary Stensvold
USDA-Natural Resources Conservation Service: Michelle Schuman, Dennis Moore, Joe Moore, Darrell Kautz, Ted Cox, Pam Taber, Mike Wilson, and Linda Giani
USDI-National Park Service, Alaska Support Office: Jess Grunblatt and Beth Koltun
USDI-National Park Service, Denali National Park and Preserve: Ken Karle, Ken Stahlnecker, Gordon Olsen, Madori Raymone, Joe Van Horn, Jon Paynter, Jim Thorne, Elaine Furbish, Guy Adema, Pam Sousanes, Phil Brease, Carl Roland, Jan Passek, Anne Vandermeer, Larry Weddle, John Kataldo, and Dan Rees
USDI-National Park Service, Natural Resources Program Center-Inventory and Monitoring Program: Pete Biggam and Gary Williams
USDI-National Park Service, Wrangell-Saint Elias National Park and Preserve: Mary Beth Cook
USDI-National Park Service, Gates of the Arctic National Park: Peter Neitlich
USDI-National Park Service, Yukon-Charley National Park and Preserve: Amy Larsen

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Soil Survey of Denali National Park Area, Alaska

Introduction

Denali National Park and Preserve includes approximately 2,452,400 hectares of land in Interior and South Central Alaska (see [Figures 1 and 2](#)). The Park entrance area is about 378 kilometers north of Anchorage and approximately 193 kilometers south of Fairbanks along the George Parks Highway (Alaska Highway 3). Denali National Park, formerly known as Mount McKinley National Park, was established in 1917. The original 853,113 hectares, now designated as wilderness except for the access road corridor and entrance area, form the core of the Park and Preserve. In 1980, 1,058,925 hectares of new Park and 540,113 hectares of Preserve land were added under the Alaska National Interest Lands Conservation Act (ANILCA), and the name was changed to Denali National Park and Preserve. It is bounded primarily by state land, including Denali State Park on the south side.

This survey was a cooperative effort of the Natural Resources Conservation Service (NRCS), United States Department of Agriculture, and the National Park Service (NPS), United States Department of Interior, and the University of Alaska Fairbanks. NRCS was responsible for survey design and methodology, data collection and analysis, and survey products. Fieldwork was completed during the months of July, August, and September from 1997 through 2002. Soil names and descriptions were approved in 2003. Unless indicated otherwise, maps and supporting documentation in this report refer to conditions in the survey area in 2002.

Survey Purpose and Product Limitations

The primary purpose of the survey was to describe and map the soils of Denali National Park and Preserve. Area soils were mapped at a scale of 1:63,360 and detailed descriptions of map units, soil types, and Landtypes, including potential natural plant communities and major seral communities are provided. As an aid to understanding the ecological aspects of the soil information, the detailed soil map was integrated into a multi-level ecological stratification of the area based on the National Hierarchical Framework of Ecological Units ([ECOMAP 1993](#)). Subsection level units provided at a scale of 1:250,000 were made by aggregating the detailed soil mapping together into more generalized categories based on similar physiography and biome. Landtype Association level units of the hierarchy are synonymous with detailed soil map units mapped at a scale of 1:63,360. Higher levels in the system have been mapped and described as a part of Alaska statewide ([Nowacki and Brock 1995](#)) and national efforts ([McNab and Avers 1994](#); [Bailey et al. 1994](#)). General maps and descriptions of Park and Preserve resources were created based on this approach. The classification and mapping hierarchy for Denali National Park and Preserve area is described in [Appendix A](#).

The scale of the map base imposes certain cartographic limitations in terms of the minimum size of individual delineations that can be made while maintaining map legibility and the maximum location accuracy of polygon boundaries that can be expected. On detailed soil maps compiled at 1:63,360 scale, polygon delineations of less than about one square centimeter, or about 15 hectares, results in a reduction in map legibility and have generally been avoided. Maximum location accuracy of polygon lines that can be expected

with this mapping scale is about 15 meters. The Subsection map was compiled at 1:250,000 scale resulting in a minimum legible delineation size of about 250 hectares. The process of aggregating the detailed soil mapping into the more generalized Subsection map resulted in the dissolution of many small polygons in order to maintain map legibility. These are important caveats when using digital spatial data in the Geographic Information System environment where scale is easily manipulated.

Products

This manuscript provides comprehensive hardcopy documentation of survey results. Manuscript content, including maps, tables, and descriptions are mostly derived from spatial and associated attribute data. These include:

- 1) Soil Survey Geographic Database (SSURGO) dataset and standard products of the National Cooperative Soil Survey (NCSS) for Denali Park, which includes:
 - Project area boundary as provided by the National Park Service
 - Soil map unit polygons (developed and certified at a scale of 1:63,360)
 - Attribute database (aggregate data exported from the National Soil Information System (NASIS)) linked to map unit polygons with Map Unit Key (MUKEY) (see documentation in metadata and system reports in attribute database)
 - Metadata
- 2) Other spatial layers including special themes and orthophoto images
- 3) Alaska Soil Survey Field Database (SSFDD), which includes:
 - Soils and vegetation field data collected at 2,205 sample points
 - Links to SSURGO data with MUKEY and soil component code (see documentation in database)
- 4) Digital photographs, landscape illustrations, Landtype and map unit distribution maps, and soil temperature graphs

All products, including printed and digital versions of this manuscript, are available at the following locations:

National Park Service, Denali National Park Headquarters
National Park Service, Regional Office, Anchorage
Natural Resources Conservation Service, Palmer

Survey Methods

The NRCS developed inventory objectives and procedures in conjunction with potential NPS users and recorded these objectives in a memorandum of understanding. The mapping base selected for the detailed soil map was the 1:60,000 scale color infrared Alaska High Altitude Photography (AHAP) flown at various dates from 1977 through 1985. Photography provided complete coverage with the exception of small areas where coverage was unavailable. A mosaic of satellite imagery from SPOT, flown in 1994, was used to fill in these holes in photo coverage and provide a mapping base for remaining areas. The soil map was compiled to the USGS Alaska 1:63,360 Series Orthophotography, derived from 1:120,000 black and white aerial photography flown during the 1970's and 80's. The draft ECOMAP Subsection map was compiled to the National Park Service-Denali National Park and Preserve Topographic map dated 1958 (revised 1986) at 1:250,000 scale. These resources were obtained from the NPS and the Bureau of Land Management (BLM).

Prior to fieldwork, a draft physiographic (ECOMAP Subsection) map was assembled for the entire Park using relevant literature and other information on climate, geology, geomorphology, hydrology, and vegetation. Aerial photography and satellite imagery were used to estimate the distribution and extent of landforms and vegetation patterns. The draft Subsection map served as a planning tool for fieldwork and also provided an interim reference illustrating general soil-landform and soil-vegetation relationships of Park resources.

A geographic block of approximately 405,000 hectares was selected each year for mapping. Using the Alaska High Altitude Photography (AHAP) and a stereoscope, tentative polygons were delineated on mylar overlays of the aerial photography. Initial map unit assignments were made based on apparent landform and vegetation patterns. Representative areas were then selected for field evaluation and documentation of soil and vegetation conditions. These representative areas or “study sites” consisted of two to four different but contiguous map units that could be crossed and documented during a single field day. This approach minimized expenses and also helicopter activity in any one area of the Park while providing supporting documentation for mapping. Field documentation includes 264 study sites visited during six summers of fieldwork.

Soil and vegetation field data were collected by transecting tentative polygons within each study site (see [Appendix B](#)). Observations made included major soil types and associated landforms, site properties, and plant communities. A transect consisted of one to several stops within an individual delineation on the map. The number of required stops was dependent on the complexity of the delineation. Corresponding soils and vegetation data and notes were linked using common transect and stop numbers. All transect and stop locations were recorded using a GPS and later reference during map preparation and data analysis. Field documentation includes 791 transects and 2,204 stops documented during six summers of fieldwork. During the fieldwork draft maps were evaluated for accuracy of line placement and polygon assignments. Samples of some of the soils in the area were collected for laboratory analyses. Laboratory data, together with the observed soil characteristics and properties, were used to provide baseline information of soil properties.

Following each field season, field data were entered into the Alaska Soil Survey Field Database (SSFDD) for data management and analysis. A complete reevaluation of draft field mapping using a stereoscope and referencing documented field data was also completed at this time. Polygons were then transferred to overlays of the orthophotography, scanned, and digitized. Interim products were distributed to the NPS. Results of data analysis were entered into the standard NRCS National Soils Information System (NASIS) database. Finally, the ECOMAP Subsection map was regenerated from the detailed soils map.

General Nature of the Survey Area

Physiography and Major Soil Orders

Denali National Park straddles the Alaska Range and is dominated by the Denali massif, whose barren peaks of ice and rock take up almost one-third of the Park’s total area. Alpine glacial plains skirt the mountains along Denali Park’s north side, gradually giving way to lowland forested plains and hills; a land underlain by permafrost and modified by wildfire. South of the Alaska Range crest is a seldom-visited area of steep mountains and broad river valleys. This is an area of significantly more moderate climate that is influenced by the Gulf of Alaska 160 kilometers to the south. This mountainous terrain is shrouded in clouds and subjected to rain, and snow during much of the year. This abundant moisture supports the herbaceous meadows and alder scrubs that cloak the lower mountain slopes. Only a small area of the South Central lowland forests is included within the Park’s southern border.

Denali National Park and Preserve includes five major physiographic sections ([Nowacki and Brock, 1995](#)). These are the Alaska Mountains, South Central Mountains, Cook Inlet Lowlands, Yukon-Kuskokwim Bottomlands; and Kuskokwim Mountains (see Figure 2). The most extensive single physiographic feature, the Alaska Range, includes both the Alaska Mountains Section and South Central Mountains Section (see Figure 3) and occupies about 60 percent of the Park. This mountain range, dominated by 6,194 meter high Mount McKinley, forms a southwest to northeast trending arc across central Alaska and is the focal point of Denali Park. Above about 1,500 meters elevation, the range is steep and extensively faulted, consisting of a wide range of rock types that include shale, andesite, schist, diorite, conglomerate, and limestone. Landforms include precipitous barren alpine mountains capped by permanent snowfields and glaciers flanked by talus slopes and cirque valleys (see Plate 1).

The Alaska Mountains Section at elevations below about 1,500 meters consists of steep alpine talus slopes and more gentle slopes locally flanked by glacial deposits (see Plate 2). Skirting the steep mountains, and much more subdued in relief, are rounded low mountains, plateaus, glacial plains, and hills (see Plates 3,

4, and 5). Dissecting all physiographic section are braided glacial-fed rivers and clear water streams with their adjacent flood plains, alluvial fans, and terraces. Soil materials are of three main types: Gravelly colluvium of variable lithology and drift in the mountains; Drift in broad valleys and lower mountain slopes and extending outwards from the mountains as aprons of glacial plains and hills; and Loamy and gravelly alluvium on flood plains and terraces. Figures 4 and 5 provide two satellite images of typical landscapes, soils, and vegetation of the Alaska Mountains Section. A unique periglacial feature on landforms of this physiographic section is "patterned ground," which is the regular surface patterns associated with intense frost action. These features include steps (see Plate 6), stripes (see Plate 7), circles (see Plate 8), gelifluction lobes (see Plate 9) and earth hummocks (see Plate 10). Polygonal ground (Plate 11) is an extensive pattern ground feature associated with massive ground ice and permafrost in the Toklat Basin area. Major soil orders include Inceptisols in steep mountains (see Plate 12), Spodosols on coarse texture alluvium and glacial deposits (see Plate 13), Gelisols on more gently sloping loamy drift and alluvial deposits (see Plate 14), and Entisols on flood plains (see Plate 15).

The South Central Mountains Section at elevations below about 1,500 meters includes steep alpine talus slopes consisting of an admixture of gravelly colluvium and volcanic ash. Volcanic ash materials originate from the many volcanoes within the Alaska Range and Aleutian Range to the west. Lower slopes consist of a mantle of volcanic ash over glacial drift deposits. Figure 6 provides a satellite image of typical landscapes, soils, and vegetation of the South Central Mountains Section. Periglacial landforms common to more northerly areas of the Park and Preserve are rarely observed in the South Central Mountains Section (see Plate 16). Major soil orders include Andisols (see Plate 17) and Inceptisols on steep mountains (see Plate 18), with Spodosols (see Plate 19) and Andisols on lower slopes.

The Yukon-Kuskokwim Bottomlands, located in the northwestern part of Denali Park, is the second most extensive physiographic feature in Denali, consisting of an expansive lowland area of plains, hills, relict sand dunes, bogs, fens, and ponds (see Plate 20). Beyond the limits of ice during the Pleistocene glaciations, this was part of a larger area often referred to as "Beringia," which included much of Interior and Western Alaska, the Bering Land Bridge and Eastern Siberia. This Section represents the largest contiguous area of permafrost-affected soils, as well as wetlands, within Denali National Park and Preserve. Soil materials are primarily loess and eolian sand on hills and plains, and stratified loamy textured alluvium as well as gravelly alluvium on flood plains. Major soil orders include Gelisols (see Plate 21) and Histosols (see Plate 22) on uplands and Entisols (see Plate 23) on flood plains.

Scattered throughout this lowland are the isolated low mountains of the Kuskokwim Mountains Section. This physiographic area is minor in extent, occupying less than five percent of the Park. Rounded low mountains cored with schist and mantled with mica-rich loess dominate the topography of this Section. Lower slopes have taiga or hardwood forest vegetation with occasional high summits of alpine scrub and tussock (see Plate 24). Major soil orders include Gelisols (see Plate 21) and Inceptisols (see Plate 25).

The Cook Inlet Lowlands Section, though extensive in South Central Alaska, occupies less than 5 percent of Denali Park. Landforms in uplands include glacial plains and hills with mixed forest interspersed with bogs and fens (see Plate 26). Braided flood plains with hardwood forests, mixed conifer-hardwood forests, scrub vegetation, and fens occupy valley bottoms along major rivers of the area. Soil materials include volcanic ash over glacial drift in uplands, and loamy and gravelly alluvium on flood plains. Major soil orders include Spodosols (see Plate 19), Andisols (see Plate 27), and Histosols (see Plate 28) in uplands and Entisols (see Plate 15) on flood plains.

Climate

Denali Park is divided into two sub-regional climates. Areas lying north of the hydrographic divide of the Alaska Range are considered sub-arctic continental, often referred to as Interior, and those lying to the south are transitional maritime-continental, often referred to as South Central (see Figure 7). These two sub-regional climates differ not only in terms of statistical measurements of temperature and precipitation, but also in the types of vegetation and landscape features that are unique to each. Climatic summaries for three climate stations in Denal are included in Tables 1, 2, and 3.

Based on climatic summaries from the Western Regional Climate Center, the sub-arctic continental climate characteristic to Interior Alaska consists of long cold winters and short warm summers. Mean

minimum January air temperature at Minchumina along the northwest border of Denali Park are -24.8 °C and the mean maximum July temperature is 22 °C. Total precipitation is relatively low, totalling 325 millimeters. The dry characteristic of the interior climatic zone is best understood by comparing total annual precipitation to water loss (evapotranspiration). Annual precipitation and potential evapotranspiration estimates for Minchumina are reported as 325 millimeters and 454 millimeters (Patric and Black 1968) and represent an annual moisture deficit of 129 millimeters. Because of this moisture deficit, the amount of water available for weathering and translocation of soil minerals is low and soil horizon expression is generally only weak or moderate. A typical soil profile from a well drained upland soil illustrates the relatively weak soil development associated with the interior climate zone and is provided in Plate 29.

Climatic variables including sub-zero winter air temperatures and low winter snow cover are two important contributors to the widespread distribution of permafrost within this zone. Average minimum winter air temperature for Minchumina in the northwestern corner of Denali Park is -22.9 °C. Winter snow cover, an important insulator against subzero winter air temperatures, is relatively low, averaging only 46 centimeters during March. A more complete description of the complex relationship between soils and permafrost is provided in the section "Permafrost and Soil Formation".

The transitional maritime-continental climate of South Central which includes the South Central Mountains and Cook Inlet Lowlands Sections is characterized as a blend of the mild, moist maritime influences of the coastal zone of the Gulf of Alaska and the cold, dry continental influences of Interior Alaska. Mean minimum January air temperature at Talkeetna, outside the southern border of Denali Park, is -16.8 °C and the mean maximum July temperature is 19.9 °C and permafrost is generally absent. Average precipitation at Talkeetna is over double that of the Minchumina station, at 709 millimeters, owing to the more significant marine influence. Landscape indicators characteristic of this climatic zone include a profound lack of periglacial features common to the Interior climatic zone with the exception of earth hummocks. On stable landscapes, soils of the Order Spodosols provide good examples of the well weathered and leached soils indicative of the more maritime South Central climate (see Plate 19). Several of the more commonly occurring plant species that favor the South Central climate include Corn lilly (*Veratrum viride*) and senecio (*Senecio triangularis*). Other species that are useful regional climatic indicators are listed in Appendix C.

The degree of surplus moisture in the South Central climate zone may be quantified by comparing total annual precipitation to water loss (evapotranspiration). Annual precipitation and potential evapotranspiration estimates for Talkeetna, the nearest available recording station is 709 millimeters and 475 millimeters (Patric and Black 1968) and represents a surplus of 234 millimeters. This surplus water percolates through soils encouraging weathering and translocation of soil minerals from surface horizons into underlying horizons. Because of abundant moisture and deep percolation of water, soils within these sections have well expressed horizons that often extend to depths of 75 centimeters or more (see Plate 19).

Geologic Features

Denali National Park and Preserve consists of three rock provinces that occupy or extend in east-west bands through the Park, and generally represent the oldest to youngest rocks from north to south (Harris et al. 1997). The largest province, the Yukon-Tanana Terrane, takes up most of the northern half of the Park, where the oldest, most highly altered marine and volcanic rocks underlie smaller pods or veneers of Quaternary and Tertiary sediments. These rock groups are associated with the northern half of the Alaska Mountains Section and all of the Kuskokwim Mountains Section (see Plate 30). A smaller group of slightly younger, and slightly less altered marine sediments (see Plate 31), the Pingston/McKinley Terranes can be found along the Alaska Range crest, where in places, they are pierced and covered by much younger granitic and volcanic rocks. This terrane corresponds to the southern part of the Alaska Mountains Section. Younger still is the Kahiltna Terrane that includes the majority of the rocks in the southern third of the Park, where the great Mount McKinley and other mountains consisting of plutonic rocks (see Plate 32) have intruded into shallow marine sediments. The rocks of the Kahiltna Terrane are included within the South Central Mountains Section.

These rock provinces are separated by the Denali fault system, a series of major crustal fractures that arc through Denali Park and the southern third of Alaska. This fault extends from Canada, entering Alaska in a

northwesterly trending arc then turning southwesterly out into Bristol Bay and the Bering Sea. A portion of the Hines Creek strand of the fault system parallels the Denali Park road for the first 48 kilometers of its course from the Park entrance to the Teklanika River area. It separates the oldest "Yukon-Tanana" terrane from the Mesozoic "Pingston/McKinley" terranes, and bisects portions of the Paleozoic "Farewell" terrane. The east-west trending McKinley strand of the fault system crosses the Parks Highway between Fairbanks and Anchorage just north of the town of Cantwell. The fault continues westerly to Anderson Pass, which is on the south side of the Alaska Range some 80 kilometers into the Park, where it then crosses to the north side of the range, arcs around Mount McKinley, and continues on to the southwestern regions of the Park and beyond. The McKinley strand separates the Farewell terrane from the Late Mesozoic-Early Tertiary "Kahiltna" terrane in the eastern portion of the Park, and splits the Farewell Terrane in the western parts of the Park.

Permafrost Distribution and Wildfire

Permafrost, or perennially frozen ground, is common throughout the Interior climatic zone and generally absent in the South Central climatic zone. Within the Alaska Mountains, Yukon-Kuskokwim Plain, and Kuskokwim Mountains Sections, permafrost is extensive on loamy textured soils within the boreal biome and is only occasionally observed in gravelly alpine soils. Commonly, landscapes underlain by permafrost have open dwarf spruce forest or woodland in which trees are tipped in various directions from frost heave (see Plate 33). The depth at which permafrost occurs, as well as ice content, vary widely. In many places, permafrost consists of small ice crystals, lenses, and seams disseminated throughout the soil (see Plate 21). Elsewhere, permafrost consists of massive ice features several meters thick (see Plate 34). In most areas, a perched water table and saturated conditions are common above the permafrost during the summer as a result of restricted drainage. The most extensive contiguous areas of soils with permafrost are within the Yukon-Kuskokwim Plain Section and the Toklat Basin Subsection of the Alaska Mountains Section. A map illustrating the distribution of permafrost within Denali Park is provided in Figure 8.

Wildfires, which are common in boreal and lowland subsections, can have a profound impact on the distribution and depth of permafrost. Plate 35 illustrates a recent fire and the blackening of the surface in the Kantishna Hills area. Plate 36 shows a burn scar from a past burn along the lower McKinley River. The short-term impact following most wildfires is warming of the permafrost and an increase in the thickness of the active layer, the surface layer that thaws during summer. As permafrost thaws, a large volume of water is liberated and either accumulates in depressions or runs off through surface or subsurface drainage outlets. Differential subsidence of the soil surface and slumping on steeper slopes can occur, depending on the ice content of the permafrost and the rate of thawing (see Plate 37). Gradually, in the absence of additional fires or disturbances, the moss-organic layer reestablishes and the permafrost level returns to the pre-fire condition (Foote 1976; Viereck 1973). Plant community dynamics associated with fire are described in more detail in [Appendix C](#).

Vegetation

General patterns of vegetation in the study area are the result of two major influences: the elevation gradient of the Alaska Range, and the different climatic regions north and south of the range. Much of the Denali Park is above tree line, and almost one-sixth is non-vegetated ice and rocky mountain slopes. In the vegetated zone, harsh conditions at high elevations limit plant communities to dwarf scrubs and herbaceous meadows in nivation hollows. Medium or tall scrubs are found lower down the slopes and these grade into forests or woodlands on well-drained substrates at lower elevations. Poor drainage at all elevations, because of glacial drift or permafrost, limits productivity. In lowlands, wet woodlands, scrubs, and herbaceous communities are found in a mosaic of fens, bogs, marshes and muskegs. The General Potential Vegetation map (see Figure 9) shows the distribution of the major vegetation types. A more detailed description of the vegetation is found in [Appendix C](#).

North of the range in the drier Interior climate, the vegetation patterns of the Yukon-Kuskokwim Bottomlands and Kuskokwim Mountains Sections are strongly influenced by permafrost and periodically modified by wildfire. Dwarf needleleaf permafrost woodland is dominated by black spruce (*Picea mariana*), which is often less than 5 meters tall (see Plate 38) but may be over a century old. Numerous ponds, bogs,

and fens dot this extensive area. Paper birch (*Betula neoalaskana*) forest, sometimes mixed with white spruce (*Picea glauca*) (see Plate 39) and with an under story of green alder (*Alnus viridis* ssp. *crispa*), dominates warm slopes of the low Kuskokwim Mountains. Well-drained floodplains associated with major rivers support narrow, productive forests of white spruce and poplar (*Populus balsamifera* ssp. *balsamifera*), with associated communities of alder (*Alnus* spp.) and willow (*Salix* spp.) scrub, but they are of very limited extent. Wet terraces and ridge tops are covered by tussock cottongrass (*Eriophorum brachyantherum* and *E. vaginatum*) (see Plate 10), a mixture of low ericaceous shrubs, and Bigelow sedge (*Carex bigelowii*), especially in the Toklat Basin.

Mountain vegetation of the Alaska Mountains Section is dominated by white mountain avens (*Dryas octopetala*)- dwarf ericaceous shrub scrubs (see Plate 40), which grade into medium-sized scrubs dominated by shrub birch and ericaceous shrubs such as blueberry (*Vaccinium uliginosum*), Labrador tea (*Ledum palustre* ssp. *decumbens* and *L. groenlandicum*) and crowberry (*Empetrum hermaphroditum*). On cooler, more northerly aspects these scrubs sometimes have high percentages of sedge and other herbaceous vegetation. Warmer low slopes, especially in the Kantishna Hills and Park headquarters areas, support white spruce/mixed scrub woodlands.

South of the Alaska Range, the South Central climate is wetter, milder, and less influenced by fire. The plant communities there are quite different. Mountain vegetation of the South Central Mountains Section is similar to the north side, but is much more ericaceous, with Steller cassiope (*Cassiope stelleriana*) (see Plate 41) and crowberry, as well as partridge foot (*Luetkea pectinata*), being the most important species. Barclay willow (*Salix barclayi*) (see Plate 42) forms a mosaic with medium-sized herbaceous meadows between the dwarf alpine communities and the tall Sitka alder/ (*Alnus sinuata*) tall herbaceous meadow mosaics of the lower slopes. Forested communities of paper birch, some mixed with white spruce, are limited to lower slopes. The well-drained river terraces of the Cook Inlet Lowlands are of very limited extent, and are found mostly in the east and west forks of the Yentna River. They support riparian forests of poplar and sometimes black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) (see Plate 43), with associated scrub communities of alder and willow. Poorly drained lowlands, underlain by glacial drift, support a mosaic of alder scrubs and wet herbaceous meadows.

Wildlife

There are 37 mammal species recorded in Denali Park. Dall sheep inhabit the high mountains throughout the Alaska Mountains and South Central Mountains Sections. Caribou migrate great distances, mainly within the Alaska Mountains Section from their calving grounds south of the Alaska Range and northwest of Mount McKinley to their winter range in the northern reaches of the Park. Wolves range throughout the Park and often follow the migrating caribou herds. Moose can be found in all reaches of the Park, though they are rarely seen in large numbers. Both black and grizzly bears are numerous and omnivorous, eating plant roots, leaves, berries, ground squirrels, moose or caribou calves, and occasionally carrion. Smaller mammals common to this northern environment include fox, weasel, wolverine, lynx, marten, snowshoe hare, hoary marmot, red squirrel, ground squirrel, pika, porcupine, beaver, and several species of shrews, voles, and lemmings.

Bird life is varied, with 156 species of birds recorded. Most birds migrate long distances between their nesting grounds in Denali Park and their wintering areas. Wheatears winter in Africa; arctic terns in the waters around Antarctica and southern South America; jaegers take to life at sea in the southern oceans. Among the widespread, year-round residents of the Park are the raven, willow ptarmigan, magpie, and gray jay. Birds occupying more specific habitats in the Park include rock and white-tailed ptarmigan, Lapland longspur and Golden eagle, which are found primarily in the alpine areas of the Alaska Mountains Section. Spruce grouse and varied thrush inhabit the forested areas.

General Resource Descriptions

Ecosystem Classification Method Used to Map Soil Resources

The National Ecological Unit Hierarchy or ECOMAP method was used in this project. This hierarchy provides a system for classifying and mapping areas of the earth based on associations of ecological factors at different geographic scales (Cleland et al. 1997). The eight levels of the hierarchy, beginning with the highest and most general level, are: Domain, Division, Province, Section, Subsection, Landtype Association, Landtype, and Landtype Phase. Higher levels in the system have been mapped and described as part of Alaska statewide (Nowacki and Brock 1995) and national efforts (McNab and Avers 1994; Bailey et al. 1994). A description of this hierarchy as applied to Denali Park is included in Appendix A and a list of the hierarchy of units for the Section, Subsection, and Landtype Association levels are provided in Table 4. This section provides specific definitions and resource information for the Section and Subsection levels of the hierarchy. The Landtype Association, Landtype, and detailed soil descriptions is included in the Detailed Resource Descriptions section.

ECOMAP-Sections

This part includes a map of the five ECOMAP Sections of the ecological unit hierarchy (ECOMAP 1993) recognized within Denali Park (Figure 2) and a brief description of each Section modified from McNab and Avers (1994). Sections are subdivisions of Provinces and each Section is restricted to a single Province. Provinces and higher levels in the system were not described as part of this document but are described by McNab and Avers (1994). See Appendix A for a complete description of the ecological unit hierarchy.

Section 131B—Yukon-Kuskokwim Bottomlands

Setting. This Section represents a collection of flat bottomlands along the larger rivers of Interior Alaska. Although nearly level, broad valleys and basins are typical, some low rolling hills do occur. Riparian features, such as meandering streams and side sloughs, are prevalent. Oxbow and thaw lakes are abundant. Elevation generally ranges from 120 to 650 meters. Alluvial fan and basin fill of late Tertiary and Quaternary age are most common. The dominant soils in uplands have shallow permafrost and aquic moisture regimes and are classified within the Orthel and Turbel Suborders of Gelisols. Common soils on flood plains include the Orthent Suborder of Entisols. Most soils were formed in loess in uplands and alluvial materials on flood plains and terraces. Dominant vegetation communities span a moisture gradient from mesic to hydric and include spruce (*Picea spp.*)- poplar (*Populus spp.*) forests, open black spruce (*Picea mariana*) forests, flood plain thickets of willow (*Salix spp.*) and alder (*Alnus spp.*) scrub, and sedge wet meadow.

Climate. Average annual precipitation ranges from 250 to 650 millimeters. Average annual temperature ranges from -6 to -1 °C. The growing season is approximately from May 15 to September 10. The average freeze-free period is 70 to 120 days.

Disturbance Regimes. Wildfire is a very common event, averaging about 2,260 hectares in size. A high frequency of lightning storms, coupled with warm, dry summers, promote fire occurrence. River flooding is frequent, particularly in the spring.

Land Use. Primarily interior settlements and agriculture occur in this Section. Subsistence and recreational hunting and fishing are popular.

Cultural Ecology. Residents are mainly Koyukon, Tanana, and Kuskokwim Athabaskans.

Section M131B—Kuskokwim Mountains

Setting. The Kuskokwim Mountains are northeast-trending ridges with rounded to flat summits and broad, gentle slopes. Deep narrow valleys are prevalent. Elevation ranges from 170 to 1,350 meters. This Section consists of deep ocean floor and continental fragments of the Tozitna, Ruby, Innoko, and Nixon Fork terranes. These are tightly folded Paleozoic and earlier rocks, some of which have been metamorphosed. The dominant soils are classified within the Orthel and Turbel Suborders of the Gelisols and the Cryept Suborder of the Inceptisol. Most soils are formed in loess and colluvium. Open black spruce (*Picea mariana*) forests are abundant. Alpine vegetation of sedges and shrubs cover most hills and ridges. White spruce (*Picea glauca*)-paper birch (*Betula neoalaskensis*) communities are also common.

Climate. Average annual precipitation ranges from 300 to 560 millimeters. Average annual temperature ranges from -6 to -2 °C. The growing season lasts approximately from May 15 to September 10. The average freeze-free period is 90 to 110 days.

Disturbance Regimes. Wildfires are frequent events.

Land Use. Subsistence and recreational hunting and fishing are the main uses. Mining was formerly important.

Cultural Ecology. Koyukon, Holikachuk, and Ingalik Athabaskans reside in this Section.

Section 135A—Cook Inlet Lowlands

Setting. A level to rolling surface derived mainly through glacial events with major landforms including glacial plains, hills, and outwash plains as well as flood plains. Elevation ranges from sea level to 1,000 meters. The dominant soils include Cryand, Aquand Suborders of Andisols, the Cryod Suborder of Spodosols, and the Saprist and Hemist Suborders of Histosols. Soils are formed primarily in volcanic ash, glacial drift, and organic materials. Lowland black spruce (*Picea Mariana*) forests are abundant. Bottomland spruce (*Picea spp.*)-poplar (*Populus spp.*) forests are adjacent to larger river drainages, along with thickets of alder (*Alnus spp.*) and willow (*Salix spp.*) scrub.

Climate. Average annual precipitation ranges from 300 to 2,200 millimeters. Average annual temperature ranges from -2 to 3 °C. The growing season extends from approximately May 10 to September 30. Average freeze-free period is 110 to 150 days. This Section is generally free of permafrost.

Disturbance Regimes. Wildfire occurrence is low.

Land Use. This Section is heavily populated and substantially affected by agriculture, urban development, petroleum extraction, and human recreation.

Cultural Ecology. Historically occupied by Tanaina Athabaskans, a variety of cultures now reside in this heavily developed Section.

Section M135A—Alaska Mountains

Setting. This Section consists of steep, rugged mountain ridges separated by broad valleys. Elevation ranges from 200 meters in valleys to greater than 6,000 meters on mountain peaks. The tallest peak in North America, Mount McKinley at about 6,200 meters, lies within this Section. The Section comprises fragments of deep ocean floor rock, as well as continental fragments of Peninsular, Kahiltna, and Wrangellia terranes. These are early Mesozoic to Cenozoic assemblages with very complex morphology. The dominant soils are classified within the Gelept Suborder of Inceptisols on mountains with the less common Orthent Suborder of Entisols on flood plains. Soils are formed primarily in colluvium with smaller areas of alluvium on flood plains. About two-thirds of the area has no soil. A substantial portion of the area is barren of vegetation. Where vegetation exists there are alpine communities of dwarf scrub types. Spruce (*Picea spp.*) woodlands are common at lower elevations and riparian spruce-hardwood forests occur infrequently at low elevations in valley bottoms.

Climate. Average annual precipitation ranges from 250 to 2,950 millimeters. Average annual temperature ranges from -22 to -1 °C. Freezing conditions may occur year around.

Disturbance Regimes. Occurrence of wildfire is high in forested valleys and lower mountain slopes and low in alpine areas. Snow avalanches are frequent in the winter.

Land Use. Human use of the area is minimal, mainly consisting of hunting and fishing.
Cultural Ecology. Tanaina and Ahtna Athabaskans historically roamed this Section.

Section M135S—South Central Mountains

Setting. This Section consists of steep, rugged mountain ridges separated by broad valleys. Elevation ranges from 200 meters in valleys to greater than 6,000 meters on mountain peaks. The Section comprises fragments of deep ocean floor rock, as well as continental fragments of Peninsular, Kahiltna, and Wrangellia terranes. These are early Mesozoic to Cenozoic assemblages with very complex morphology. The dominant soils are classified within the Cryept Suborder of Inceptisols and Cryand Suborder of Andisols. Soils are formed primarily in colluvium and volcanic ash. About two-thirds of the area has no soil. A substantial portion of the area is barren of vegetation. Moderately extensive areas of subalpine alder scrub communities are found at lower elevations with higher areas consisting of alpine communities of dwarf scrub types. Spruce (*Picea spp.*) woodlands are common at lower elevations and riparian spruce-hardwood forests occur infrequently at low elevations in valley bottoms.

Climate. Average annual precipitation ranges from 500 to 3,450 millimeters. Average annual temperature ranges from -23 to -1 °C. Freezing conditions may occur year around. Permafrost is generally absent in this section.

Disturbance Regimes. Occurrence of wildfire is low. Snow avalanches are frequent in the winter.

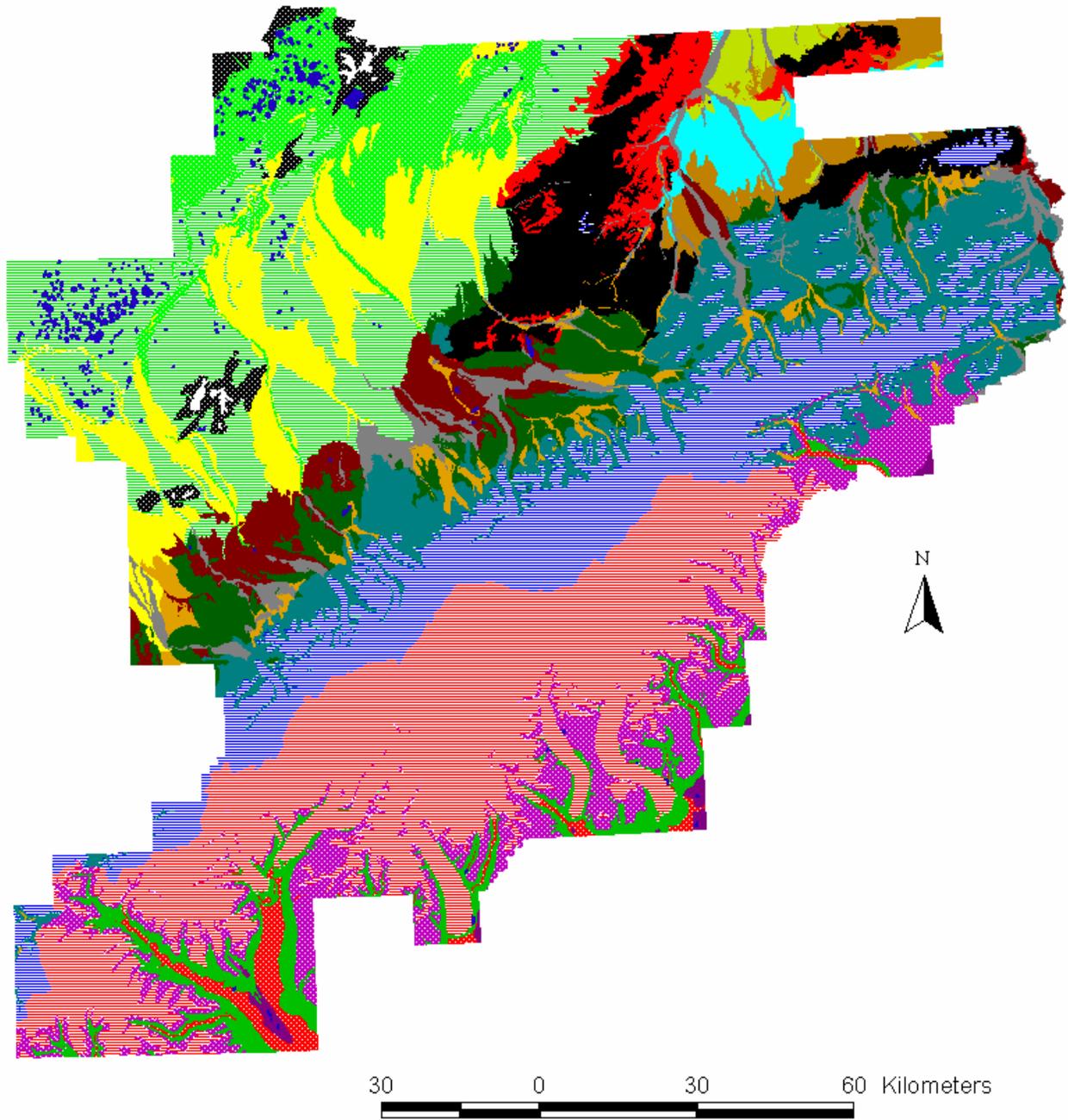
Land Use. Human use of the area is minimal, mainly consisting of hunting and fishing.

Cultural Ecology. Tanaina and Ahtna Athabaskans historically roamed this Section.

ECOMAP-Subsections (physiographic-biome map)

This part includes a brief description of the 22 Subsections of the ecological unit hierarchy ([ECOMAP 1993](#)) occurring in Denali Park. Subsections are subdivisions of Sections. Each Subsection is restricted to a single Section. Subsections are smaller areas within Sections with similar surficial geology, lithology, geomorphic process, soil groups, subregional climate, and potential natural plant communities. Subsection boundaries usually correspond with discrete changes in geomorphology. Names of Subsections are usually derived from geologic features such as Toklat Basin or Kantishna Hills as well as the dominant biome. See [Appendix A](#) for a complete description of the ecological unit hierarchy. See [Soil Formation](#) for a definition of each geomorphic and pedogenic process mentioned in the descriptions. The Subsection map (Figure 10) was compiled at 1:250,000 scale.

Figure 10. ECOMAP Subsections Map



ECOMAP Subsections

	131B.L1--Yukon-Kuskokwim Bottomlands.Eolian Lowlands
	131B.V1--Yukon-Kuskokwim Bottomlands.Lowland Flood Plains & Terraces
	131B.V2--Yukon-Kuskokwim Bottomlands.Minchumina Basin Lowlands
	135A.G1--Cook Inlet Lowlands.Glaciaded Lowlands
	135A.V1--Cook Inlet Lowlands.Lowland Flood Plains & Terraces & Fans
	M131B.M1--Kuskokwim Mountains.Boreal Low Mountains
	M131B.M1A--Kuskokwim Mountains.Alpine Low Mountains
	M135A.B1--Alaska Mountains.Nonvegetated Alpine Mountains
	M135A.G1--Alaska Mountains.Glaciaded Uplands
	M135A.G1L--Alaska Mountains.Glaciaded Lowlands
	M135A.M1--Alaska Mountains.Alpine Outer Range & Kantishna Hills
	M135A.M1L--Alaska Mountains.Boreal Outer Range & Kantishna Hills
	M135A.M2--Alaska Mountains.Alpine Mountains
	M135A.M2L--Alaska Mountains.Boreal Mountains
	M135A.M6--Alaska Mountains.Teklanika Alpine Mountains & Plateaus
	M135A.M6L--Alaska Mountains.Teklanika Boreal Mountains & Plateaus
	M135A.M7--Alaska Mountains.Toklat Basin Lowlands
	M135A.V1--Alaska Mountains.Alpine Flood Plains & Terraces & Fans
	M135A.V1L--Alaska Mountains.Lowland Flood Plains & Terraces & Fans
	M135S.B2--South Central Mountains.Nonvegetated Alpine Mountains
	M135S.M5--South Central Mountains.Alpine Mountains
	M135S.M5L--South Central Mountains.Boreal & Subalpine Mountains
	Water

M135A.B1—Alaska Mountains.Nonvegetated Alpine Mountains Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 742 to 2,939 mm

Mean Annual Air Temperature: -21.6 to -5.6 °C

Site Description:

Location in Denali: Alaska Range north of the hydrographic divide

Biome: Interior alpine

Elevation: 785 to 6,125 m

Landforms: mountains

General Potential Vegetation: nonvegetated

Parent Materials: colluvium of variable lithology

Geomorphic Processes: colluviation and frost shatter

Permafrost Status: none

Major Soil Taxa: none

Detailed Soil Map Units: NV1



M135A.G1—Alaska Mountains.Glaciated Uplands Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 528 to 758 mm

Mean Annual Air Temperature: -3.5 to -2.4 °C

Site Description:

Location in Denali: Alaska Range northern footslopes

Biome: Interior alpine

Elevation: 304 to 1,536 m

Landforms: till plains, outwash plains, and hills

General Potential Vegetation: Interior-shrub birch-ericaceous scrub, Interior-shrub birch/sedge scrub and ericaceous dwarf scrub, and Interior-tussock and shrub birch/sedge scrub

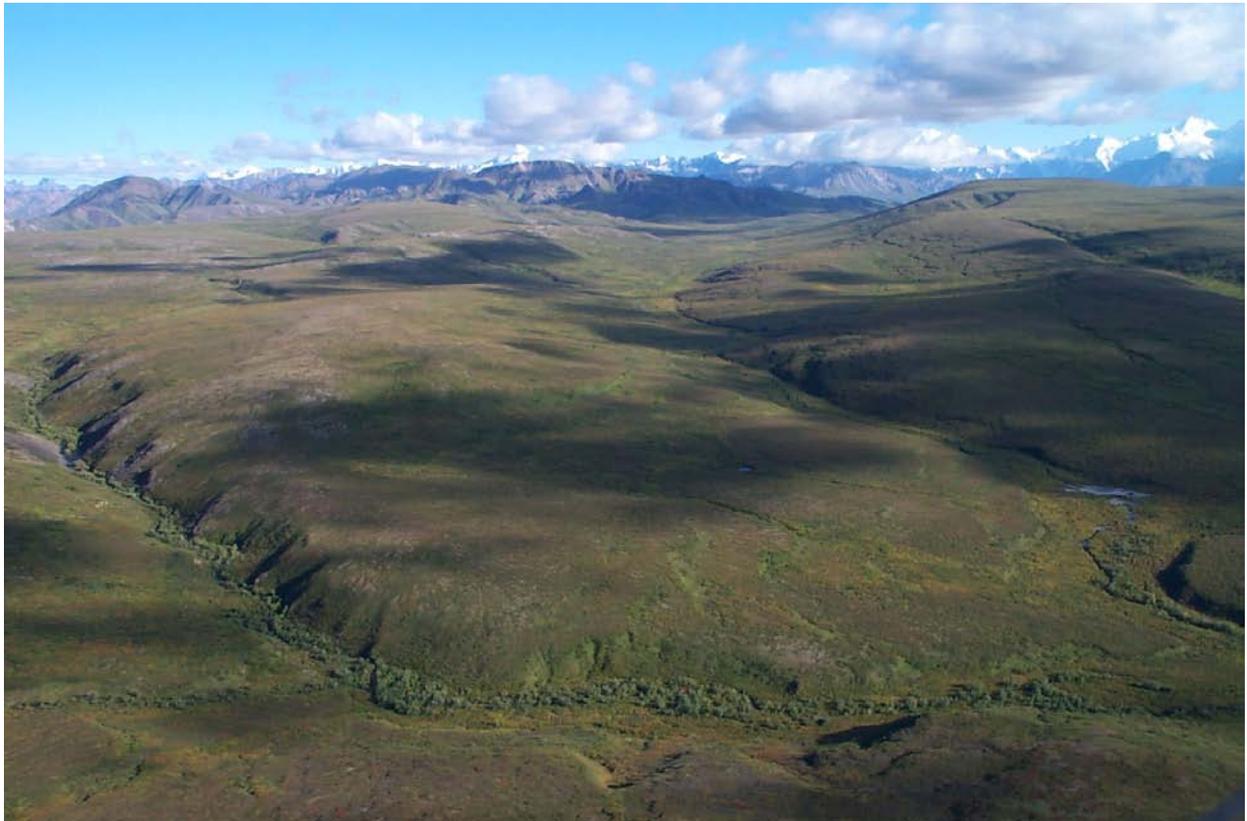
Parent Materials: thin mantle of loess over drift

Geomorphic Processes: podzolization, hydromorphism, and cryoturbation

Permafrost Status: discontinuous

Major Soil Taxa: Typic Haplogelods, Typic Eutrogelepts, Typic Historthels, and Typic Histoturbels

Detailed Soil Map Units: 7FGA, 7NG, 7NG2, 7P1, 7TP, 7TP2, and 7TP8



M135A.G1L—Alaska Mountains.Glaciated Lowlands Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 506 to 732 mm

Mean Annual Air Temperature: -3.2 to -2.5 °C

Site Description:

Location in Denali: east central, central, and west central

Biome: Interior boreal

Elevation: 445 to 982 m

Landforms: till plains, outwash plains, and hills

General Potential Vegetation: Interior-white spruce/mixed scrub woodland and Interior-dwarf needleleaf permafrost woodland

Parent Materials: thin mantle of loess over drift

Geomorphic Processes: podzolization and hydromorphism

Permafrost Status: discontinuous

Major Soil Taxa: Typic Historthels and Typic Haplogelods

Detailed Soil Map Units: 7ES, 7P2, 7P4, 7P6, 7TP3, 7TP4, and 7TP5



M135A.M1—Alaska Mountains.Alpine Outer Range and Kantishna Hills Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 446 to 870 mm

Mean Annual Air Temperature: -5.1 to -2.4 °C

Site Description:

Location in Denali: northeast and north central

Biome: Interior alpine

Elevation: 261 to 1,546 m

Landforms: mountains

General Potential Vegetation: Interior-shrub birch-ericaceous scrub and Interior-shrub birch/sedge scrub and ericaceous dwarf scrub

Parent Materials: colluvium derived from schist, mica rich loess over colluvium derived from schist

Geomorphic Processes: braunification, colluviation, hydromorphism, and cryoturbation

Permafrost Status: discontinuous

Major Soil Taxa: Typic Dystrogelepts, Typic Historthels, Ruptic-Histic Aquiturbels, and Typic Histoturbels

Detailed Soil Map Units: 5P1, 5SA1, 5SA11, 5SA2, 5TS1, 8LM, 8LM1, 8LMV, 8MBS, 8MFS, and 8MS



M135A.M1L—Alaska Mountains.Boreal Outer Range and Kantishna Hills Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 358 to 776 mm

Mean Annual Air Temperature: -4.0 to -2.4 °C

Site Description:

Location in Denali: northeast and north central

Biome: Interior boreal

Elevation: 211 to 1,152 m

Landforms: mountains

General Potential Vegetation: Interior-dwarf needleleaf permafrost woodland and Interior-white spruce/mixed scrub woodland

Parent Materials: colluvium derived from schist and mica-rich loess over colluvium derived from schist

Geomorphic Processes: hydromorphism, braunification, and cryoturbation

Permafrost Status: discontinuous

Major Soil Taxa: Humic Cryaquepts, Typic Dystrocryepts, and Typic Historthels

Detailed Soil Map Units: 5MS21, 5TS1, 8LMF, 8LMVF, 8MFS1, and 8MVF



M135A.M2—Alaska Mountains.Alpine Mountains Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 552 to 2,466 mm

Mean Annual Air Temperature: -10.7 to -2.5 °C

Site Description:

Location in Denali: Alaska Range north of the hydrographic divide

Biome: alpine

Elevation: 517 to 2,053 m

Landforms: mountains

General Potential Vegetation: Interior-shrub birch-ericaceous scrub and Interior-mountain avens-ericaceous dwarf alpine scrub

Parent Materials: colluvium and drift of variable lithology

Geomorphic Processes: braunification, colluviation, and hydromorphism

Permafrost Status: sporadic

Major Soil Taxa: Typic Eutrogelepts, Typic Haplogelolls, (Oxyaquic) Humic Eutrogelepts, and (Oxyaquic) Typic Haplogelolls

Detailed Soil Map Units: 7CE, 7CEF, 7MFA, 7MS1D, 7MS1L, 7MS3, 7MS31, 7MSA, 7MSC, 7MSHD, 7MSHL, 7MSHS, 7SA1, 7SA3, 7SA31, 7TM, 7TM1, 7TM2, 7TM21, 7TM24, 7TMS, 7V1, 7V11, 7V1A, 7V1B, and 7V5



M135A.M2L—Alaska Mountains.Boreal Mountains Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 511 to 783 mm

Mean Annual Air Temperature: -5.7 to -3.4 °C

Site Description:

Location in Denali: Alaska Range north of the hydrographic divide

Biome: Interior boreal

Elevation: 211 to 1,152 m

Landforms: mountain footslopes

General Potential Vegetation: Interior-white spruce/mixed scrub woodland and Interior-dwarf needleleaf permafrost woodland

Parent Materials: loess over colluvium and drift of variable lithology

Geomorphic Processes: braunification and hydromorphism

Permafrost Status: sporadic

Major Soil Taxa: Oxyaquic Eutrocryepts, Typic Eutrocryepts, and Typic Historthels

Detailed Soil Map Units: 7MS2, 7MS4, and 7V2



M135A.M6—Alaska Mountains.Teklanika Alpine Mountains and Plateaus Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 426 to 856 mm

Mean Annual Air Temperature: -4.8 to -2 °C

Site Description:

Location in Denali: northeastern

Biome: Interior alpine

Elevation: 415 to 1,222 m

Landforms: low mountains and plateaus

General Potential Vegetation: Interior-shrub birch-ericaceous scrub and Interior-tussock and shrub birch/sedge scrub

Parent Materials: Tertiary age Nenana Gravels and Suntrana Sandstone mantled with a thin layer of loess

Geomorphic Processes: hydromorphism, cryoturbation, braunification, and colluviation

Permafrost Status: discontinuous

Major Soil Taxa: Typic Historthels, Typic Histoturbels, and Typic Eutrogelepts

Detailed Soil Map Units: 10ES, 10ES1, 10LM, 10P1, 10P4, and 10SU



M135A.M6L—Alaska Mountains.Teklanika Boreal Mountains and Plateaus Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 405 to 580 mm

Mean Annual Air Temperature: -3.2 to -2.2 °C

Site Description:

Location in Denali: northeastern

Biome: Interior boreal

Elevation: 333 to 1,009 m

Landforms: low mountains and plateaus

General Potential Vegetation: Interior-white spruce/mixed scrub woodland and Interior-dwarf needleleaf permafrost woodland

Parent Materials: Tertiary age Nenana Gravels and Suntrana Sandstone mantled with a thin layer of loess

Geomorphic Processes: hydromorphism, cryoturbation, and braunification

Permafrost Status: continuous

Major Soil Taxa: Typic Historthels, Typic Histoturbels, and Typic Eutrogelepts

Detailed Soil Map Units: 10ES1, 10P3, 10TS, and 10TS1



M135A.M7—Alaska Mountains.Toklat Basin Lowlands Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 452 to 577 mm

Mean Annual Air Temperature: -2.8 to -2.2 °C

Site Description:

Location in Denali: northeastern

Biome: Interior boreal

Elevation: 441 to 825 m

Landforms: alluvial plains and flood plains

General Potential Vegetation: Interior-tussock & shrub birch/sedge scrub and Interior-white spruce/mixed scrub woodland

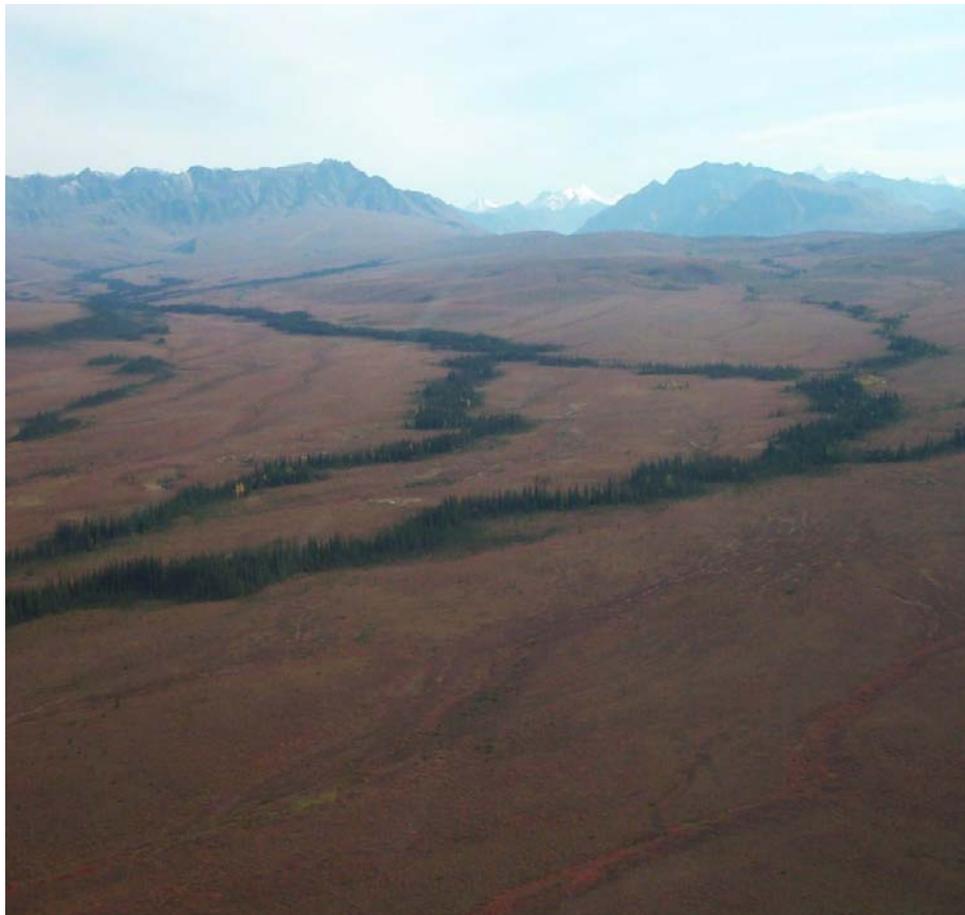
Parent Materials: loamy alluvium and loess

Geomorphic Processes: hydromorphism, cryoturbation, and fluvial

Permafrost Status: continuous with extensive areas of ice wedges

Major Soil Taxa: Typic Histoturbels, Typic Historthels, Glacic Folistels, and Typic Cryofluvents

Detailed Soil Map Units: 11P, 11P1, and 11ST



M135A.V1—Alaska Mountains.Alpine Flood Plains, Terraces and Fans Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 497 to 1,229 mm

Mean Annual Air Temperature: -8.3 to -2.5 °C

Site Description:

Location in Denali: east-central, central, and west-central

Biome: Interior alpine

Elevation: 433 to 1,298 m

Landforms: flood plains, terraces, and alluvial fans

General Potential Vegetation: Interior-riparian mixed scrub

Parent Materials: gravelly alluvium or loamy alluvium over gravelly alluvium derived from a mixture of rock types; stream terraces are mantled with a thin loess layer over gravelly alluvium

Geomorphic Processes: fluvial processes on flood plains and braunification and podzolization on terraces

Permafrost Status: sporadic

Major Soil Taxa: Typic Gelorthents, Oxyaquic Gelorthents, and Typic Haplogelods

Detailed Soil Map Units: 5V1, 7AF, 7AF2, 7FP2, 7FP21, GA, 7ST, 7STF, 8FP1, and 8ST1



M135A.V1L—Alaska Mountains.Lowland Flood Plains, Terraces and Fans Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 344 to 923 mm

Mean Annual Air Temperature: -6.0 to -2.1 °C

Site Description:

Location in Denali: east-central, central, and west-central

Biome: Interior boreal

Elevation: 280 to 1,145 m

Landforms: flood plains, terraces, and alluvial fans

General Potential Vegetation: Interior-riparian white spruce, mixed hardwoods and mixed scrub

Parent Materials: gravelly alluvium or loamy alluvium over gravelly alluvium derived from a mixture of rock types; stream terraces are mantled with a thin loess layer over gravelly alluvium

Geomorphic Processes: fluvial processes on flood plains and podzolization on terraces

Permafrost Status: sporadic

Major Soil Taxa: Typic Cryofluvents, Oxyaquic Cryorthents, and Typic Haplocryods

Detailed Soil Map Units: 5V2, 7AFF, 7FP1, 7FP11, 8FP2, 10V2, and G



135A.G1—Cook Inlet Lowlands.Glaciated Lowlands Subsection**Climatic Data:**

Climatic Domain: humid temperate

Sub-regional Climate: transitional maritime-continental

Mean Annual Precipitation: 536 to 2,174 mm

Mean Annual Air Temperature: -1 to 1 °C

Site Description:

Location in Denali: southern and southeastern

Biome: south central boreal

Elevation: 76 to 972 m

Landforms: till plains, hills, and bogs

General Potential Vegetation: South Central-mixed paper birch-white spruce forest and South Central-sedge/sphagnum bog

Parent Materials: volcanic ash and loess over glacial drift and organic material

Geomorphic Processes: andisolization, podzolization, and hydromorphism

Permafrost Status: none

Major Soil Taxa: Andic Humicryods, Andic Haplocryods, Fluvaquentic Cryohemists, and Thaptic Cryaquands

Detailed Soil Map Units: 12B and 12HS2



135A.V1—Cook Inlet Lowlands.Lowland Flood Plains, Terraces, and Fans Subsection

Climatic Data:

Climatic Domain: humid temperate

Sub-regional Climate: transitional maritime-continental

Mean Annual Precipitation: 678 to 989 mm

Mean Annual Air Temperature: -1.5 to 1 °C

Site Description:

Location in Denali: southern and southeastern

Biome: south central boreal

Elevation: 61 to 992 m

Landforms: flood plains and stream terraces

General Potential Vegetation: South Central-riparian poplar forest, mixed willow-alder scrub

Parent Materials: loamy and gravelly alluvium

Geomorphic Processes: fluvial and hydromorphism

Permafrost Status: none

Major Soil Taxa: Typic Cryofluvents, Typic Cryaquents, Terric Cryofibrists, Typic Cryorthents, and Oxyaquic Cryorthents

Detailed Soil Map Units: 13F21, 13F22, 13FP, 13FP2, 13FPW, 13FWW, and G2



M131B.M1—Kuskokwim Mountains.Boreal Low Mountains Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 345 to 549 mm

Mean Annual Air Temperature: -2.9 to -1.2 °C

Site Description:

Location in Denali: northwestern and west central

Biome: Interior boreal

Elevation: 178 to 611 m

Landforms: low mountains

General Potential Vegetation: Interior-dwarf needleleaf permafrost woodland, Interior-mixed paper birch-white spruce forest, and Interior-tussock and shrub birch/sedge scrub

Parent Materials: mica-rich loess over schist colluvium

Geomorphic Processes: hydromorphism, colluviation, and braunification

Permafrost Status: discontinuous

Major Soil Taxa: Typic Historthels, Typic Histoturbels, and Typic Dystrocrypts

Detailed Soil Map Units: 4BS, 4BSS, 4FS, and 4TS



M131B.M1A—Kuskokwim Mountains.Alpine Low Mountains Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 356 to 549 mm

Mean Annual Air Temperature: -2.8 to -2.0 °C

Site Description:

Location in Denali: northwestern and west central

Biome: Interior alpine

Elevation: 197 to 632 m

Landforms: low mountains

General Potential Vegetation: Interior-tussock & shrub birch/sedge scrub

Parent Materials: mica-rich loess and schist cryoturbate

Geomorphic Processes: hydromorphism and cryoturbation

Permafrost Status: continuous

Major Soil Taxa: Typic Histoturbels and Ruptic-Histic Aquiturbels

Detailed Soil Map Units: 4S1



M135S.B2—South Central Mountains.Nonvegetated Alpine Mountains Subsection**Climatic Data:**

Climatic Domain: humid temperate

Sub-regional Climate: transitional maritime-continental

Mean Annual Precipitation: 768 to 3,450 mm

Mean Annual Air Temperature: -23 to -3.5 °C

Site Description:

Location in Denali: Alaska Range south of the hydrographic divide

Biome: south central alpine

Elevation: 210 to 6,188 m

Landforms: mountains and glaciers

Vegetation: non-vegetated

Parent Materials: colluvium of mixed lithology

Geomorphic Processes: colluviation and frost shatter

Permafrost Status: none

Major Soil Taxa: none

Detailed Soil Map Units: NV2



M135S.M5—South Central Mountains.Alpine Mountains Subsection

Climatic Data:

Climatic Domain: humid temperate

Sub-regional Climate: transitional maritime-continental

Mean Annual Precipitation: 509 to 3,285 mm

Mean Annual Air Temperature: -11.4 to -1.7 °C

Site Description:

Location in Denali: Alaska Range south of the hydrographic divide

Biome: south central alpine

Elevation: 273 to 2,018 m

Landforms: mountains, till plains, and fans

General Potential Vegetation: South Central-ericaceous dwarf alpine scrub and South Central-Barclay willow scrub/medium herbaceous meadow mosaic

Parent Materials: volcanic ash over colluvium, mixed volcanic ash and colluvium, and colluvium

Geomorphic Processes: andisolization, colluviation, and podzolization

Permafrost Status: none

Major Soil Taxa: Andic Dystrocrypts, Humic Vitricryands, and Typic Humicryods

Detailed Soil Map Units: 9MSA, 9MSH, 9MSH1, 9SA4, 9SA44, 9TM, 9TM3, 9TM4, 9TP, and 9V12



M135S.M5L—South Central Mountains.Boreal and Subalpine Mountains Subsection**Climatic Data:**

Climatic Domain: humid temperate

Sub-regional Climate: transitional maritime-continental

Mean Annual Precipitation: 408 to 3,051 mm

Mean Annual Air Temperature: -6.9 to 0.7 °C

Site Description:

Location in Denali: Alaska Range-south of the hydrographic divide

Biome: south central boreal and subalpine

Elevation: 63 to 1,408 m

Landforms: mountains and alluvial fans

General Potential Vegetation: South Central-Sitka alder scrub/tall herbaceous meadow mosaic; South Central-mixed paper birch-white spruce forest

Parent Materials: mixed volcanic ash and loess over till, colluvium, and alluvium

Geomorphic Processes: andisolization and podzolization

Permafrost Status: none

Major Soil Taxa: Andic Humicryods and Cryohemists

Detailed Soil Map Units: 9AF, 9AF2, 9CE, 9SA5, 9SA6, 9SA61, 9SA62, 9SA66, and 9TMF



131B.L1—Yukon-Kuskokwim Bottomlands.Eolian Lowlands Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 359 to 651 mm

Mean Annual Air Temperature: -2.4 to -2.9 °C

Site Description:

Location in Denali: northwestern

Biome: Interior boreal

Elevation: 153 to 649 m

Landforms: eolian plains and hills, bogs, and narrow flood plains

General Potential Vegetation: Interior-dwarf needleleaf permafrost woodland, Interior-riparian white spruce, mixed hardwoods and mixed scrub, and Interior-sedge/sphagnum bog

Parent Materials: eolian and organic materials

Geomorphic Processes: hydromorphism and cryoturbation

Permafrost Status: continuous

Major Soil Taxa: Typic Historthels, Typic Histoturbels, and Hydric Cryofibrists

Detailed Soil Map Units: 3BG, 3C, 3DH, 3FG, 3FG3, 3FP1, 3FP3, 3FU, 3FU2, 3FU3, 3FU4, and 3Y



131B.V1—Yukon-Kuskokwim Bottomlands. Lowland Flood Plains and Terraces Subsection**Climatic Data:**

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 380 to 602 mm

Mean Annual Air Temperature: -2.4 to -2.9 °C

Site Description:

Location in Denali: northwestern

Biome: Interior boreal

Elevation: 202 to 641 m

Landforms: flood plains, terraces, and alluvial plains

General Potential Vegetation: Interior-riparian white spruce, mixed hardwoods and mixed scrub and Interior-dwarf needleleaf permafrost woodland

Parent Materials: silty alluvium, stratified loamy alluvium, and gravelly alluvium

Geomorphic Processes: fluvial, hydromorphism, and cryoturbation

Permafrost Status: discontinuous

Major Soil Taxa: Typic Cryofluvents, Oxyaquic Cryorthents, Typic Historthels, Typic Histoturbels, and Typic Haplocryods

Detailed Soil Map Units: 2FG, 2FP2, 2FP3, 2FW2, 2P, 2ST, and 2ST2



131B.V2—Yukon-Kuskokwim Bottomlands.Minchumina Basin Lowlands Subsection

Climatic Data:

Climatic Domain: polar

Sub-regional Climate: subarctic continental

Mean Annual Precipitation: 336 to 565 mm

Mean Annual Air Temperature: -2.5 to -3.0 °C

Site Description:

Location in Denali: northwestern

Biome: Interior boreal

Elevation: 149 to 314 m

Landforms: alluvial plains, flood plains, bogs, fens, and lakes

General Potential Vegetation: Interior-riparian white spruce, mixed hardwoods, mixed scrub; Interior-dwarf needleleaf permafrost woodland; Interior-mixed paper birch-white spruce forest

Parent Materials: silty and sandy alluvium and organic material

Geomorphic Processes: fluvial, hydromorphism, and cryoturbation

Permafrost Status: continuous

Major Soil Taxa: Aquic Cryofluvents, Fluvaquentic Historthels, Typic Historthels, Typic Histoturbels, Fluventic Haplorthels, and Terric Cryofibrists

Detailed Soil Map Units: 1FP, 1FP2, 1FP4, 1FW1, 1ST, 1ST1, 1STW, 1STW2, and G1



Detailed Resource Descriptions

ECOMAP Landtype Associations (detailed soil map units)

This part includes a brief description of the 152 Landtype Associations of the ecological unit hierarchy ([ECOMAP 1993](#)) described in Denali Park. Landtype Associations are groupings of Landtypes or subdivisions of Subsections based on similarities in geomorphic process, geologic rock types, soil complexes, or plant association vegetation communities. Each Landtype Association is restricted to a single Subsection. Individual Landtype Associations represent repeatable patterns of landforms, soil complexes, and plant communities that can be consistently delineated on maps. Primary criteria used to delineate and name Landtype Associations include major biome and landform(s). Additional criteria used include geologic origin or lithology of soil parent material, relative wetness, and other landscape features like permafrost distribution. See [Appendix A](#) for a complete description of the ecological unit hierarchy. Landtype Associations are used synonymously with detailed soil map units throughout this document.

Delineations on the detailed soil map represent the soil map units of Denali Park. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses, and to plan the management needed for those uses. More information about each map unit is provided in the section [Soil Properties](#).

Each delineation on the detailed soil map has a *map unit symbol* to indicate the map unit and to link it to the corresponding map unit description. Each delineation on the map represents an area on the landscape and consists of one or more soils or miscellaneous areas. The soil or miscellaneous areas contained within a soil map unit are known as components. The range in the proportion of each component is listed as a percentage for each map unit with a representative value or "RV" for each major component also provided. The map unit itself is assigned two names. The primary name represents the landscape-biome name. The name also includes other significant information that may be used to distinguish the unit. Other characteristics include permafrost distribution, wetness, or lithology of parent material. The map unit is also identified and named according to the taxonomic classification of the dominant soils or miscellaneous area components. The individual map unit components also are assigned two names. The primary component name is based on biome, plant community, general surface texture, and other significant information that may be used to distinguish the component. Other characteristics include whether the soil has permafrost, dominant lithology of parent material, and wetness. The component also is assigned a soil name based on its taxonomic classification. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called similar inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so

complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, on-site investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the primary map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal site, soil, and plant community properties for each soil component occurring within the map unit.

Soil profiles that are almost alike make up a phase of a *soil textural family*. Soils of one textural family can differ in texture of the surface layer or of the underlying layers. They also can differ in mineralogy, reaction class, slope, stoniness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil textural family is divided into soil phases. Most of the components of the soil map units are phases of soil textural families. The name of a soil phase commonly indicates a feature that affects use or management. For example, the soil taxonomic name associated with soil component *Alpine-dwarf scrub gravelly schist colluvial slopes* is *Typic Dystrogelepts, loamy-skeletal, schist*. This component is a phase of the soil textural family *Typic Dystrogelepts, loamy-skeletal*. The “schist” phase consists of *Typic Dystrogelepts, loamy-skeletal* soils that formed in schist parent materials. This specific information is useful to use and management of soils.

Most soil map units are made up of two or more components. The range in the proportion of each component is listed as a percentage with a representative value or “RV” also provided. All components of each map unit are listed in the composition section. However, only the major soil components are described in detail in the map unit descriptions.

These map units are complexes, consociations, or undifferentiated groups. A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. [1FP2—Boreal Terraces and Flood Plains with Discontinuous Permafrost](#) (*Typic Historthels, coarse-loamy-Typic Cryofluvents, coarse-loamy over sandy skeletal Complex*), is an example.

In a consociation, delineated areas are dominated by a single soil taxon (or miscellaneous area) and similar soils. [7MS4—Boreal Lower Mountain Slopes with Continuous Permafrost](#) (*Typic Historthels, coarse-loamy, 10 to 22 percent slopes*), is an example.

An undifferentiated group is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a different mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. [3C—Boreal Colluvial Hill Footslopes with Continuous Permafrost](#) (*Typic Histoturbels, coarse-silty and Typic Historthels, coarse-silty Soils, 4 to 15 percent slopes*) is an undifferentiated group in this survey area.

This survey includes miscellaneous map units. Such areas have little or no soil material and support little or no vegetation. Map unit [G—Nonvegetated Alluvium, Alaska Mountains, Boreal](#) (Riverwash, Alaska Mountains) is an example.

Table 5 gives the hectares and proportionate extent of each soil map unit. Table 6 lists the Landtype correlated to each common component by map unit. Other tables ([List of Tables](#)) give properties of the soils and the limitations, capabilities, and potential for many uses. The [Glossary](#) defines many of the terms used in describing the soils or miscellaneous areas.

[Soil Classification and Taxonomic Unit Descriptions](#) gives the description of the soils and [ECOMAP Landtypes and Landtype Phases](#) gives the detailed descriptions of Landtypes listed in the following map unit descriptions.

1FP—Boreal Flood Plains with Discontinuous Permafrost, Minchumina Basin

Soil name: Fluvaquentic Historthels, coarse-loamy-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryofluvents, coarse-loamy over sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested loamy wet flood plains, frozen: 40 to 65 percent of the map unit (RV=50 percent)
- Boreal-riparian forested loamy flood plains, moderately wet: 15 to 35 percent of the map unit (RV=20 percent)
- Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim: 10 to 30 percent of the map unit (RV=15 percent)
- Boreal-taiga loamy channels, frozen: 2 to 15 percent of the map unit (RV=10 percent)
- Boreal-riparian wet meadow organic depressions: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 160 to 307 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Boreal-riparian forested loamy wet flood plains, frozen

Soil name: Fluvaquentic Historthels, coarse-loamy

Landtype: Loamy Wet Flood Plains, Frozen (131B_156)

Climax plant community: White spruce-tamarack/thinleaf alder forest

Landform(s): flood plains

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium

Restrictive feature(s): permafrost at 23 to 83 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 20	mucky peat	moderately rapid	6.4 to 7.0	3.2 to 6.2	.28	.28
Cg/Oab — 20 to 41	very fine sandy loam, muck	moderately rapid	2.9 to 3.8	6.1 to 7.2	.28	.28
Cg/Oabf — 41 to 150	permanently frozen stratified fine sand to muck	impermeable	15.3to 19.6	6.1 to 7.2	.28	.28

Characteristics of Boreal-riparian forested loamy flood plains, moderately wet

Soil name: Aquic Cryofluvents, coarse-loamy over sandy-skeletal

Landtype: Loamy Flood Plains (131B_100)

Climax plant community: White spruce-poplar/alder forest

Landform(s): channels on flood plains

Slope gradient: 0 to 1 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 33 to 78 cm

Water table (May to September): approximately 70 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	6.2 to 7.8			
AC	— 2 to 33	stratified fine sand to silt	moderate	4.0 to 5.0	6.6 to 8.2	.28	.28	
Cg	— 33 to 54	stratified fine sand to silt	moderate	2.7 to 3.4	6.8 to 8.4	.28	.28	
2C	— 54 to 150	extremely gravelly coarse sand	rapid	2.9 to 5.8	6.8 to 8.2	.02	.10	

Characteristics of Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, Kuskokwim Plains

Landtype: Loamy High Flood Plains (131B_101)

Climax plant community: White spruce/alder forest

Landform(s): flood plains

Slope gradient: 0 to 1 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 22 to 96 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	4.4 to 5.6			
AC	— 5 to 25	stratified fine sand to silt	moderate	2.6 to 3.2	5.0 to 6.8	.28	.28	
C	— 25 to 92	stratified fine sand to silt	moderate	8.7 to 10.7	5.8 to 7.6	.28	.28	
2C	— 92 to 150	extremely gravelly coarse sand	rapid	1.7 to 3.5	6.0 to 7.4	.02	.10	

1FP2—Boreal Terraces and Flood Plains with Discontinuous Permafrost

Soil name: Typic Historthels, coarse-loamy-Typic Cryofluvents, coarse-loamy over sandy skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-taiga deep loamy terraces, frozen: 25 to 50 percent of the map unit (RV=40 percent)
- Boreal-riparian forested loamy flood plains: 15 to 30 percent of the map unit (RV=20 percent)
- Boreal-riparian wet meadow organic depressions: 5 to 10 percent of the map unit (RV=10 percent)
- Boreal-riparian forested loamy flood plains, frozen: 5 to 20 percent of the map unit (RV=10 percent)
- Boreal-riparian woodland loamy flood plains, wet: 10 to 20 percent of the map unit (RV=10 percent)
- Boreal-taiga loamy channels, frozen: 2 to 15 percent of the map unit (RV=10 percent)

Setting

Elevation: 149 to 214 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Boreal-taiga deep loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy, terraces, deep

Landtype: Loamy Frozen Terraces (131B_104)

Climax plant community: Black spruce-tamarack/Labrador tea woodland

Landform(s): stream terraces

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium

Restrictive feature(s): permafrost at 45 to 81 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 22	peat	moderately rapid	7.0 to 7.7	3.6 to 4.5		
A	— 22 to 31	silt loam	moderate	2.2 to 2.5	3.8 to 5.0	.32	.32
2C	— 31 to 53	stratified sand to silt	moderately rapid	3.1 to 4.0	5.0 to 6.6	.28	.28
2Cf	— 53 to 150	permanently frozen stratified sand to silt	impermeable	5.2 to 7.2		.28	.28

Characteristics of Boreal-riparian forested loamy flood plains

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, rarely flooded

Landtype: Loamy High Flood Plains (131B_101)

Climax plant community: White spruce/alder forest

Landform(s): flood plains

Slope gradient: 0 to 1 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 22 to 96 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	4.4 to 5.6		
AC	— 5 to 25	stratified fine sand to silt	moderate	2.6 to 3.2	5.0 to 6.8	.28	.28
C	— 25 to 92	stratified fine sand to silt	moderate	8.7 to 10.7	5.8 to 7.6	.28	.28
2C	— 92 to 150	extremely gravelly coarse sand	rapid	1.7 to 3.5	6.0 to 7.4	.02	.10

1FP4—Boreal Flood Plains and Terraces with Discontinuous Permafrost, Wet

Soil name: Fluvaquentic Historthels, coarse-loamy-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euic Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested loamy wet flood plains, frozen: 20 to 40 percent of the map unit (RV=25 percent)
- Boreal-riparian forested loamy flood plains, frozen: 10 to 40 percent of the map unit (RV=25 percent)
- Boreal-riparian wet meadow organic depressions: 10 to 30 percent of the map unit (RV=20 percent)
- Boreal-riparian scrub silty flood plains, wet: 5 to 15 percent of the map unit (RV=15 percent)
- Boreal-taiga deep loamy terraces, frozen: 10 to 30 percent of the map unit (RV=13 percent)
- Nonvegetated alluvium: 1 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 190 to 236 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Boreal-riparian forested loamy wet flood plains, frozen

Soil name: Fluvaquentic Historthels, coarse-loamy

Landtype: Loamy Wet Flood Plains, Frozen (131B_156)

Climax plant community: White spruce-tamarack/thinleaf alder forest

Landform(s): flood plains

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium

Restrictive feature(s): permafrost at 23 to 83 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
O — 0 to 20	mucky peat	moderately rapid	6.4 to 7.0	3.2 to 6.2	.28	.28
Cg/Oab — 20 to 41	very fine sandy loam, muck	moderately rapid	2.9 to 3.8	6.1 to 7.2	.28	.28
Cg/Oabf — 41 to 150	permanently frozen stratified fine sand to muck	impermeable	15.3 to 19.6	6.1 to 7.2	.28	.28

Characteristics of Boreal-riparian forested loamy flood plains, frozen

Soil name: Fluventic Haplorthels, coarse-loamy

Landtype: Loamy Frozen Flood Plains (131B_102)

Climax plant community: Mixed paper birch-spruce/prickly rose forest

Landform(s): flood plains

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium

Restrictive feature(s): permafrost at 31 to 89 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	2.8 to 5.0			
A	— 8 to 21	silt loam	moderate	3.1 to 3.6	3.7 to 5.2	.43	.43	
C/Oab	— 21 to 78	stratified silt to fine sand to muck	moderately rapid	8.0 to 10.3	4.8 to 6.9	.28	.28	
Cf	— 78 to 150	permanently frozen stratified fine sand to silt	impermeable	5.6 to 8.0		.28	.28	

Characteristics of Boreal-riparian wet meadow organic depressions

Soil name: Cryofibrists, euic, fens

Landtype: Organic Depressions, Fens (131B_501)

Climax plant community: Sedge wet meadow

Landform(s): cutoffs on flood plains

Slope gradient: 0 percent

Parent material: grassy organic material over sandy and silty alluvium

Restrictive feature(s): strongly contrasting textural stratification at 51 to 150 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 56	peat	moderately rapid	17.9 to 19.6	5.6 to 7.4			
Cg	— 56 to 150	silt loam	moderate	16.0 to 18.8	5.2 to 7.8	.43	.43	

1FW1—Boreal Terraces with Continuous Permafrost

Soil name: Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Complex

Composition

(All components are listed but only major components are described)

- Boreal-taiga deep loamy terraces, frozen: 10 to 45 percent of the map unit (RV=30 percent)
- Boreal-taiga/tussock silty terraces, frozen: 15 to 45 percent of the map unit (RV=30 percent)
- Boreal-taiga loamy channels, frozen: 15 to 25 percent of the map unit (RV=20 percent)
- Boreal-riparian forested loamy flood plains, frozen: 5 to 15 percent of the map unit (RV=10 percent)
- Boreal-riparian wet meadow organic depressions: 2 to 10 percent of the map unit (RV=8 percent)
- Boreal-bog organic depressions: 2 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 150 to 294 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Boreal-taiga deep loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy, terraces, deep

Landtype: Loamy Frozen Terraces (131B_104)

Climax plant community: Black spruce-tamarack/Labrador tea woodland

Landform(s): stream terraces

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium

Restrictive feature(s): permafrost at 45 to 81 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon—Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi — 0 to 22	peat	moderately rapid	7.0 to 7.7	3.6 to 4.5		
A — 22 to 31	silt loam	moderate	2.2 to 2.5	3.8 to 5.0	.32	.32
2C — 31 to 53	stratified sand to silt	moderately rapid	3.1 to 4.0	5.0 to 6.6	.28	.28
2Cf — 53 to 150	permanently frozen stratified sand to silt	impermeable	5.2 to 7.2		.28	.28

Characteristics of Boreal-taiga/tussock silty terraces, frozen

Soil name: Typic Histoturbels, coarse-silty, terraces

Landtype: Loamy Frozen Terraces, Wet (131B_105)

Climax plant community: Black spruce-tamarack/tussock cottongrass woodland

Landform(s): turf hummocks on stream terraces

Slope gradient: 0 to 1 percent

Parent material: grassy organic material over sandy and silty cryoturbate

Restrictive feature(s): permafrost at 46 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi — 0 to 48	peat	moderately rapid	15.4 to 16.8	3.0 to 5.2		
Cg/Oajj — 48 to 64	silt loam, muck	moderate	6.1 to 6.7	4.5 to 6.2	.32	.32
Cgf — 64 to 150	permanently frozen stratified very fine sand to silt	impermeable	4.5 to 6.2		.32	.32

Characteristics of Boreal-taiga loamy channels, frozen

Soil name: Typic Historthels, coarse-loamy, channels

Landtype: Loamy Channels (131B_505)

Climax plant community: Tamarack-black spruce/leatherleaf woodland

Landform(s): channels on stream terraces

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over silty alluvium over sandy and silty alluvium

Restrictive feature(s): permafrost at 45 to 81 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 24	peat	moderately rapid	7.7 to 8.4	4.0 to 5.3		
A/C	— 24 to 31	silt loam	moderate	1.7 to 2.0	5.2 to 6.8	.32	.32
Cg/Oeb	— 31 to 53	stratified silt to fine sand to muck	moderately rapid	3.1 to 4.0	5.2 to 6.8	.28	.28
Cgf	— 53 to 150	permanently frozen stratified fine sand to silt	impermeable	5.0 to 6.0	.	28	.28

1ST—Boreal Plains with Discontinuous Permafrost

Soil name: Typic Historthels, coarse-silty-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euic Complex

Composition

(All components are listed but only major components are described)

- Boreal-taiga silty loess slopes, frozen: 20 to 50 percent of the map unit (RV=40 percent)
- Boreal-riparian forested loamy flood plains, frozen: 20 to 35 percent of the map unit (RV=30 percent)
- Boreal-riparian wet meadow organic depressions: 10 to 20 percent of the map unit (RV=15 percent)
- Boreal-bog organic depressions: 10 to 20 percent of the map unit (RV=15 percent)

Setting

Elevation: 168 to 232 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Boreal-taiga silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty

Landtype: Loamy Frozen Slopes (131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): Plains

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 25 to 66 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi and Oe	— 0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8		
A	— 23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43	.43
Cf	— 39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43

Characteristics of Boreal-riparian forested loamy flood plains, frozen

Soil name: Fluventic Haplorthels, coarse-loamy

Landtype: Loamy Frozen Flood Plains (131B_102)

Climax plant community: Mixed paper birch-spruce/prickly rose forest

Landform(s): flood plains

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium

Restrictive feature(s): permafrost at 31 to 89 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	2.8 to 5.0		
A	— 8 to 21	silt loam	moderate	3.1 to 3.6	3.7 to 5.2	.43	.43
C/Oab	— 21 to 78	stratified silt to fine sand to muck	moderately rapid	8.0 to 10.3	4.8 to 6.9	.28	.28
Cf	— 78 to 150	permanently frozen stratified fine sand to silt	impermeable	5.6 to 8.0		.28	.28

Characteristics of Boreal-riparian wet meadow organic depressions

Soil name: Cryofibrists, euic, fens

Landtype: Organic Depressions, Fens (131B_501)

Climax plant community: Sedge wet meadow

Landform(s): cutoffs on flood plains

Slope gradient: 0 percent

Parent material: grassy organic material over sandy and silty alluvium

Restrictive feature(s): strongly contrasting textural stratification at 51 to 150 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 56	peat	moderately rapid	17.9 to 19.6	5.6 to 7.4		
Cg	— 56 to 150	silt loam	moderate	16.0 to 18.8	5.2 to 7.8	.43	.43

1ST1—Boreal Terraces with Discontinuous Permafrost, Minchumina Basin

Soil name: Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty-Cryofibrists, euic Association

Composition

(All components are listed but only major components are described)

- Boreal-taiga deep loamy terraces, frozen: 25 to 60 percent of the map unit (RV=45 percent)
- Boreal-taiga/tussock silty terraces, frozen: 15 to 35 percent of the map unit (RV=25 percent)
- Boreal-riparian wet meadow organic depressions: 5 to 20 percent of the map unit (RV=15 percent)
- Boreal-riparian forested loamy wet flood plains, frozen: 5 to 20 percent of the map unit (RV=5 percent)
- Boreal-taiga peat plateaus, frozen: 5 to 10 percent of the map unit (RV=5 percent)
- Boreal-bog organic depressions: 5 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 160 to 223 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Boreal-taiga deep loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy, terraces, deep

Landtype: Loamy Frozen Terraces (131B_104)

Climax plant community: Black spruce-tamarack/Labrador tea woodland

Landform(s): stream terraces

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium

Restrictive feature(s): permafrost at 45 to 81 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon—Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi — 0 to 22	peat	moderately rapid	7.0 to 7.7	3.6 to 4.5		
A — 22 to 31	silt loam	moderate	2.2 to 2.5	3.8 to 5.0	.32	.32
2C — 31 to 53	stratified sand to silt	moderately rapid	3.1 to 4.0	5.0 to 6.6	.28	.28
2Cf — 53 to 150	permanently frozen stratified sand to silt	impermeable	5.2 to 7.2		.28	.28

Characteristics of Boreal-taiga/tussock silty terraces, frozen

Soil name: Typic Histoturbels, coarse-silty, terraces

Landtype: Loamy Frozen Terraces, Wet (131B_105)

Climax plant community: Black spruce-tamarack/tussock cottongrass woodland

Landform(s): turf hummocks on stream terraces

Slope gradient: 0 to 1 percent

Parent material: grassy organic material over sandy and silty cryoturbate

Restrictive feature(s): permafrost at 46 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 48	peat	moderately rapid	15.4 to 16.8	3.0 to 5.2			
Cg/Oajj	— 48 to 64	silt loam, muck	moderate	6.1 to 6.7	4.5 to 6.2	.32	.32	
Cgf	— 64 to 150	permanently frozen stratified very fine sand to silt	impermeable	4.5 to 6.2		.32	.32	

Characteristics of Boreal-riparian wet meadow organic depressions

Soil name: Cryofibrists, euic, fens

Landtype: Organic Depressions, Fens (131B_501)

Climax plant community: Sedge wet meadow

Landform(s): cutoffs on flood plains

Slope gradient: 0 percent

Parent material: grassy organic material over sandy and silty alluvium

Restrictive feature(s): strongly contrasting textural stratification at 51 to 150 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 56	peat	moderately rapid	17.9 to 19.6	5.6 to 7.4			
Cg	— 56 to 150	silt loam	moderate	16.0 to 18.8	5.2 to 7.8	.43	.43	

1STW—Boreal Terraces with Continuous Permafrost, Wet

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association

Composition

(All components are listed but only major components are described)

- Boreal-taiga/tussock silty terraces, frozen: 25 to 65 percent of the map unit (RV=45 percent)
- Boreal-taiga loamy channels, frozen: 15 to 40 percent of the map unit (RV=25 percent)
- Boreal-taiga deep loamy terraces, frozen: 15 to 25 percent of the map unit (RV=20 percent)
- Boreal-riparian wet meadow organic depressions: 0 to 30 percent of the map unit (RV=5 percent)
- Boreal-taiga scrub bog organic depressions: 0 to 20 percent of the map unit (RV=5 percent)

Setting

Elevation: 165 to 236 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification**Section:** Yukon-Kuskokwim Bottomlands (131B)**Subsection:** Minchumina Basin Lowlands (131B.V2)**Characteristics of Boreal-taiga/tussock silty terraces, frozen****Soil name:** Typic Histoturbels, coarse-silty, terraces**Landtype:** Loamy Frozen Terraces, Wet (131B_105)**Climax plant community:** Black spruce-tamarack/tussock cottongrass woodland**Landform(s):** turf hummocks on stream terraces**Slope gradient:** 0 to 1 percent**Parent material:** grassy organic material over sandy and silty cryoturbate**Restrictive feature(s):** permafrost at 46 to 64 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water		
				Capacity (cm)	pH	Kw Kf
Oi	0 to 48	peat	moderately rapid	15.4 to 16.8	3.0 to 5.2	
Cg/Oajj	48 to 64	silt loam, muck	moderate	6.1 to 6.7	4.5 to 6.2	.32 .32
Cgf	64 to 150	permanently frozen stratified very fine sand to silt	impermeable	4.5 to 6.2		.32 .32

Characteristics of Boreal-taiga loamy channels, frozen**Soil name:** Typic Historthels, coarse-loamy, channels**Landtype:** Loamy Channels (131B_505)**Climax plant community:** Tamarack-black spruce/leatherleaf woodland**Landform(s):** channels on stream terraces**Slope gradient:** 0 to 1 percent**Parent material:** mossy organic material and/or woody organic material over silty alluvium over sandy and silty alluvium**Restrictive feature(s):** permafrost at 45 to 81 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water		
				Capacity (cm)	pH	Kw Kf
Oi	0 to 24	peat	moderately rapid	7.7 to 8.4	4.0 to 5.3	
A/C	24 to 31	silt loam	moderate	1.7 to 2.0	5.2 to 6.8	.32 .32
Cg/Oeb	31 to 53	stratified silt to fine sand to muck	moderately rapid	3.1 to 4.0	5.2 to 6.8	.28 .28
Cgf	53 to 150	permanently frozen stratified fine sand to silt	impermeable	5.0 to 6.0		.28 .28

Characteristics of Boreal-taiga deep loamy terraces, frozen**Soil name:** Typic Historthels, coarse-loamy, terraces, deep**Landtype:** Loamy Frozen Terraces (131B_104)**Climax plant community:** Black spruce-tamarack/Labrador tea woodland

Landform(s): stream terraces

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium

Restrictive feature(s): permafrost at 45 to 81 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	0 to 22	peat	moderately rapid	7.0 to 7.7	3.6 to 4.5			
A	22 to 31	silt loam	moderate	2.2 to 2.5	3.8 to 5.0	.32	.32	
2C	31 to 53	stratified sand to silt	moderately rapid	3.1 to 4.0	5.0 to 6.6	.28	.28	
2Cf	53 to 150	permanently frozen stratified sand to silt	impermeable	5.2 to 7.2		.28	.28	

1STW2—Boreal Groundwater Discharge Plains with Discontinuous Permafrost

Soil name: Histic Cryaquepts, coarse-loamy-Terric Cryohemists, loamy Association

Composition

(All components are listed but only major components are described)

- Boreal-taiga gravelly alluvial plains, wet: 15 to 40 percent of the map unit (RV=35 percent)
- Boreal-riparian scrub silty drains, frozen: 15 to 25 percent of the map unit (RV=20 percent)
- Boreal-riparian fen organic depressions: 15 to 25 percent of the map unit (RV=20 percent)

Setting

Elevation: 168 to 289 m

Precipitation: 336 to 565 mm

Air temperature: -3 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Boreal-taiga gravelly alluvial plains, wet

Soil name: Histic Cryaquepts, loamy-skeletal

Landtype: Loamy Channels (131B_505)

Climax plant community: Tamarack-black spruce/leatherleaf woodland

Landform(s): plains

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over gravelly alluvium

Restrictive feature(s): none

Water table (May to September): 0 to 25 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 43	peat	moderately rapid	13.8 to 15.1	5.6 to 7.4	
Cg — 43 to 150	stratified very gravelly sand to silt	moderately rapid	12.8 to 17.1	6.4 to 7.4	.15 .28

Characteristics of Boreal-riparian scrub silty drains, frozen

Soil name: Fluvaquentic Historthels, coarse-silty

Landtype: Silty Drainages, Very Wet (131B_503)

Climax plant community: Leatherleaf-sweetgale/sedge scrub

Landform(s): drainageways on plains

Slope gradient: 0 to 1 percent

Parent material: mossy organic material and/or woody organic material over silty alluvium

Restrictive feature(s): permafrost at 99 to 150 cm

Water table (May to September): 0 to 25 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: frequent

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oe — 0 to 24	mucky peat	moderately rapid	7.7 to 8.4	3.3 to 5.2	
Cg/Oe — 24 to 99	mixed silty loam and mucky peat	moderate	12.8 to 15	4.5 to 5.3	.28 .28
Cgf — 99 to 150	frozen silt loam	impermeable		4.8 to 6.0	.43 .43

Characteristics of Boreal-riparian fen organic depressions

Soil name: Terric Cryohemists, loamy

Landtype: Organic Depressions, Eutrophic Fens (131B_506)

Climax plant community: Tulted bulrush meadow

Landform(s): depressions on plains

Slope gradient: 0 percent

Parent material: grassy organic material over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 63 to 150 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 54	mucky peat	moderately rapid	17.3 to 18.9	6.2 to 7.9	
Cg — 54 to 130	stratified fine sand to silt	moderately rapid	9.1 to 12.2	6.0 to 7.6	.24 .28
2C — 130 to 150	very gravelly loamy coarse sand	rapid	0.6 to 1.2	7.1 to 7.8	.02 .10

2FG—Boreal Terraces with Continuous Permafrost, Very Wet

Soil name: Typic Histoturbels, coarse-silty-Glacic Folistels, dysic Association

Composition

(All components are listed but only major components are described)

- Boreal-taiga/tussock silty terraces, frozen: 60 to 85 percent of the map unit (RV=70 percent)
- Boreal-taiga peat plateaus, frozen: 5 to 35 percent of the map unit (RV=15 percent)
- Boreal-taiga loamy terraces, frozen: 5 to 35 percent of the map unit (RV=10 percent)
- Boreal-loamy wet meadows: 0 to 10 percent of the map unit (RV=3 percent)
- Boreal-bog organic depressions: 0 to 10 percent of the map unit (RV=2 percent)

Setting

Elevation: 149 to 522 m

Precipitation: 380 to 602 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Lowland Flood Plains & Terraces (131B.V1)

Characteristics of Boreal-taiga/tussock silty terraces, frozen

Soil name: Typic Histoturbels, coarse-silty, terraces

Landtype: Loamy Frozen Terraces, Wet (131B_105)

Climax plant community: Black spruce-tamarack/tussock cottongrass woodland

Landform(s): turf hummocks on stream terraces

Slope gradient: 0 to 2 percent

Parent material: grassy organic material over sandy and silty cryoturbate

Restrictive feature(s): permafrost at 46 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi	0 to 48	peat	moderately rapid	15.4 to 16.8	3.0 to 5.2		
Cg/Oajj	48 to 64	silt loam, muck	moderate	6.1 to 6.7	4.5 to 6.2	.32	.32
Cgf	64 to 150	permanently frozen stratified very fine sand to silt	impermeable	4.5 to 6.2		.32	.32

Characteristics of Boreal-taiga peat plateaus, frozen

Soil name: Glacic Folistels, dysic, Kuskokwim Plains

Landtype: Peat Plateaus (131B_111)

Climax plant community: Black spruce-tamarack/lichen woodland

Landform(s): peat plateaus on plains

Slope gradient: 0 to 3 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 38 to 61 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

		Available Water					
Horizon	Depth (cm)	Texture	Permeability	Capacity (cm)	pH	Kw	Kf
Oi and Oe	0 to 45	peat	moderately rapid	14.4 to 15.8	3.2 to 4.9		
Oef	45 to 150	permanently frozen mucky peat	impermeable	33.6 to 36.8	4.2 to 5.2		

2FP2—Boreal Schist Flood Plains with Discontinuous Permafrost

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested loamy schist flood plains: 45 to 60 percent of the map unit (RV=45 percent)
- Boreal-riparian scrub loamy schist flood plains: 20 to 35 percent of the map unit (RV=30 percent)
- Boreal-riparian forested gravelly flood plains: 5 to 30 percent of the map unit (RV=15 percent)
- Nonvegetated alluvium: 5 to 15 percent of the map unit (RV=10 percent)

Setting

Elevation: 167 to 624 m

Precipitation: 380 to 602 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Lowland Flood Plains & Terraces (131B.V1)

Characteristics of Boreal-riparian forested loamy schist flood plains

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, schist, flood plains

Landtype: Loamy High Flood Plains (131B_101)

Climax plant community: White spruce/alder forest

Landform(s): flood plains

Slope gradient: 0 to 3 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 22 to 113 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

		Available Water					
Horizon	Depth (cm)	Texture	Permeability	Capacity (cm)	pH	Kw	Kf
Oi	0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.9 to 5.0		
A	5 to 11	silt loam	moderate	2.3 to 2.5	3.9 to 4.7	.43	.43
C	11 to 73	stratified sand to silt	moderate	10.5 to 13.6	4.7 to 5.8	.28	.28
2C	73 to 150	extremely cobbly loamy coarse sand	rapid	3.1 to 6.2	5.8 to 6.4	.02	.10

Characteristics of Boreal-riparian scrub loamy schist flood plains

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, schist

Landtype: Loamy Flood Plains (131B_100)

Climax plant community: White spruce-poplar/alder forest

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 40 to 66 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	4.4 to 5.7			
AC — 9 to 25	stratified sand to silt	moderate	2.9 to 3.5	5.1 to 5.7	.28	.28	
C — 25 to 66	stratified sand to silt	moderate	7.0 to 9.0	5.6 to 6.1	.28	.28	
2C — 66 to 150	extremely gravelly coarse sand	rapid	3.4 to 6.7	5.8 to 6.8	.02	.10	

Characteristics of Boreal-riparian forested gravelly flood plains

Soil name: Typic Cryorthents, sandy-skeletal, Kuskokwim Plains

Landtype: Gravelly Flood Plains (131B_255)

Climax plant community: White spruce-poplar woodland

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 6 to 12 cm

Water table (May to September): more than 150 cm

Drainage class: excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	4.3 to 6.7			
A — 4 to 8	stratified sand to silt	moderate	0.5 to 0.6	5.1 to 7.4	.28	.28	
2AC — 8 to 19	extremely gravelly coarse sand	rapid	0.4 to 0.9	6.8 to 7.8	.02	.10	
2C — 19 to 150	extremely gravelly coarse sand	rapid	5.2 to 10.5	7.4 to 8.3	.02	.10	

2FP3—Boreal Flood Plains with Discontinuous Permafrost

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim: 15 to 50 percent of the map unit (RV=45 percent)
- Boreal-riparian forested loamy flood plains, moderately wet: 10 to 30 percent of the map unit (RV=15 percent)
- Boreal-riparian forested gravelly flood plains: 5 to 30 percent of the map unit (RV=15 percent)
- Boreal-riparian forested loamy wet flood plains, frozen: 10 to 30 percent of the map unit (RV=10 percent)
- Boreal-taiga loamy terraces, frozen: 5 to 25 percent of the map unit (RV=10 percent)
- Nonvegetated alluvium: 2 to 15 percent of the map unit (RV=5 percent)

Setting

Elevation: 192 to 624 m

Precipitation: 380 to 602 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Lowland Flood Plains & Terraces (131B.V1)

Characteristics of Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, Kuskokwim Plains

Landtype: Loamy High Flood Plains (131B_101)

Climax plant community: White spruce/alder forest

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 22 to 96 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	4.4 to 5.6			
AC	— 5 to 25	stratified fine sand to silt	moderate	2.6 to 3.2	5.0 to 6.8	.28	.28	
C	— 25 to 92	stratified fine sand to silt	moderate	8.7 to 10.7	5.8 to 7.6	.28	.28	
2C	— 92 to 150	extremely gravelly coarse sand	rapid	1.7 to 3.5	6.0 to 7.4	.02	.10	

Characteristics of Boreal-riparian forested loamy flood plains, moderately wet

Soil name: Aquic Cryofluvents, coarse-loamy over sandy-skeletal

Landtype: Loamy Flood Plains (131B_100)

Climax plant community: White spruce-poplar/alder forest

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 33 to 78 cm

Water table (May to September): approximately 70 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	6.2 to 7.8			
AC — 2 to 33	stratified fine sand to silt	moderate	4.0 to 5.0	6.6 to 8.2	.28	.28	
Cg — 33 to 54	stratified fine sand to silt	moderate	2.7 to 3.4	6.8 to 8.4	.28	.28	
2C — 54 to 150	extremely gravelly coarse sand	rapid	2.9 to 5.8	6.8 to 8.2	.02	.10	

Characteristics of Boreal-riparian forested gravelly flood plains

Soil name: Typic Cryorthents, sandy-skeletal, Kuskokwim Plains

Landtype: Gravelly Flood Plains (131B_255)

Climax plant community: White spruce-poplar woodland

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 6 to 12 cm

Water table (May to September): more than 150 cm

Drainage class: excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	4.3 to 6.7			
A — 4 to 8	stratified sand to silt	moderate	0.5 to 0.6	5.1 to 7.4	.28	.28	
2AC — 8 to 19	extremely gravelly coarse sand	rapid	0.4 to 0.9	6.8 to 7.8	.02	.10	
2C — 19 to 150	extremely gravelly coarse sand	rapid	5.2 to 10.5	7.4 to 8.3	.02	.10	

2FW2—Boreal Terraces and High Flood Plains with Continuous Permafrost

Soil name: Typic Historthels, coarse-loamy Complex

Composition

(All components are listed but only major components are described)

- Boreal-taiga deep loamy terraces, frozen: 20 to 55 percent of the map unit (RV=40 percent)
- Boreal-taiga loamy channels, frozen: 10 to 45 percent of the map unit (RV=30 percent)
- Boreal-riparian forested loamy wet flood plains, frozen: 5 to 20 percent of the map unit (RV=10 percent)
- Boreal-riparian forested loamy flood plains, thick surface: 5 to 15 percent of the map unit (RV=10 percent)
- Boreal-riparian wet meadow organic depressions: 3 to 5 percent of the map unit (RV=5 percent)
- Boreal-riparian forested loamy flood plains, frozen: 0 to 10 percent of the map unit (RV=3 percent)
- Boreal-taiga/tussock silty terraces, frozen: 0 to 15 percent of the map unit (RV=2 percent)

Setting

Elevation: 152 to 503 m
Precipitation: 380 to 602 mm
Air temperature: -2.9 to -2.4 °C
Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)
Subsection: Lowland Flood Plains & Terraces (131B.V1)

Characteristics of Boreal-taiga deep loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy, terraces, deep
Landtype: Loamy Frozen Terraces (131B_104)
Climax plant community: Black spruce-tamarack/Labrador tea woodland
Landform(s): stream terraces
Slope gradient: 0 to 1 percent
Parent material: mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium
Restrictive feature(s): permafrost at 45 to 81 cm
Water table (May to September): 0 to 50 cm
Drainage class: poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: none
Potential frost action: high
Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 22	peat	moderately rapid	7.0 to 7.7	3.6 to 4.5	
A — 22 to 31	silt loam	moderate	2.2 to 2.5	3.8 to 5.0	.32 .32
2C — 31 to 53	stratified sand to silt	moderately rapid	3.1 to 4.0	5.0 to 6.6	.28 .28
2Cf — 53 to 150	permanently frozen stratified sand to silt	impermeable	5.2 to 7.2		.28 .28

Characteristics of Boreal-taiga loamy channels, frozen

Soil name: Typic Historthels, coarse-loamy, channels
Landtype: Loamy Channels (131B_505)
Climax plant community: Tamarack-black spruce/leatherleaf woodland
Landform(s): channels on stream terraces
Slope gradient: 0 to 1 percent
Parent material: mossy organic material and/or woody organic material over silty alluvium over sandy and silty alluvium
Restrictive feature(s): permafrost at 45 to 81 cm
Water table (May to September): 0 to 50 cm
Drainage class: very poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: none
Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 24	peat	moderately rapid	7.7 to 8.4	4.0 to 5.3			
A/C — 24 to 31	silt loam	moderate	1.7 to 2.0	5.2 to 6.8	.32	.32	
Cg/Oeb — 31 to 53	stratified silt to fine sand to muck	moderately rapid	3.1 to 4.0	5.2 to 6.8	.28	.28	
Cgf — 53 to 150	permanently frozen stratified fine sand to silt	impermeable	5.0 to 6.0		.28	.28	

2P—Boreal Plains with Continuous Permafrost

Soil name: Typic Historthels, coarse-silty

Composition

(All components are listed but only major components are described)

- Boreal-taiga silty outwash plains, frozen: 75 to 95 percent of the map unit (RV=90 percent)
- Boreal-loamy wet meadows: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-riparian scrub silty drains, frozen: 2 to 5 percent of the map unit (RV=3 percent)
- Boreal-bog organic depressions: 2 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 310 to 511 m

Precipitation: 380 to 602 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Lowland Flood Plains & Terraces (131B.V1)

Characteristics of Boreal-taiga silty outwash plains, frozen

Soil name: Typic Historthels, coarse-silty, terraces

Landtype: Loamy Frozen Terraces (131B_104)

Climax plant community: Black spruce-tamarack/Labrador tea woodland

Landform(s): outwash plains

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or woody organic material over silty alluvium

Restrictive feature(s): permafrost at 46 to 66 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 28	peat	moderately rapid	9.0 to 9.8	3.6 to 4.5			
Cg — 28 to 86	silt loam	moderate	22.0 to 24.4	5.1 to 6.2	.43	.43	
Cgf — 86 to 150	permanently frozen silt loam	impermeable	5.2 to 6.4		.43	.43	

2ST—Boreal Terraces with Discontinuous Permafrost

Soil name: Typic Eutrocryepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal Complex

Composition

- Boreal-forested gravelly terraces: 30 to 70 percent of the map unit (RV=45 percent)
- Boreal-taiga loamy terraces, frozen: 30 to 60 percent of the map unit (RV=45 percent)
- Boreal-taiga/tussock silty terraces, frozen: 0 to 10 percent of the map unit (RV=5 percent)
- Boreal-taiga loamy channels, frozen: 2 to 5 percent of the map unit (RV=3 percent)
- Boreal-bog organic depressions: 2 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 195 to 630 m

Precipitation: 380 to 602 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Lowland Flood Plains & Terraces (131B.V1)

Characteristics of Boreal-forested gravelly terraces

Soil name: Typic Eutrocryepts, sandy-skeletal, terraces

Landtype: Gravelly and Sandy Terraces (131B_108)

Climax plant community: Spruce/ericaceous woodland

Landform(s): stream terraces

Slope gradient: 0 to 2 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 3 to 22 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	0 to 10	slightly decomposed plant material	moderately rapid	3.2 to 3.5	4.0 to 6.1			
A/E	10 to 20	silt loam	moderate	1.7 to 2.0	4.1 to 5.6	.43	.43	
2Bw	20 to 29	very gravelly loamy sand	rapid	0.2 to 0.4	5.2 to 6.2	.02	.10	
2C	29 to 150	very gravelly coarse sand	rapid	2.4 to 4.8	5.6 to 7.4	.02	.10	

Characteristics of Boreal-taiga loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy over sandy-skeletal

Landtype: Loamy Frozen Terraces (131B_104)

Climax plant community: Black spruce-tamarack/Labrador tea woodland

Landform(s): stream terraces

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): permafrost at 44 to 90 cm; strongly contrasting textural stratification at 46 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi and Oe — 0 to 37	peat	moderately rapid	11.8 to 12.9	3.6 to 5.0			
A — 37 to 41	mucky silt loam	moderate	1.5 to 1.7	4.1 to 5.6	.37	.37	
2C — 41 to 44	stratified sand to silt	moderately rapid	0.4 to 0.5	5.4 to 6.4	.28	.28	
2Cf — 44 to 90	permanently frozen stratified sand to silt	impermeable	5.4 to 6.4		.28	.28	
3Cf — 90 to 150	permanently frozen extremely cobbly coarse sand	impermeable	5.4 to 7.6		.02	.10	

2ST2—Boreal Mid to High Level Flood Plains

Soil name: Typic Cryorthents, sandy-skeletal Complex

Composition

- Boreal-riparian forested gravelly high flood plains, Yukon-Kuskokwim: 55 to 75 percent of the map unit (RV=70 percent)
- Boreal-riparian forested gravelly flood plains: 15 to 30 percent of the map unit (RV=20 percent)
- Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-taiga loamy terraces, frozen: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 228 to 398 m

Precipitation: 380 to 602 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Lowland Flood Plains & Terraces (131B.V1)

Characteristics of Boreal-riparian forested gravelly high flood plains, Yukon-Kuskokwim

Soil name: Typic Cryorthents, sandy-skeletal, flood plains, Kuskokwim Plains

Landtype: Gravelly Flood Plains (131B_255)

Climax plant community: White spruce-poplar woodland

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 6 to 12 cm

Water table (May to September): more than 150 cm

Drainage class: excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: rare

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon—	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oe —	0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	4.3 to 6.7			
A —	4 to 8	stratified sand to silt	moderate	0.5 to 0.6	5.1 to 7.4	.28	.28	
2AC —	8 to 19	extremely cobbly loamy coarse sand	rapid	0.4 to 0.9	6.8 to 7.8	.02	.10	
2C —	19 to 150	extremely cobbly loamy coarse sand	rapid	5.2 to 10.5	7.4 to 8.3	.02	.10	

Characteristics of Boreal-riparian forested gravelly flood plains

Soil name: Typic Cryorthents, sandy-skeletal, Kuskokwim Plains

Landtype: Gravelly Flood Plains (131B_255)

Climax plant community: White spruce-poplar woodland

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 6 to 12 cm

Water table (May to September): more than 150 cm

Drainage class: excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon —	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oe —	0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	4.3 to 6.7			
A —	4 to 8	stratified sand to silt	moderate	0.5 to 0.6	5.1 to 7.4	.28	.28	
2AC —	8 to 19	extremely gravelly coarse sand	rapid	0.4 to 0.9	6.8 to 7.8	.02	.10	
2C —	19 to 150	extremely gravelly coarse sand	rapid	5.2 to 10.5	7.4 to 8.3	.02	.10	

3BG—Boreal Wet Meadows and Bogs

Soil name: Humic Cryaquepts, coarse-loamy-Hydric Cryofibrists, dysic Complex

Composition

- Boreal-loamy wet meadows: 30 to 65 percent of the map unit (RV=45 percent)
- Boreal-bog organic depressions: 30 to 65 percent of the map unit (RV=45 percent)
- Boreal-taiga silty loess slopes, frozen: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-taiga/tussock silty loess slopes, frozen: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 232 to 266 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-loamy wet meadows

Soil name: Humic Cryaquepts, coarse-loamy
Landtype: Loamy Depressions, Eutrophic Bogs (131B_532)
Climax plant community: Bluejoint wet meadow
Landform(s): depressions on plains
Slope gradient: 0 percent
Parent material: silty eolian deposits over loamy eolian deposits
Restrictive feature(s): strongly contrasting textural stratification at 28 to 68 cm
Water table (May to September): approximately 0 cm
Drainage class: very poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: occasional
Potential frost action: high
Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.0 to 4.0			
A — 8 to 28	silt loam	moderate	4.8 to 5.6	4.0 to 5.0	.37	.37	
2Cg — 28 to 150	fine sandy loam	moderate	15.9 to 19.5	4.2 to 5.4	.32	.32	

Characteristics of Boreal-bog organic depressions

Soil name: Hydric Cryofibrists, dysic
Landtype: Depressions, Bogs (131B_530)
Climax plant community: Sedge/sphagnum moss bog
Landform(s): bogs on hills; bogs on plains
Slope gradient: 0 percent
Parent material: mossy organic material and/or grassy organic material
Restrictive feature(s): strongly contrasting textural stratification at 82 to 150 cm
Water table (May to September): approximately 0 cm
Drainage class: very poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: frequent
Potential frost action: high
Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 63	peat	moderately rapid	20.2 to 22.0	3.8 to 4.5			
W — 63 to 143	water						
C — 143 to 150	silt loam	moderately rapid	2.2 to 2.5	4.0 to 5.0	.32	.32	

3C—Boreal Colluvial Hill Footslopes with Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty and Typic Historthels, coarse-silty Soils, 4 to 15 percent slopes

Composition

- Boreal-taiga/tussock silty colluvial slopes, frozen: 20 to 75 percent of the map unit (RV=45 percent)
- Boreal-taiga silty colluvial slopes, frozen: 20 to 75 percent of the map unit (RV=40 percent)
- Boreal-riparian tall scrub silty frozen drains, Yukon-Kuskokwim: 2 to 10 percent of the map unit (RV=10 percent)
- Boreal-taiga silty loess hills, frozen: 2 to 10 percent of the map unit (RV=5 percent)

Setting**Elevation:** 260 to 589 m**Precipitation:** 359 to 651 mm**Air temperature:** -2.9 to -2.4 °C**Frost-free period:** 80 to 110 days**Ecoregion Classification****Section:** Yukon-Kuskokwim Bottomlands (131B)**Subsection:** Eolian Lowlands (131B.L1)**Characteristics of Boreal-taiga/tussock silty colluvial slopes, frozen****Soil name:** Typic Histoturbels, coarse-silty, colluvium**Landtype:** Loamy Frozen Slopes, Wet (131B_402)**Climax plant community:** Black spruce/tussock cottongrass woodland**Landform(s):** turf hummocks on hills**Slope gradient:** 4 to 15 percent**Parent material:** grassy organic material over silty colluvium and/or silty cryoturbate**Restrictive feature(s):** permafrost at 51 to 82 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon —	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe —	0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2			
Cg/Oajj —	40 to 77	silt loam, muck	moderate	6.3 to 7.4	4.5 to 5.3	.32	.32	
Cgf —	77 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43	

Characteristics of Boreal-taiga silty colluvial slopes, frozen**Soil name:** Typic Historthels, coarse-silty, colluvium**Landtype:** Loamy Frozen Slopes (131B_400)**Climax plant community:** Black spruce/Labrador tea woodland**Landform(s):** hills**Slope gradient:** 4 to 15 percent**Parent material:** mossy organic material and/or woody organic material over silty colluvium**Restrictive feature(s):** permafrost at 35 to 62 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon —	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe —	0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8			
A —	23 to 35	silt loam	moderate	2.9 to 3.4	4.9 to 5.7	.43	.43	
Cg —	35 to 58	silt loam	moderate	4.6 to 5.5	5.0 to 6.6	.43	.43	
Cf —	58 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43	

3DH—Boreal Loess Footslopes and Gravelly Colluvial Hills With Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 2 to 48 percent slopes

Composition

- Boreal-taiga/tussock silty loess slopes, frozen: 30 to 55 percent of the map unit (RV=45 percent)
- Boreal-taiga silty loess slopes, frozen: 20 to 40 percent of the map unit (RV=30 percent)
- Boreal-taiga/tussock silty colluvial slopes, frozen: 5 to 20 percent of the map unit (RV=15 percent)
- Boreal-forested gravelly colluvial slopes, dissected: 5 to 15 percent of the map unit (RV=10 percent)

Setting

Elevation: 267 to 596 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga/tussock silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty

Landtype: Loamy Frozen Slopes, Wet (131B_402)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on hills

Slope gradient: 2 to 8 percent

Parent material: grassy organic material over silty cryoturbate

Restrictive feature(s): permafrost at 51 to 82 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe	0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2			
Cg/Oajj	40 to 61	silt loam, muck	moderate	3.6 to 4.2	4.5 to 5.3	.32	.32	
Cgf	61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43	

Characteristics of Boreal-taiga silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty

Landtype: Loamy Frozen Slopes (131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): plains

Slope gradient: 0 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 25 to 66 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe	0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8			
A	23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43	.43	
Cf	39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43	

Characteristics of Boreal-taiga/tussock silty colluvial slopes, frozen

Soil name: Typic Histoturbels, coarse-silty, colluvium

Landtype: Loamy Frozen Slopes, Wet (131B_402)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on hills

Slope gradient: 2 to 15 percent

Parent material: grassy organic material over silty colluvium and/or silty cryoturbate

Restrictive feature(s): permafrost at 51 to 82 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe	0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2			
Cg/Oajj	40 to 77	silt loam, muck	moderate	6.3 to 7.4	4.5 to 5.3	.32	.32	
Cgf	77 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43	

3FG—Boreal Loess Plains with Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes

Composition

- Boreal-taiga/tussock silty loess slopes, frozen: 30 to 80 percent of the map unit (RV=60 percent)
- Boreal-taiga silty loess slopes, frozen: 10 to 60 percent of the map unit (RV=30 percent)
- Boreal-bog organic depressions: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-riparian scrub silty drains, frozen: 2 to 5 percent of the map unit (RV=3 percent)
- Boreal-taiga peat plateaus, frozen: 0 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 162 to 521 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga/tussock silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty
Landtype: Loamy Frozen Slopes, Wet (131B_402)
Climax plant community: Black spruce/tussock cottongrass woodland
Landform(s): turf hummocks on plains
Slope gradient: 0 to 3 percent
Parent material: grassy organic material over silty cryoturbate
Restrictive feature(s): permafrost at 51 to 82 cm
Water table (May to September): 0 to 50 cm
Drainage class: very poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: frequent
Potential frost action: high
Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe	0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2			
Cg/Oajj	40 to 61	silt loam, muck	moderate	3.6 to 4.2	4.5 to 5.3	.32	.32	
Cgf	61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43	

Characteristics of Boreal-taiga silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty
Landtype: Loamy Frozen Slopes (131B_400)
Climax plant community: Black spruce/Labrador tea woodland
Landform(s): plains
Slope gradient: 0 to 10 percent
Parent material: mossy organic material and/or woody organic material over silty eolian deposits
Restrictive feature(s): permafrost at 25 to 66 cm
Water table (May to September): 0 to 50 cm
Drainage class: poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: none
Potential frost action: high
Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe	0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8			
A	23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43	.43	
Cf	39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43	

3FG3—Boreal Loess Plains and Peat Plateaus with Continuous Permafrost

Soil name: Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Glacic Folistels, dysic Association, 0 to 14 percent slopes

Composition

- Boreal-taiga silty loess slopes, frozen: 30 to 55 percent of the map unit (RV=40 percent)
- Boreal-taiga/tussock silty loess slopes, frozen: 20 to 55 percent of the map unit (RV=30 percent)
- Boreal-taiga peat plateaus, frozen: 5 to 30 percent of the map unit (RV=20 percent)
- Boreal-riparian scrub silty drains, frozen: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-bog organic depressions: 2 to 10 percent of the map unit (RV=5 percent)

Setting**Elevation:** 228 to 599 m**Precipitation:** 359 to 651 mm**Air temperature:** -2.9 to -2.4 °C**Frost-free period:** 80 to 110 days**Ecoregion Classification****Section:** Yukon-Kuskokwim Bottomlands (131B)**Subsection:** Eolian Lowlands (131B.L1)**Characteristics of Boreal-taiga silty loess slopes, frozen****Soil name:** Typic Historthels, coarse-silty**Landtype:** Loamy Frozen Slopes (131B_400)**Climax plant community:** Black spruce/Labrador tea woodland**Landform(s):** plains**Slope gradient:** 2 to 10 percent**Parent material:** mossy organic material and/or woody organic material over silty eolian deposits**Restrictive feature(s):** permafrost at 25 to 66 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi and Oe	0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8		
A	23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43	.43
Cf	39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43

Characteristics of Boreal-taiga/tussock silty loess slopes, frozen**Soil name:** Typic Histoturbels, coarse-silty**Landtype:** Loamy Frozen Slopes, Wet (131B_402)**Climax plant community:** Black spruce/tussock cottongrass woodland**Landform(s):** turf hummocks on plains**Slope gradient:** 0 to 6 percent**Parent material:** grassy organic material over silty cryoturbate**Restrictive feature(s):** permafrost at 51 to 82 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi and Oe	0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2		
Cg/Oajj	40 to 61	silt loam, muck	moderate	3.6 to 4.2	4.5 to 5.3	.32	.32
Cgf	61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6	.43	.43	

Characteristics of Boreal-taiga peat plateaus, frozen

Soil name: Glacic Folistels, dysic, Kuskokwim Plains

Landtype: Peat Plateaus (131B_111)

Climax plant community: Black spruce-tamarack/lichen woodland

Landform(s): peat plateaus on plains

Slope gradient: 0 to 3 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 38 to 61 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi and Oe	0 to 45	peat	moderately rapid	14.4 to 15.8	3.2 to 4.9		
Oef	45 to 150	permanently frozen mucky peat	impermeable	33.6 to 36.8	4.2 to 5.2		

3FP1—Boreal Flood Plains and Terraces with Discontinuous Permafrost

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex

Composition

- Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim: 10 to 35 percent of the map unit (RV=30 percent)
- Boreal-taiga loamy terraces, frozen: 20 to 55 percent of the map unit (RV=30 percent)
- Boreal-riparian forested loamy flood plains, moderately wet: 10 to 25 percent of the map unit (RV=20 percent)
- Boreal-taiga/tussock silty terraces, frozen: 5 to 25 percent of the map unit (RV=15 percent)
- Nonvegetated alluvium: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 210 to 502 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, Kuskokwim Plains

Landtype: Loamy High Flood Plains (131B_101)

Climax plant community: White spruce/alder forest

Landform(s): flood plains

Slope gradient: 0 to 3 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 22 to 96 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	4.4 to 5.6			
AC — 5 to 25	stratified fine sand to silt	moderate	2.6 to 3.2	5.0 to 6.8	.28	.28	
C — 25 to 92	stratified fine sand to silt	moderate	8.7 to 10.7	5.8 to 7.6	.28	.28	
2C — 92 to 150	extremely gravelly coarse sand	rapid	1.7 to 3.5	6.0 to 7.4	.02	.10	

Characteristics of Boreal-taiga loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy over sandy-skeletal

Landtype: Loamy Frozen Terraces (131B_104)

Climax plant community: Black spruce-tamarack/Labrador tea woodland

Landform(s): stream terraces

Slope gradient: 0 to 2 percent

Parent material: organic material over silty eolian deposits over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): permafrost at 44 to 90 cm; strongly contrasting textural stratification at 46 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 37	peat	moderately rapid	11.8 to 12.9	3.6 to 5.0			
A — 37 to 41	mucky silt loam	moderate	1.5 to 1.7	4.1 to 5.6	.37	.37	
2C — 41 to 44	stratified sand to silt	moderately rapid	0.4 to 0.5	5.4 to 6.4	.28	.28	
2Cf — 44 to 90	permanently frozen stratified sand to silt	impermeable	5.4 to 6.4		.28	.28	
3Cf — 90 to 150	permanently frozen extremely cobbly coarse sand	impermeable	5.4 to 7.6		.02	.10	

Characteristics of Boreal-riparian forested loamy flood plains, moderately wet

Soil name: Aquic Cryofluvents, coarse-loamy over sandy-skeletal

Landtype: Loamy Flood Plains (131B_100)

Climax plant community: White spruce-poplar/alder forest

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 33 to 78 cm

Water table (May to September): approximately 70 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	6.2 to 7.8		
AC — 2 to 33	stratified fine sand to silt	moderate	4.0 to 5.0	6.6 to 8.2	.28	.28
Cg — 33 to 54	stratified fine sand to silt	moderate	2.7 to 3.4	6.8 to 8.4	.28	.28
2C — 54 to 150	extremely gravelly coarse sand	rapid	2.9 to 5.8	6.8 to 8.2	.02	.10

3FP3—Boreal Mica-Rich Terraces and Flood Plains with Discontinuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Typic Cryofluvents, coarse-loamy-Typic Historthels, coarse-loamy Association

Composition

- Boreal-taiga/tussock mica-rich silty terraces, frozen: 15 to 50 percent of the map unit (RV=40 percent)
- Boreal-riparian forested mica-rich loamy flood plains, frozen: 15 to 40 percent of the map unit (RV=28 percent)
- Boreal-taiga mica-rich loamy channels, frozen: 15 to 30 percent of the map unit (RV=15 percent)
- Boreal-taiga mica-rich loamy terraces, frozen: 15 to 25 percent of the map unit (RV=15 percent)
- Boreal-riparian wet meadow organic depressions: 0 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 164 to 592 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga/tussock mica-rich silty terraces, frozen

Soil name: Typic Histoturbels, coarse-silty, terraces, mica-rich

Landtype: Loamy Frozen Terraces, Wet (131B_105)

Climax plant community: Black spruce-tamarack/tussock cottongrass woodland

Landform(s): turf hummocks on stream terraces

Slope gradient: 0 to 2 percent

Parent material: grassy organic material over sandy and silty cryoturbate

Restrictive feature(s): permafrost at 46 to 53 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 38	peat	moderately rapid	12.2 to 13.3	3.0 to 5.2		
Cg/Oajj — 38 to 48	silt loam, muck	moderate	3.8 to 4.2	4.5 to 6.2	.32	.32
Cgf — 48 to 150	permanently frozen stratified very fine sand to silt	impermeable	4.5 to 6.2		.32	.32

Characteristics of Boreal-riparian forested mica-rich loamy flood plains, frozen**Soil name:** Typic Cryofluvents, coarse-loamy**Landtype:** Loamy Frozen Flood Plains (131B_102)**Climax plant community:** Mixed paper birch-spruce/prickly rose forest**Landform(s):** flood plains**Slope gradient:** 0 to 1 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium derived from schist**Restrictive feature(s):** none**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** occasional**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	3.9 to 5.0			
C/Oi	9 to 30	stratified fine sand to slightly decomposed plant material	moderate	8.0 to 8.8	3.9 to 4.7	.43	.43	
C	30 to 150	stratified sand to silt	moderate	20.4 to 26.4	4.7 to 5.8	.28	.28	

Characteristics of Boreal-taiga mica-rich loamy channels, frozen**Soil name:** Typic Historthels, coarse-loamy, channels, mica-rich**Landtype:** Loamy Channels (131B_505)**Climax plant community:** Tamarack-black spruce/leatherleaf woodland**Landform(s):** channels on stream terraces**Slope gradient:** 0 to 1 percent**Parent material:** mossy organic material and/or woody organic material over silty alluvium over sandy and silty alluvium**Restrictive feature(s):** permafrost at 45 to 81 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	0 to 24	peat	moderately rapid	7.7 to 8.4	4.0 to 5.3			
A/C	24 to 31	silt loam	moderate	1.7 to 2.0	5.2 to 6.8	.32	.32	
Cg/Oeb	31 to 53	stratified silt to fine sand to muck	moderately rapid	3.1 to 4.0	5.2 to 6.8	.28	.28	
Cgf	53 to 150	permanently frozen stratified fine sand to silt	impermeable	5.0 to 6.0		.28	.28	

3FU—Boreal Loess Plains and Hills with Continuous Permafrost

Soil name: Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 10 percent slopes

Composition

- Boreal-taiga silty loess slopes, frozen: 40 to 70 percent of the map unit (RV=50 percent)
- Boreal-taiga/tussock silty loess slopes, frozen: 20 to 50 percent of the map unit (RV=35 percent)
- Boreal-bog organic depressions: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-taiga peat slopes, frozen: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-taiga silty loess hills, frozen: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 153 to 381 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty

Landtype: Loamy Frozen Slopes (131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): plains

Slope gradient: 0 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 25 to 66 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi and Oe	0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8		
A	23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43	.43
Cf	39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43

Characteristics of Boreal-taiga/tussock silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty

Landtype: Loamy Frozen Slopes, Wet (131B_402)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on plains

Slope gradient: 0 to 5 percent

Parent material: grassy organic material over silty cryoturbate

Restrictive feature(s): permafrost at 51 to 82 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2	
Cg/Oajj — 40 to 61	silt loam, muck	moderate	3.6 to 4.2	4.5 to 5.3	.32 .32
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43 .43

3FU2—Boreal Peat Plateaus and Loess Plains with Continuous Permafrost

Soil name: Glacic Folistels, dysic-Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes

Composition

- Boreal-taiga peat plateaus, frozen: 25 to 45 percent of the map unit (RV=40 percent)
- Boreal-taiga/tussock silty loess slopes, frozen: 30 to 50 percent of the map unit (RV=40 percent)
- Boreal-taiga silty loess slopes, frozen: 15 to 30 percent of the map unit (RV=15 percent)
- Boreal-bog organic depressions: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 160 to 260 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga peat plateaus, frozen

Soil name: Glacic Folistels, dysic, Kuskokwim Plains

Landtype: Peat Plateaus (131B_111)

Climax plant community: Black spruce-tamarack/lichen woodland

Landform(s): peat plateaus on plains

Slope gradient: 0 to 3 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 38 to 61 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 45	peat	moderately rapid	14.4 to 15.8	3.2 to 4.9	
Oef — 45 to 150	permanently frozen mucky peat	impermeable	33.6 to 36.8	4.2 to 5.2	

Characteristics of Boreal-taiga/tussock silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty
Landtype: Loamy Frozen Slopes, Wet (131B_402)
Climax plant community: Black spruce/tussock cottongrass woodland
Landform(s): turf hummocks on plains
Slope gradient: 0 to 3 percent
Parent material: grassy organic material over silty cryoturbate
Restrictive feature(s): permafrost at 51 to 82 cm
Water table (May to September): 0 to 50 cm
Drainage class: very poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: frequent
Potential frost action: high
Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2		
Cg/Oajj — 40 to 61	silt loam, muck	moderate	3.6 to 4.2	4.5 to 5.3	.32	.32
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43

Characteristics of Boreal-taiga silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty
Landtype: Loamy Frozen Slopes (131B_400)
Climax plant community: Black spruce/Labrador tea woodland
Landform(s): plains
Slope gradient: 0 to 10 percent
Parent material: mossy organic material and/or woody organic material over silty eolian deposits
Restrictive feature(s): permafrost at 25 to 66 cm
Water table (May to September): 0 to 50 cm
Drainage class: poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: none
Potential frost action: high
Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8		
A — 23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43	.43
Cf — 39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43

3FU3—Boreal Eolian Plains and Dunes with Discontinuous Permafrost

Soil name: Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-loamy-Typic Haplocryods, sandy Association, 0 to 38 percent slopes

Composition

- Boreal-taiga loamy eolian slopes, frozen: 20 to 40 percent of the map unit (RV=30 percent)
- Boreal-taiga/tussock loamy eolian slopes, frozen: 20 to 40 percent of the map unit (RV=30 percent)
- Boreal-forested sandy hills: 10 to 25 percent of the map unit (RV=20 percent)
- Boreal-taiga peat plateaus, frozen: 5 to 15 percent of the map unit (RV=10 percent)
- Boreal-loamy wet meadows: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-bog organic depressions: 5 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 170 to 320 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga loamy eolian slopes, frozen

Soil name: Typic Historthels, coarse-loamy

Landtype: Loamy Frozen Slopes (131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): plains

Slope gradient: 0 to 6 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over loamy eolian deposits

Restrictive feature(s): permafrost at 50 to 88 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 29	peat	moderately rapid	9.3 to 10.1	3.0 to 4.2			
A — 29 to 40	mucky silt loam	moderate	2.6 to 3.1	3.9 to 5.2	.37	.37	
C — 40 to 54	fine sandy loam	moderately rapid	1.7 to 2.2	4.8 to 6.6	.24	.28	
Cf — 54 to 150	permanently frozen fine sandy loam	impermeable	4.8 to 6.6		.24	.28	

Characteristics of Boreal-taiga/tussock loamy eolian slopes, frozen

Soil name: Typic Histoturbels, coarse-loamy

Landtype: Loamy Frozen Terraces, Wet (131B_105)

Climax plant community: Black spruce-tamarack/tussock cottongrass woodland

Landform(s): turf hummocks on plains

Slope gradient: 0 to 4 percent

Parent material: grassy organic material over loamy cryoturbate over loamy eolian deposits

Restrictive feature(s): permafrost at 38 to 66 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 24	peat	moderately rapid	7.7 to 8.4	3.0 to 4.2			
A	— 24 to 46	silt loam	moderately rapid	3.3 to 4.4	5.1 to 6.1	.32	.32	
C/Afj	— 46 to 58	fine sandy loam, silt loam	moderately rapid	1.4 to 1.9	5.4 to 6.6	.28	.28	
Cf	— 58 to 150	permanently frozen fine sandy loam	impermeable	5.4 to 6.6		.28	.28	

Characteristics of Boreal-forested sandy hills

Soil name: Typic Haplocryods, sandy

Landtype: Sandy Hills (131B_185)

Climax plant community: Black spruce/lingonberry/lichen woodland

Landform(s): hills

Slope gradient: 5 to 38 percent

Parent material: silty eolian deposits over sandy eolian deposits

Restrictive feature(s): strongly contrasting textural stratification at 10 to 39 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 7	slightly decomposed plant material	moderately rapid	2.2 to 2.5	3.3 to 4.1			
E	— 7 to 9	silt loam	moderate	0.6 to 0.6	5.1 to 6.0	.43	.43	
Bs	— 9 to 16	silt loam	moderate	2.1 to 2.2	4.1 to 5.7	.43	.43	
2BC	— 16 to 44	fine sand	rapid	1.4 to 2.0	5.4 to 6.4	.24	.24	
2C	— 44 to 150	fine sand	rapid	5.3 to 7.4	5.4 to 6.4	.24	.24	

3FU4—Boreal Loess Plains, Hills, and Drains with Continuous Permafrost

Soil name: Typic Historthels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 2 to 35 percent slopes

Composition

- Boreal-taiga silty loess slopes, frozen: 40 to 75 percent of the map unit (RV=70 percent)
- Boreal-taiga silty loess hills, frozen: 5 to 20 percent of the map unit (RV=15 percent)
- Boreal-riparian tall scrub silty frozen drains, Yukon-Kuskokwim: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-riparian scrub silty drains, frozen: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-bog organic depressions: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 288 to 649 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty

Landtype: Loamy Frozen Slopes (131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): hills; plains

Slope gradient: 2 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 25 to 66 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi and Oe — 0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8			
A — 23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7		.43	.43
Cf — 39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6			.43	.43

Characteristics of Boreal-taiga silty loess hills, frozen

Soil name: Typic Umbrorthels, coarse-silty, Kuskokwim Plain

Landtype: Loamy Frozen Slopes, Ice Cored (131B_113)

Climax plant community: Black spruce/green alder/Labrador tea woodland

Landform(s): hills

Slope gradient: 16 to 35 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 25 to 43 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 23	slightly decomposed plant material	moderately rapid	7.4 to 8.1	3.5 to 4.8			
A1 — 23 to 27	mucky silt loam	moderate	1.0 to 1.1	4.9 to 5.7		.43	.43
Af — 27 to 39	permanently frozen silt loam	impermeable	2.4 to 2.9	5.0 to 6.6		.43	.43
Cf — 39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6			.43	.43

3Y—Boreal Ice Cored Loess Hills and Plains with Continuous Permafrost

Soil name: Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 0 to 26 percent slopes

Composition

- Boreal-taiga silty loess slopes, frozen: 25 to 40 percent of the map unit (RV=35 percent)
- Boreal-taiga/tussock silty loess slopes, frozen: 20 to 40 percent of the map unit (RV=30 percent)
- Boreal-taiga silty loess hills, frozen: 20 to 30 percent of the map unit (RV=25 percent)
- Boreal-bog organic depressions: 2 to 5 percent of the map unit (RV=5 percent)
- Water: 5 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 165 to 387 m

Precipitation: 359 to 651 mm

Air temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Eolian Lowlands (131B.L1)

Characteristics of Boreal-taiga silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty

Landtype: Loamy Frozen Slopes (131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): hills; plains

Slope gradient: 0 to 20 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 25 to 66 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8	
A — 23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43 .43
Cf — 39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43 .43

Characteristics of Boreal-taiga/tussock silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty

Landtype: Loamy Frozen Slopes, Wet (131B_402)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on plains

Slope gradient: 0 to 6 percent

Parent material: grassy organic material over silty cryoturbate

Restrictive feature(s): permafrost at 51 to 82 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2	
Cg/Oajj — 40 to 61	silt loam, muck	moderate	3.6 to 4.2	4.5 to 5.3	.32 .32
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43 .43

Characteristics of Boreal-taiga silty loess hills, frozen

Soil name: Typic Umbrorthels, coarse-silty, Kuskokwim Plain

Landtype: Loamy Frozen Slopes, Ice Cored (131B_113)

Climax plant community: Black spruce/green alder/Labrador tea woodland

Landform(s): hills

Slope gradient: 14 to 26 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 25 to 43 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 23	slightly decomposed plant material	moderately rapid	7.4 to 8.1	3.5 to 4.8	
A1 — 23 to 27	mucky silt loam	moderate	1.0 to 1.1	4.9 to 5.7	.43 .43
Af — 27 to 39	permanently frozen silt loam	impermeable	2.4 to 2.9	5.0 to 6.6	.43 .43
Cf — 39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43 .43

4BS—Boreal Schist Mountain Backslopes with Discontinuous Permafrost

Soil name: Typic Dystricryepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 8 to 25 percent slopes

Composition

- Boreal-taiga mica-rich silt loess slopes: 25 to 50 percent of the map unit (RV=45 percent)
- Boreal-taiga silty schist slopes, frozen: 25 to 50 percent of the map unit (RV=45 percent)
- Alpine-scrub-sedge gravelly schist hummocks, frozen: 5 to 20 percent of the map unit (RV=10 percent)

Setting

Elevation: 194 to 611 m

Precipitation: 345 to 549 mm

Air temperature: -2.9 to -1.2 °C

Frost-free period: 60 to 100 days

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection: Boreal Low Mountains (M131B.M1)

Characteristics of Boreal-taiga mica-rich silt loess slopes

Soil name: Typic Dystrocrepts, loamy-skeletal, thick surface

Landtype: Silty Slopes, Cool (M131B_355)

Climax plant community: Black spruce/mixed ericaceous shrub woodland

Landform(s): mountains

Slope gradient: 15 to 25 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 14 to 30 cm; bedrock (paralithic) at 41 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 10	slightly decomposed plant material	moderately rapid	3.2 to 3.5	3.0 to 4.1	
A — 10 to 19	silt loam	moderate	2.2 to 2.5	3.3 to 4.9	.43 .43
2Bw — 19 to 41	very channery silt loam	moderately rapid	1.8 to 3.1	4.2 to 5.4	.17 .55
2C — 41 to 84	very channery loam	moderately rapid	3.4 to 6.0	4.6 to 5.6	.10 .32
2Cr — 84 to 150	bedrock				

Characteristics of Boreal-taiga silty schist slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, schist, Kuskokwim Mountains

Landtype: Loamy Frozen Slopes (M131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): mountain slopes

Slope gradient: 8 to 25 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): permafrost at 25 to 49 cm; strongly contrasting textural stratification at 25 to 49 cm; bedrock (paralithic) at 70 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 25	peat	moderately rapid	8.0 to 8.8	3.4 to 5.4	
A — 25 to 35	silt loam	moderate	2.4 to 2.8	4.1 to 5.4	.43 .43
2Cgf — 35 to 89	permanently frozen extremely channery silt loam	impermeable	4.8 to 5.8		.10 .55
2Crf — 89 to 150	permanently frozen bedrock	impermeable			

4BSS—Boreal Mica-Rich Low Mountains

Soil name: Typic Eutrocryepts, coarse-silty, 8 to 30 percent slopes

Composition

- Boreal-forested mica-rich silty loess slopes: 80 to 95 percent of the map unit (RV=90 percent)
- Boreal-taiga mica-rich silt loess slopes: 0 to 5 percent of the map unit (RV=3 percent)
- Boreal-taiga mica-rich silty frozen colluvial slopes, Kuskokwim Mountains: 2 to 10 percent of the map unit (RV=3 percent)
- Boreal-riparian scrub mica-rich silty drains, frozen: 0 to 5 percent of the map unit (RV=2 percent)
- Boreal-taiga silty schist slopes, frozen: 0 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 193 to 579 m

Precipitation: 345 to 549 mm

Air temperature: -2.9 to -1.2 °C

Frost-free period: 60 to 100 days

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection: Boreal Low Mountains (M131B.M1)

Characteristics of Boreal-forested mica-rich silty loess slopes

Soil name: Typic Eutrocryepts, coarse-silty

Landtype: Silty Slopes (M131B_349)

Climax plant community: Paper birch-white spruce forest

Landform(s): mountains

Slope gradient: 10 to 30 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): bedrock (paralithic) at 89 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)		Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 6	slightly decomposed plant material	moderately rapid	1.9 to 2.1	3.0 to 3.8		
A	— 6 to 9	silt loam	moderate	0.7 to 0.8	3.0 to 4.2	.43	.43
Bw	— 9 to 56	very fine sandy loam	moderate	11.3 to 13.2	4.2 to 5.5	.43	.43
C	— 56 to 141	very fine sandy loam	moderate	20.4 to 23.8	5.4 to 6.8	.43	.43
2Cr	—141 to 150	bedrock					

4FS—Boreal Mica-Rich Low Mountain Footslopes with Continuous Permafrost

Soil name: Typic Historthels, coarse-silty, 2 to 10 percent slopes

Composition

- Boreal-taiga mica-rich silty frozen colluvial slopes, Kuskokwim Mountains: 75 to 90 percent of the map unit (RV=85 percent)
- Boreal-riparian scrub mica-rich silty drains, frozen: 2 to 10 percent of the map unit (RV=10 percent)
- Boreal-taiga mica-rich silt loess slopes: 2 to 5 percent of the map unit (RV=5 percent)

Setting

Elevation: 177 to 570 m

Precipitation: 345 to 549 mm

Air temperature: -2.9 to -1.2 °C

Frost-free period: 60 to 100 days

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection: Boreal Low Mountains (M131B.M1)

Characteristics of Boreal-taiga mica-rich silty frozen colluvial slopes, Kuskokwim Mountains

Soil name: Typic Historthels, coarse-silty, mica-rich

Landtype: Loamy Frozen Slopes (M131B_400)

Climax plant community: Black spruce/Labrador tea woodland

Landform(s): mountain slopes

Slope gradient: 3 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty colluvium derived from schist

Restrictive feature(s): permafrost at 35 to 62 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi and Oe	— 0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8		
A	— 23 to 39	silt loam	moderate	3.8 to 4.5	3.9 to 5.7	.43	.43
Cf	— 39 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43

4S1—Alpine Low Schist Mountain Summits with Continuous Permafrost

Soil name: Ruptic-Histic Aquiturbels, loamy-skeletal-Typic Histoturbels, coarse-silty-Typic Histoturbels, loamy-skeletal Association, 0 to 16 percent slopes

Composition

- Alpine-scrub gravelly schist circles, Kuskokwim Mountains: 20 to 65 percent of the map unit (RV=55 percent)
- Alpine-tussock-scrub mica-rich silty slopes, Kuskokwim Mountains: 15 to 35 percent of the map unit (RV=25 percent)
- Alpine-scrub-sedge gravelly schist hummocks, frozen: 15 to 30 percent of the map unit (RV=20 percent)

Setting

Elevation: 197 to 632 m

Precipitation: 356 to 549 mm

Air temperature: -2.9 to -2 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection: Alpine Low Mountains (M131B.M1A)

Characteristics of Alpine-scrub gravelly schist circles, Kuskokwim Mountains

Soil name: Ruptic-Histic Aquiturbels, loamy-skeletal, Kuskokwim Mountains

Landtype: Loamy Frozen Slopes, High Elevation (M131B_415)

Climax plant community: Mixed ericaceous shrub-shrub birch scrub

Landform(s): nonsorted circles on mountains

Slope gradient: 4 to 16 percent

Parent material: silty eolian deposits over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 0 to 33 cm; permafrost at 88 to 150 cm; bedrock (paralithic) at 88 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	4.2 to 5.4		
A — 1 to 3	silt loam	moderate	0.5 to 0.6	4.2 to 5.6	.43	.43
2Bw/Cjj — 3 to 11	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 5.7	.10	.32
2C/Bwjj — 11 to 150	very channery silt loam	moderately rapid	11.1 to 19.5	4.8 to 5.9	.10	.32
2Crf —150 to 150	permanently frozen bedrock	impermeable				

Characteristics of Alpine-tussock-scrub mica-rich silty slopes, Kuskokwim Mountains

Soil name: Typic Histoturbels, coarse-silty, Kuskokwim Mountains

Landtype: Gravelly Frozen Slopes, Wet (M131B_179)

Climax plant community: Tussock cottongrass/mixed ericaceous shrub meadow2

Landform(s): turf hummocks on mountains

Slope gradient: 0 to 8 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): permafrost at 51 to 82 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 31	peat	moderately rapid	9.9 to 10.8	3.3 to 5.2			
Cg/Oajj — 31 to 61	silt loam, muck	moderate	5.1 to 6.0	4.5 to 5.3	.32	.32	
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43	

Characteristics of Alpine-scrub-sedge gravelly schist hummocks, frozen

Soil name: Typic Histoturbels, loamy-skeletal, Kuskokwim Mountains

Landtype: Loamy Frozen Slopes, High Elevation (M131B_415)

Climax plant community: Mixed ericaceous shrub-shrub birch scrub

Landform(s): hummocks on mountain slopes

Slope gradient: 4 to 16 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 29 to 44 cm; permafrost at 33 to 77 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	3.6 to 5.2			
A/Oajj — 20 to 34	silt loam, muck	moderate	3.4 to 3.9	4.4 to 5.3	.32	.32	
2Cg — 34 to 42	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 5.8	.17	.55	
2Cgf — 42 to 150	permanently frozen very channery loam	impermeable	4.5 to 6.0		.10	.32	

4TS—Boreal Mica-Rich Mountain Toeslopes with Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes

Composition

- Boreal-tussock-scrub mica-rich silty loess slopes, frozen: 30 to 70 percent of the map unit (RV=50 percent)
- Boreal-taiga mica-rich silty frozen colluvial slopes, Kuskokwim Mountains: 20 to 50 percent of the map unit (RV=45 percent)
- Boreal-riparian scrub mica-rich silty drains, frozen: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 193 to 242 m

Precipitation: 345 to 549 mm

Air temperature: -2.9 to -1.2 °C

Frost-free period: 60 to 100 days

Ecoregion Classification**Section:** Kuskokwim Mountains (M131B)**Subsection:** Boreal Low Mountains (M131B.M1)**Characteristics of Boreal-tussock-scrub mica-rich silty loess slopes, frozen****Soil name:** Typic Histoturbels, coarse-silty, mica-rich, Kuskokwim Mountains**Landtype:** Loamy Frozen Slopes, Very Wet (M131B_403)**Climax plant community:** Tussock cottongrass/mixed ericaceous shrub meadow3**Landform(s):** turf hummocks on mountains**Slope gradient:** 0 to 6 percent**Parent material:** grassy organic material over silty cryoturbate derived from schist**Restrictive feature(s):** permafrost at 51 to 82 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2		
Cg/Oajj — 40 to 77	silt loam, muck	moderate	6.3 to 7.4	4.5 to 5.3	.32	.32
Cgf — 77 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43

Characteristics of Boreal-taiga mica-rich silty frozen colluvial slopes, Kuskokwim Mountains**Soil name:** Typic Historthels, coarse-silty, mica-rich**Landtype:** Loamy Frozen Slopes (M131B_400)**Climax plant community:** Black spruce/Labrador tea woodland**Landform(s):** mountains**Slope gradient:** 2 to 10 percent**Parent material:** mossy organic material and/or woody organic material over silty colluvium derived from schist**Restrictive feature(s):** permafrost at 35 to 62 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 23	peat	moderately rapid	7.4 to 8.1	3.5 to 4.8		
A — 23 to 35	silt loam	moderate	2.9 to 3.4	4.9 to 5.7	.43	.43
Cg — 35 to 58	silt loam	moderate	4.6 to 5.5	5.0 to 6.6	.43	.43
Cf — 58 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43

5MS21—Boreal and Subalpine Schist Mountains with Discontinuous Permafrost

Soil name: Humic Cryaquepts, loamy-skeletal-Typic Dystrocrepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 10 to 50 percent slopes

Composition

- Boreal-forested silty schist slopes, wet: 20 to 35 percent of the map unit (RV=30 percent)
- Subalpine-scrub gravelly schist colluvial slopes: 20 to 30 percent of the map unit (RV=25 percent)
- Boreal-taiga gravelly schist slopes, frozen: 15 to 40 percent of the map unit (RV=25 percent)
- Boreal-forested gravelly schist colluvial slopes: 15 to 25 percent of the map unit (RV=20 percent)

Setting

Elevation: 426 to 1,050 m

Precipitation: 358 to 776 mm

Air temperature: -4 to -2.4 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Boreal Outer Range & Kantishna Hills (M135A.M1L)

Characteristics of Boreal-forested silty schist slopes, wet

Soil name: Humic Cryaquepts, loamy-skeletal

Landtype: Loamy Slopes, Wet (M135A_354)

Climax plant community: White spruce/willow woodland, wet

Landform(s): mountains

Slope gradient: 12 to 36 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 16 to 43 cm; bedrock (paralithic) at 84 to 150 cm

Water table (May to September): 0 to 25 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	4.2 to 6.0		
A — 9 to 18	mucky silt loam	moderate	2.2 to 2.5	5.5 to 7.4	.43	.43
2A — 18 to 27	gravelly silt loam	moderately rapid	0.7 to 1.3	5.5 to 7.4	.24	.32
2C — 27 to 103	very channery silt loam	moderately rapid	6.1 to 10.6	5.7 to 7.4	.10	.55
2Cr —103 to 150	bedrock					

Characteristics of Subalpine-scrub gravelly schist colluvial slopes

Soil name: Typic Dystrocryepts, loamy-skeletal, schist

Landtype: Gravelly Mountains, Acid (M135A_303)

Climax plant community: Green alder/red current/bluejoint scrub

Landform(s): mountains

Slope gradient: 26 to 50 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 4 to 32 cm; bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	3.7 to 5.4	
A — 9 to 30	silt loam	moderate	5.0 to 5.9	3.7 to 5.8	.43 .43
2Bw — 30 to 58	very channery loam	moderately rapid	2.2 to 3.9	4.8 to 6.1	.10 .32
2C — 58 to 84	extremely channery loam	moderately rapid	2.1 to 3.6	5.0 to 6.4	.10 .32
2Cr — 84 to 150	bedrock				

Characteristics of Boreal-taiga gravelly schist slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, schist

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): mountain slopes

Slope gradient: 10 to 30 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): permafrost at 25 to 49 cm; strongly contrasting textural stratification at 25 to 49 cm; bedrock (paralithic) at 70 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 25	peat	moderately rapid	8.0 to 8.8	3.4 to 5.4	
A — 25 to 35	silt loam	moderate	2.4 to 2.8	4.1 to 5.4	.43 .43
2Cgf — 35 to 89	permanently frozen extremely channery silt loam	impermeable	4.8 to 5.8		.10 .55
2Crf — 89 to 150	permanently frozen bedrock	impermeable			

5P1—Alpine Schist Mountain Summits with Discontinuous Permafrost

Soil name: Ruptic Histic Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Tpic Aquiturbels, loamy-skeletal Association, 0 to 25 percent slopes

Composition

- Alpine-scrub gravelly schist circles, frozen: 30 to 50 percent of the map unit (RV=35 percent)
- Alpine-dwarf scrub gravelly schist steps and lobes: 15 to 55 percent of the map unit (RV=30 percent)
- Alpine-sedge-dwarf scrub gravelly schist lobes and stripes, frozen: 15 to 35 percent of the map unit (RV=20 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 5 to 15 percent of the map unit (RV=10 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 0 to 15 percent of the map unit (RV=5 percent)

Setting

Elevation: 543 to 1,546 m
Precipitation: 446 to 870 mm
Air temperature: -5.1 to -2.4 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-scrub gravelly schist circles, frozen

Soil name: Ruptic-Histic Aquiturbels, loamy-skeletal
Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)
Climax plant community: Shrub birch/sedge scrub mosaic
Landform(s): nonsorted circles on mountains
Slope gradient: 0 to 10 percent
Parent material: silty eolian deposits over gravelly cryoturbate derived from schist
Restrictive feature(s): strongly contrasting textural stratification at 1 to 12 cm; bedrock (paralithic) at 88 to 150 cm; permafrost at 88 to 150 cm
Water table (May to September): 80 to 120 cm
Drainage class: moderately well drained
Hydric soil: no
Hydrologic group: C
Flooding hazard: none
Ponding hazard: none
Potential frost action: high
Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	4.2 to 5.4		
A	— 1 to 3	silt loam	moderate	0.5 to 0.6	4.2 to 5.8	.43	.43
2Bw/Cjj	— 3 to 11	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 6.0	.10	.32
2C/Bwjj	— 11 to 150	very channery silt loam	moderately rapid	11.1 to 19.5	4.8 to 6.5	.10	.32
2Crf	—150 to 150	permanently frozen bedrock	impermeable				

Characteristics of Alpine-dwarf scrub gravelly schist steps and lobes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, steps
Landtype: Gravelly Mountains, High Elevation (M135A_310)
Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub
Landform(s): solifluction lobes on mountains
Slope gradient: 0 to 20 percent
Parent material: gravelly cryoturbate derived from schist
Restrictive feature(s): bedrock (paralithic) at 110 to 150 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
A — 0 to 3	gravelly silt loam	moderately rapid	0.4 to 0.5	4.0 to 4.6	.28	.55
AC/Bw — 3 to 45	very channery silt loam	moderately rapid	3.4 to 5.9	4.2 to 5.2	.10	.32
C — 45 to 150	very channery silt loam	moderately rapid	8.4 to 14.7	4.6 to 5.2	.10	.32
Cr —150 to 150	bedrock					

Characteristics of Alpine-sedge-dwarf scrub gravelly schist lobes and stripes, frozen**Soil name:** Typic Aquiturbels, loamy-skeletal**Landtype:** Gravelly Frozen Slopes, Cold (M135A_183)**Climax plant community:** Sedge/dwarf willow-white mountain avens wet meadow**Landform(s):** solifluction lobes on mountains; stripes on mountains**Slope gradient:** 8 to 25 percent**Parent material:** gravelly cryoturbate derived from schist**Restrictive feature(s):** permafrost at 68 to 150 cm; bedrock (paralithic) at 68 to 150 cm**Water table (May to September):** 0 to 130 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oe — 0 to 17	moderately decomposed plant	moderately rapid	5.4 to 5.9	5.7 to 6.9		
A/Cgjj — 17 to 21	very gravelly silt loam	moderately rapid	0.5 to 0.6	5.1 to 6.9	.17	.55
Cg — 21 to 130	very gravelly loam	moderately rapid	8.7 to 15.3	5.6 to 6.9	.10	.32
Crf —130 to 150	permanently frozen bedrock	impermeable				

5SA1—Alpine Schist Mountains**Soil name:** Typic Dystroglepts, loamy-skeletal-Rock Outcrop Association, 12 to 55 percent slopes**Composition**

- Alpine-dwarf scrub gravelly schist colluvial slopes: 20 to 45 percent of the map unit (RV=30 percent)
- Alpine-dwarf scrub gravelly schist steps and lobes: 20 to 40 percent of the map unit (RV=30 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 10 to 25 percent of the map unit (RV=15 percent)
- Alpine-sedge-dwarf scrub gravelly schist lobes and stripes, frozen: 10 to 20 percent of the map unit (RV=15 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 5 to 15 percent of the map unit (RV=10 percent)

Setting**Elevation:** 427 to 1,536 m**Precipitation:** 446 to 870 mm**Air temperature:** -5.1 to -2.4 °C**Frost-free period:** 50 to 70 days**Ecoregion Classification****Section:** Alaska Mountains (M135A)**Subsection:** Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-dwarf scrub gravelly schist colluvial slopes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist
Landtype: Gravelly Mountains, High Elevation (M135A_310)
Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub
Landform(s): ridges on mountains
Slope gradient: 20 to 55 percent
Parent material: gravelly colluvium derived from schist
Restrictive feature(s): bedrock (paralithic) at 50 to 90 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate
Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
A — 0 to 2	gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28 .55
Bw — 2 to 28	very channery silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17 .55
C — 28 to 86	extremely channery silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10 .55
Cr — 86 to 150	bedrock				

Characteristics of Alpine-dwarf scrub gravelly schist steps and lobes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, steps
Landtype: Gravelly Mountains, High Elevation (M135A_310)
Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub
Landform(s): solifluction lobes on ridges on mountains
Slope gradient: 15 to 45 percent
Parent material: gravelly cryoturbate derived from schist
Restrictive feature(s): bedrock (paralithic) at 110 to 150 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate
Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
A — 0 to 3	gravelly silt loam	moderately rapid	0.4 to 0.5	4.0 to 4.6	.28 .55
AC/Bw — 3 to 45	very channery silt loam	moderately rapid	3.4 to 5.9	4.2 to 5.2	.10 .32
C — 45 to 150	very channery silt loam	moderately rapid	8.4 to 14.7	4.6 to 5.2	.10 .32
Cr —150 to 150	bedrock				

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior
Landtype: Rock and Ice, Nonvegetated (M135A_ROC)
Climax plant community: Sparsely vegetated mountain slopes, Interior
Landform(s): mountains, glaciers and moraines
Slope gradient: 20 to 150 percent
Parent material: rockfall deposits and/or scree and/or talus
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: not determined

Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: none
Ponding hazard: none
Potential frost action: not determined

5SA2—Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Cool

Soil name: Ruptic-Histic Aquiturbels, loamy-skeletal-Oxyaquic Eutrocrypts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 5 to 36 percent slopes

Composition

- Alpine-scrub gravelly schist circles, frozen: 35 to 55 percent of the map unit (RV=50 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 15 to 35 percent of the map unit (RV=25 percent)
- Alpine-scrub-sedge-gravelly schist hummocks, frozen: 10 to 20 percent of the map unit (RV=15 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 2 to 10 percent of the map unit (RV=5 percent)
- Alpine-riparian scrub loamy schist flood plains: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 635 to 1,216 m
Precipitation: 446 to 870 mm
Air temperature: -5.1 to -2.4 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-scrub gravelly schist circles, frozen

Soil name: Ruptic-Histic Aquiturbels, loamy-skeletal
Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)
Climax plant community: Shrub birch/sedge scrub mosaic
Landform(s): nonsorted circles on mountains
Slope gradient: 12 to 25 percent
Parent material: silty eolian deposits over gravelly cryoturbate derived from schist
Restrictive feature(s): strongly contrasting textural stratification at 1 to 12 cm; permafrost at 88 to 150 cm; bedrock (paralithic) at 88 to 150 cm
Water table (May to September): 80 to 120 cm
Drainage class: moderately well drained
Hydric soil: no
Hydrologic group: C
Flooding hazard: none
Ponding hazard: none
Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3		4.2 to 5.4		
A — 1 to 3	silt loam	moderate	0.5 to 0.6		4.2 to 5.8	.43	.43
2Bw/Cjj — 3 to 11	very channery silt loam	moderately rapid	0.6 to 1.1		4.4 to 6.0	.10	.32
2C/Bwjj — 11 to 150	very channery silt loam	moderately rapid	11.1 to 19.5		4.8 to 6.5	.10	.32
2Crf —150 to 150	permanently frozen bedrock	impermeable					

Characteristics of Subalpine-scrub-meadow mosaic gravelly schist swales

Soil name: Oxyaquic Eutrocryepts, loamy-skeletal

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 12 to 36 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 8 to 30 cm; bedrock (paralithic) at 78 to 150 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.1 to 6.0			
A	— 3 to 9	channery loam	moderate	1.4 to 1.7	4.5 to 6.3	.32	.32	
2C	— 9 to 124	very channery loam	moderately rapid	9.2 to 16.1	5.2 to 6.8	.10	.32	
2Cr	—124 to 150	bedrock						

Characteristics of Alpine-scrub-sedge-gravelly schist hummocks, frozen

Soil name: Typic Histoturbels, loamy-skeletal, schist, steps

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): hummocks on mountains

Slope gradient: 5 to 20 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 29 to 44 cm; permafrost at 33 to 77 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe	— 0 to 20	peat	moderately rapid	6.4 to 7.0	3.6 to 5.2			
A/Oajj	— 20 to 34	silt loam, muck	moderate	3.4 to 3.9	4.4 to 5.3	.32	.32	
2Cg	— 34 to 42	very cobbly loam	moderately rapid	0.6 to 1.1	4.4 to 5.8	.10	.32	
2Cgf	— 42 to 150	permanently frozen very cobbly loam	impermeable	4.5 to 6.0		.10	.32	

5SA11—Alpine and Subalpine Schist Mountains

Soil name: Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 12 to 50 percent slopes

Composition

- Alpine-scrub mosaic gravelly colluvial schist slopes: 20 to 40 percent of the map unit (RV=30 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 10 to 25 percent of the map unit (RV=20 percent)
- Alpine-scrub gravelly schist colluvial slopes, thick surface: 10 to 25 percent of the map unit (RV=20 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 10 to 20 percent of the map unit (RV=15 percent)
- Subalpine-scrub gravelly schist colluvial slopes: 5 to 25 percent of the map unit (RV=15 percent)

Setting

Elevation: 396 to 1,479 m

Precipitation: 446 to 870 mm

Air temperature: -5.1 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-scrub mosaic gravelly colluvial schist slopes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, summits

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): ridges on mountains

Slope gradient: 20 to 50 percent

Parent material: gravelly colluvium derived from schist

Restrictive feature(s): bedrock (paralithic) at 19 to 90 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
A — 0 to 2	very gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28	.55
Bw — 2 to 28	very gravelly silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17	.55
C — 28 to 86	extremely cobbly silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10	.55
Cr — 86 to 150	bedrock					

Characteristics of Subalpine-scrub-meadow mosaic gravelly schist swales

Soil name: Oxyaquic Eutrocryepts, loamy-skeletal

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 12 to 36 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 8 to 30 cm; bedrock (paralithic) at 78 to 150 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water		
				Capacity (cm)	pH	Kw Kf
Oi	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.1 to 6.0	
A	— 3 to 9	channery loam	moderate	1.4 to 1.7	4.5 to 6.3	.32 .32
2C	— 9 to 124	very channery loam	moderately rapid	9.2 to 16.1	5.2 to 6.8	.10 .32
2Cr	—124 to 150	bedrock				

Characteristics of Alpine-scrub gravelly schist colluvial slopes, thick surface

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, thick surface

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 20 to 50 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 5 to 25 cm; bedrock (paralithic) at 110 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water		
				Capacity (cm)	pH	Kw Kf
Oi and Oe	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.0 to 5.4	
A	— 3 to 8	silt loam	moderate	0.9 to 1.0	3.8 to 5.1	.43 .43
2Bw	— 8 to 20	very channery silt loam	moderately rapid	1.0 to 1.7	4.2 to 5.4	.10 .32
2C	— 20 to 150	extremely channery silt loam	moderately rapid	10.4 to 18.2	5.0 to 6.2	.10 .55
2Cr	—150 to 150	bedrock				

5TS1—Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Warm

Soil name: Ruptic-Histic-Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 5 to 45 percent slopes

Composition

- Alpine-scrub gravelly schist circles, frozen: 40 to 60 percent of the map unit (RV=45 percent)
- Alpine-scrub gravelly schist colluvial slopes, thick surface: 20 to 45 percent of the map unit (RV=25 percent)
- Alpine-scrub-sedge-gravelly schist hummocks, frozen: 15 to 25 percent of the map unit (RV=20 percent)
- Alpine-riparian scrub gravelly schist flood plains: 0 to 15 percent of the map unit (RV=5 percent)
- Alpine-scrub gravelly schist terraces: 0 to 15 percent of the map unit (RV=5 percent)

Setting

Elevation: 750 to 1,167 m

Precipitation: 446 to 870 mm

Air temperature: -5.1 to -2.4 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-scrub gravelly schist circles, frozen

Soil name: Ruptic-Histic Aquiturbels, loamy-skeletal

Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)

Climax plant community: Shrub birch/sedge scrub mosaic

Landform(s): nonsorted circles on mountains

Slope gradient: 5 to 20 percent

Parent material: silty eolian deposits over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 1 to 12 cm; permafrost at 88 to 150 cm; bedrock (paralithic) at 88 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	4.2 to 5.4		
A — 1 to 3	silt loam	moderate	0.5 to 0.6	4.2 to 5.8	.43	.43
2Bw/Cjj — 3 to 11	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 6.0	.10	.32
2C/Bwjj — 11 to 150	very channery silt loam	moderately rapid	11.1 to 19.5	4.8 to 6.5	.10	.32
2Crf —150 to 150	permanently frozen bedrock	impermeable				

Characteristics of Alpine-scrub gravelly schist colluvial slopes, thick surface

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, thick surface

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 10 to 45 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 5 to 25 cm; bedrock (paralithic) at 110 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.0 to 5.4		
A — 3 to 8	silt loam	moderate	0.9 to 1.0	3.8 to 5.1	.43	.43
2Bw — 8 to 20	very channery silt loam	moderately rapid	1.0 to 1.7	4.2 to 5.4	.10	.32
2C — 20 to 150	extremely channery silt loam	moderately rapid	10.4 to 18.2	5.0 to 6.2	.10	.55
2Cr —150 to 150	bedrock					

Characteristics of Alpine-scrub-sedge-gravelly schist hummocks, frozen

Soil name: Typic Histoturbels, loamy-skeletal, schist, steps

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): hummocks on mountains

Slope gradient: 5 to 20 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 29 to 44 cm; permafrost at 33 to 77 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	3.6 to 5.2		
A/Oajj — 20 to 34	silt loam, muck	moderate	3.4 to 3.9	4.4 to 5.3	.32	.32
2Cg — 34 to 42	very cobbly loam	moderately rapid	0.6 to 1.1	4.4 to 5.8	.10	.32
2Cgf — 42 to 150	permanently frozen very cobbly loam	impermeable	4.5 to 6.0		.10	.32

5V1—Alpine Schist Alluvial Fans with Discontinuous Permafrost

Soil name: Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy-Typic Gelorthents, loamy-skeletal Association, 2 to 15 percent slopes

Composition

- Alpine-scrub gravelly schist terraces: 30 to 65 percent of the map unit (RV=40 percent)
- Alpine-scrub gravelly schist colluvial toeslopes, frozen: 15 to 45 percent of the map unit (RV=25 percent)
- Alpine-riparian scrub gravelly schist flood plains: 10 to 35 percent of the map unit (RV=20 percent)
- Alpine-riparian scrub loamy schist flood plains: 5 to 10 percent of the map unit (RV=10 percent)
- Nonvegetated alluvium: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 673 to 1,109 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Alpine-scrub gravelly schist terraces

Soil name: Typic Haplogelods, sandy-skeletal, schist

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 5 to 15 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8		
E	— 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43	.43
Bs	— 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43	.43
2Bs	— 15 to 21	extremely gravelly coarse sand	rapid	0.1 to 0.2	4.4 to 5.6	.02	.10
2C	— 21 to 150	extremely gravelly coarse sand	rapid	2.6 to 5.2	5.6 to 6.2	.02	.10

Characteristics of Alpine-scrub gravelly schist colluvial toeslopes, frozen

Soil name: Typic Historthels, coarse-loamy, schist

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): fans on mountains

Slope gradient: 2 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 33 to 62 cm; permafrost at 33 to 62 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 23	peat	moderately rapid	7.4 to 8.1	5.4 to 5.8		
A	— 23 to 31	silt loam	moderate	1.9 to 2.2	3.7 to 5.8	.43	.43
C	— 31 to 45	silt loam	moderately rapid	1.1 to 2.0	4.8 to 6.1	.43	.43
2Cf	— 45 to 150	permanently frozen gravelly silt loam	impermeable	4.8 to 6.1		.28	.43

Characteristics of Alpine-riparian scrub gravelly schist flood plains

Soil name: Typic Gelorthents, sandy-skeletal, schist

Landtype: Gravelly Flood Plains, Cool (M135A_258)

Climax plant community: Feltleaf willow-mixed shrub/herbaceous scrub

Landform(s): flood plains on alluvial fans on mountains

Slope gradient: 4 to 12 percent

Parent material: silty alluvium over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 18 to 27 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oe — 0 to 7	moderately decomposed plant	moderately rapid	2.2 to 2.5	4.0 to 5.6		
A — 7 to 19	silt loam	moderate	2.2 to 2.6	4.8 to 6.0	.43	.43
2C — 19 to 150	extremely cobbly loamy coarse sand	rapid	10.5 to 15.7	5.2 to 6.6	.02	.10

5V2—Boreal Schist Alluvial Fans

Soil name: Typic Haplocryods, loamy-skeletal-Typic Cryorthents, sandy-skeletal Association, 4 to 16 percent slopes

Composition

- Boreal-forested gravelly schist terraces: 50 to 80 percent of the map unit (RV=65 percent)
- Boreal-riparian forested gravelly schist flood plains: 15 to 30 percent of the map unit (RV=25 percent)
- Nonvegetated alluvium: 2 to 10 percent of the map unit (RV=5 percent)
- Boreal-riparian scrub loamy flood plains: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 658 to 1,145 m

Precipitation: 344 to 923 mm

Air temperature: -6 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Boreal-forested gravelly schist terraces

Soil name: Typic Haplocryods, loamy-skeletal, schist

Landtype: Gravelly and Sandy Slopes (M135A_350)

Climax plant community: White spruce/shrub birch woodland

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 6 to 15 percent

Parent material: silty eolian deposits over gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 5 to 13 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.5 to 4.4		
E — 4 to 9	silt loam	moderate	0.9 to 1.0	3.8 to 5.0	.43	.43
2Bs — 9 to 22	extremely cobbly sandy loam	moderately rapid	1.3 to 1.8	4.0 to 5.6	.15	.55
2BC — 22 to 37	extremely cobbly sandy loam	moderately rapid	1.5 to 2.1	4.4 to 5.6	.15	.55
2C — 37 to 150	extremely cobbly sandy loam	moderately rapid	11.3 to 15.8	5.6 to 6.2	.15	.55

Characteristics of Boreal-riparian forested gravelly schist flood plains

Soil name: Typic Cryorthents, sandy-skeletal, schist
Landtype: Loamy High Flood Plains (M135A_151)
Climax plant community: White spruce/bog blueberry/feathermoss forest
Landform(s): flood plains on alluvial fans on mountains
Slope gradient: 4 to 16 percent
Parent material: sandy and gravelly alluvium derived from schist
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: somewhat excessively drained
Hydric soil: no
Hydrologic group: A
Flooding hazard: occasional
Ponding hazard: none
Potential frost action: low
Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water		Kw	Kf
				Capacity (cm)	pH		
Oi	— 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	5.4 to 6.4		
AC	— 3 to 44	extremely cobbly loamy sand	rapid	2.5 to 4.9	6.5 to 7.9	.02	.20
C	— 44 to 150	extremely cobbly loamy sand	rapid	6.4 to 12.7	6.5 to 7.9	.02	.20

7AF—Alpine Alluvial Fans

Soil name: (Oxyaquic) Humic Eutrogelepts, coarse-silty over sandy-skeletal-Typic Haplogelods, sandy-skeletal Association, 2 to 8 percent slopes

Composition

- Alpine-scrub silty fan terraces: 50 to 80 percent of the map unit (RV=70 percent)
- Alpine-scrub gravelly terraces: 15 to 40 percent of the map unit (RV=28 percent)
- Nonvegetated alluvium: 0 to 3 percent of the map unit (RV=2 percent)

Setting

Elevation: 620 to 1,077 m
Precipitation: 497 to 1,229 mm
Air temperature: -8.3 to -2.5 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Alpine-scrub silty fan terraces

Soil name: (Oxyaquic) Humic Eutrogelepts, coarse-silty over sandy-skeletal
Landtype: Loamy Slopes, High Elevation (M135A_253)
Climax plant community: Diamondleaf willow scrub, moist
Landform(s): fan terraces on alluvial fans on mountains
Slope gradient: 2 to 8 percent
Parent material: silty eolian deposits over sandy and gravelly alluvium
Restrictive feature(s): strongly contrasting textural stratification at 28 to 52 cm
Water table (May to September): 0 to 30 cm
Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 7	slightly decomposed plant material	moderately rapid	2.2 to 2.5	4.0 to 5.5			
A	— 7 to 41	silt loam	moderate	12.9 to 14.3	4.1 to 6.4	.37	.37	
2C	— 41 to 150	extremely cobbly loamy coarse sand	rapid	2.2 to 4.4	5.3 to 7.3	.02	.10	

Characteristics of Alpine-scrub gravelly terraces

Soil name: Typic Haplogelods, sandy-skeletal, terraces

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): fan terraces on alluvial fans

Slope gradient: 2 to 8 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8			
E	— 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43	.43	
Bs	— 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43	.43	
2Bs/C	— 15 to 21	loamy sand	rapid	0.1 to 0.2	4.4 to 5.6	.02	.10	
2C	— 21 to 150	extremely gravelly loamy sand	rapid	2.6 to 5.2	5.6 to 6.2	.02	.10	

7AF2—Alpine and Boreal Alluvial Fans

Soil name: Typic Haplogelods, sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 3 to 25 percent slopes

Composition

- Alpine-scrub gravelly terraces: 40 to 65 percent of the map unit (RV=55 percent)
- Subalpine-riparian scrub gravelly fan terraces: 25 to 45 percent of the map unit (RV=40 percent)
- Nonvegetated alluvium: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 613 to 1,137 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification**Section:** Alaska Mountains (M135A)**Subsection:** Alpine Flood Plains & Terraces & Fans (M135A.V1)**Characteristics of Alpine-scrub gravelly terraces****Soil name:** Typic Haplogelods, sandy-skeletal, terraces**Landtype:** Gravelly and Sandy Terraces, High Elevation (M135A_352)**Climax plant community:** Shrub birch-bog blueberry/lichen scrub**Landform(s):** fan terraces on alluvial fans**Slope gradient:** 10 to 25 percent**Parent material:** silty eolian deposits over sandy and gravelly alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 15 to 31 cm**Water table (May to September):** more than 150 cm**Drainage class:** somewhat excessively drained**Hydric soil:** no**Hydrologic group:** A**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** low**Representative soil profile:**

Horizon	—Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
				Capacity (cm)				
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8			
E	— 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0		.43	.43
Bs	— 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6		.43	.43
2Bs/C	— 15 to 21	loamy sand	rapid	0.1 to 0.2	4.4 to 5.6		.02	.10
2C	— 21 to 150	extremely gravelly loamy sand	rapid	2.6 to 5.2	5.6 to 6.2		.02	.10

Characteristics of Subalpine-riparian scrub gravelly fan terraces**Soil name:** Typic Cryorthents, sandy-skeletal, fans**Landtype:** Gravelly Mountains, Acid (M135A_303)**Climax plant community:** Green alder/red current/bluejoint scrub**Landform(s):** flood plains on alluvial fans**Slope gradient:** 3 to 12 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 10 to 20 cm**Water table (May to September):** more than 150 cm**Drainage class:** excessively drained**Hydric soil:** no**Hydrologic group:** A**Flooding hazard:** occasional**Ponding hazard:** none**Potential frost action:** low**Representative soil profile:**

Horizon	—Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
				Capacity (cm)				
Oe	— 0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	6.0 to 7.7			
AC	— 2 to 10	sandy loam	moderate	1.0 to 1.3	6.0 to 7.8		.32	.32
2C	— 10 to 150	extremely gravelly coarse sand	rapid	5.6 to 11.2	6.2 to 8.4		.02	.10

7AFF—Boreal Outwash Plains and Fans with Discontinuous Permafrost

Soil name: Typic Eutrocryepts, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy Association, 0 to 5 percent slopes

Composition

- Boreal-woodland gravelly terraces: 20 to 45 percent of the map unit (RV=30 percent)
- Boreal-riparian forested loamy flood plains, very wet: 10 to 30 percent of the map unit (RV=25 percent)
- Boreal-taiga high elevation loamy terraces, frozen: 20 to 30 percent of the map unit (RV=25 percent)
- Boreal-riparian scrub gravelly diorite flood plains, moderately wet: 10 to 20 percent of the map unit (RV=15 percent)
- Nonvegetated alluvium: 2 to 10 percent of the map unit (RV=5 percent)

Setting

Elevation: 496 to 865 m

Precipitation: 344 to 923 mm

Air temperature: -6 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Boreal-woodland gravelly terraces

Soil name: Typic Eutrocryepts, sandy-skeletal, terraces, cool

Landtype: Gravelly and Sandy Slopes (M135A_350)

Climax plant community: White spruce/shrub birch woodland

Landform(s): fan terraces on alluvial fans; outwash plains

Slope gradient: 0 to 5 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium and/or sandy and gravelly outwash

Restrictive feature(s): strongly contrasting textural stratification at 10 to 29 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi	0 to 10	slightly decomposed plant material	moderately rapid	3.2 to 3.5	4.0 to 6.1		
A/E	10 to 20	silt loam	moderate	1.7 to 2.0	4.1 to 5.6	.43	.43
2Bw	20 to 29	very gravelly loamy sand	rapid	0.2 to 0.4	5.2 to 6.2	.02	.10
2C	29 to 150	very gravelly coarse sand	rapid	2.4 to 4.8	5.6 to 7.4	.02	.10

Characteristics of Boreal-riparian forested loamy flood plains, very wet

Soil name: Typic Cryaquents, coarse-loamy over sandy-skeletal, moderately wet

Landtype: Loamy Wet High Flood Plains (M135A_156)

Climax plant community: White spruce/Richardson willow/horsetail woodland

Landform(s): flood plains on alluvial fans

Slope gradient: 0 to 4 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 28 to 86 cm

Water table (May to September): 0 to 10 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oe — 0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	5.4 to 6.6			
A/C, Cg/Ab — 4 to 33	stratified fine sand to silt	moderate	3.8 to 4.6	6.3 to 7.2	.28	.28	
2Cg — 33 to 56	extremely cobbly sand	rapid	0.7 to 1.4	6.4 to 7.4	.02	.10	
2C — 56 to 150	extremely cobbly sand	rapid	2.8 to 5.6	6.4 to 7.4	.02	.10	

Characteristics of Boreal-taiga high elevation loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy, terraces

Landtype: Loamy Frozen Terraces (M135A_104)

Climax plant community: Spruce/shrub birch-bog blueberry woodland

Landform(s): fan terraces on alluvial fans; outwash plains

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): permafrost at 63 to 91 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 27	peat	moderately rapid	8.6 to 9.4	4.2 to 6.6			
Cg — 27 to 72	stratified gravelly sand to silt	moderately rapid	5.4 to 7.2	5.2 to 7.0	.17	.24	
Cgf — 72 to 150	permanently frozen stratified gravelly sand to silt	impermeable	5.6 to 7.0		.28	.28	

7CE—Alpine Recent Moraines

Soil name: Typic Gelorthents, loamy-skeletal-Nonvegetated Drift Association 0 to 65 percent slopes

Composition

- Alpine-scrub gravelly moraines, calcareous: 50 to 75 percent of the map unit (RV=60 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 15 to 40 percent of the map unit (RV=28 percent)
- Alpine-dwarf scrub gravelly diorite fans, cool: 5 to 20 percent of the map unit (RV=10 percent)
- Water: 2 to 5 percent of the map unit (RV=2 percent)

Setting

Elevation: 758 to 1,496 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-scrub gravelly moraines, calcareous

Soil name: Typic Gelorthents, loamy-skeletal

Landtype: Moraines, Ice Cored (M135A_802)

Climax plant community: Moraine mountain avens dwarf scrub

Landform(s): moraines

Slope gradient: 10 to 45 percent

Parent material: gravelly till

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oe	0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	6.9 to 7.8		
A	1 to 9	silt loam	moderately rapid	0.7 to 1.0	7.1 to 8.0	.10	.24
2C	9 to 150	extremely cobbly loam	moderately rapid	12.7 to 16.9	7.5 to 8.5	.10	.24

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Landform(s): moraines

Slope gradient: 0 to 65 percent

Parent material: gravelly drift

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

7CEF—Alpine Recent Moraines, Diorite

Soil name: Typic Gelorthents, sandy-skeletal-Nonvegetated Drift Association, 0 to 65 percent slopes

Composition

- Alpine-dwarf scrub gravelly diorite moraines: 55 to 70 percent of the map unit (RV=65 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 15 to 40 percent of the map unit (RV=20 percent)
- Alpine-dwarf scrub-meadow mosaic gravelly depressions: 5 to 20 percent of the map unit (RV=10 percent)
- Water: 5 to 10 percent of the map unit (RV=5 percent)

Setting**Elevation:** 845 to 1,683 m**Precipitation:** 552 to 2,466 mm**Air temperature:** -10.7 to -2.5 °C**Frost-free period:** 50 to 70 days**Ecoregion Classification****Section:** Alaska Mountains (M135A)**Subsection:** Alpine Mountains (M135A.M2)**Characteristics of Alpine-dwarf scrub gravelly diorite moraines****Soil name:** Typic Gelorthents, sandy-skeletal, moraines**Landtype:** Moraines, Ice Cored (M135A_802)**Climax plant community:** Moraine mountain avens dwarf scrub**Landform(s):** moraines**Slope gradient:** 10 to 45 percent**Parent material:** gravelly drift derived from diorite**Restrictive feature(s):** none**Water table (May to September):** more than 150 cm**Drainage class:** excessively drained**Hydric soil:** no**Hydrologic group:** A**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** low**Representative soil profile:**

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oe	— 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	3.8 to 5.2			
A	— 1 to 7	very cobbly sandy loam	moderately rapid	0.5 to 0.7	4.5 to 6.2	.10	.24	
C	— 7 to 150	extremely cobbly loamy coarse sand	rapid	2.9 to 5.7	5.4 to 6.8	.02	.10	

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift**Soil name:** Nonvegetated rock outcrop, ice, talus, and/or drift, Interior**Landtype:** Rock and Ice, Nonvegetated (M135A_ROC)**Climax plant community:** Sparsely vegetated mountain slopes, Interior**Landform(s):** moraines**Slope gradient:** 0 to 65 percent**Parent material:** gravelly drift derived from diorite**Restrictive feature(s):** none**Water table (May to September):** more than 150 cm**Drainage class:** not determined**Hydric soil:** unranked**Hydrologic group:** not determined**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** not determined

7ES—Boreal and Alpine Escarpments

Soil name: Typic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal-Nonvegetated Talus Complex, 20 to 70 percent slopes

Composition

- Boreal-forested gravelly colluvial slopes, dissected: 45 to 70 percent of the unit (RV=60 percent)
- Alpine-scrub gravelly till slopes: 15 to 30 percent of the unit (RV=25 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 10 to 25 percent of the unit (RV=15 percent)

Setting

Elevation: 417 to 745 m

Precipitation: 506 to 732 mm

Air temperature: -3.2 to -2.5 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Lowlands (M135A.G1L)

Characteristics of Boreal-forested gravelly colluvial slopes, dissected

Soil name: Typic Eutrocryepts, coarse-loamy

Landtype: Escarpments (M135A_800)

Climax plant community: White spruce forest

Landform(s): escarpments on terraces

Slope gradient: 30 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium

Restrictive feature(s): strongly contrasting textural stratification at 9 to 18 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	5.2 to 6.0			
A	— 5 to 11	loam	moderate	1.0 to 1.2	4.8 to 5.6	.43	.43	
Bw	— 11 to 32	silt loam	moderate	2.1 to 2.9	5.4 to 6.0	.17	.28	
2C	— 32 to 150	very gravelly loamy sand	rapid	4.7 to 14.2	5.6 to 6.6	.02	.10	

Characteristics of Alpine-scrub gravelly till slopes

Soil name: Typic Haplogelods, loamy-skeletal

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): escarpments; hills

Slope gradient: 20 to 40 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water		Kw	Kf
				Capacity (cm)	pH		
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9		
A	— 5 to 9	silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43	.43
E	— 9 to 10	silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43	.43
2Bs	— 10 to 40	very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10	.24
2C	— 40 to 150	very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10	.24

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Landform(s): mountains, ice, and moraines

Slope gradient: 20 to 70 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

7FGA—Alpine Plains and Hills with Continuous Permafrost, Nenana Gravels

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, loamy-skeletal Association, 0 to 25 percent slopes

Composition

- Alpine-tussock-scrub silty loess slopes, frozen: 30 to 60 percent of the unit (RV=50 percent)
- Alpine-scrub-sedge gravelly slopes, frozen: 30 to 60 percent of the unit (RV=40 percent)
- Subalpine-riparian scrub loamy drains: 2 to 10 percent of the unit (RV=10 percent)

Setting

Elevation: 304 to 670 m

Precipitation: 528 to 758 mm

Air temperature: -3.5 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Uplands (M135A.G1)

Characteristics of Alpine-tussock-scrub silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty, cool

Landtype: Loamy Frozen Wet Terraces, High Elevation (M135A_175)

Climax plant community: Tussock cottongrass/mixed ericaceous shrub meadow

Landform(s): turf hummocks on alluvial flats on basin floors

Slope gradient: 0 to 5 percent

Parent material: woody organic material and/or grassy organic material over silty cryoturbate over silty eolian deposits

Restrictive feature(s): permafrost at 51 to 70 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	3.3 to 4.8		
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	3.9 to 5.4	.37	.37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	4.8 to 5.9	.37	.37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.9		.43	.43

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): mountains

Slope gradient: 5 to 25 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9		
A — 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37	.37
2Cg — 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10	.24
2Cgf — 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0		.10	.24

7FP1—Boreal Flood Plains and Terraces

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex

Composition

- Boreal-riparian forested loamy high flood plains: 20 to 60 percent of the unit (RV=35 percent)
- Boreal-riparian scrub gravelly flood plains, moderately wet: 10 to 50 percent of the unit (RV=25 percent)
- Boreal-riparian scrub loamy flood plains: 15 to 30 percent of the unit (RV=20 percent)
- Boreal-riparian scrub gravelly flood plains, wet: 5 to 15 percent of the unit (RV=10 percent)
- Nonvegetated alluvium: 2 to 30 percent of the unit (RV=5 percent)
- Boreal-riparian scrub loamy wet flood plains: 5 to 20 percent of the unit (RV=5 percent)

Setting

Elevation: 421 to 960 m

Precipitation: 344 to 923 mm

Air temperature: -6 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Boreal-riparian forested loamy high flood plains

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, high flood plains

Landtype: Loamy High Flood Plains (M135A_151)

Climax plant community: White spruce/bog blueberry/feathermoss forest

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 32 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 7	slightly decomposed plant material	moderately rapid	2.2 to 2.5	5.1 to 6.5		
AC — 7 to 17	stratified fine sand to silt	moderate	1.3 to 1.6	5.2 to 6.6	.28	.28
C — 17 to 43	stratified fine sand to silt	moderate	3.4 to 4.2	5.9 to 7.6	.28	.28
2C — 43 to 150	very cobbly sand	rapid	3.2 to 6.4	6.0 to 7.4	.02	.10

Characteristics of Boreal-riparian scrub gravelly flood plains, moderately wet

Soil name: Oxyaquic Cryorthents, sandy-skeletal

Landtype: Gravelly Flood Plains (M135A_204)

Climax plant community: White spruce-poplar/soapberry forest

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 8 to 17 cm

Water table (May to September): approximately 70 cm

Drainage class: somewhat poorly drained

Hydric soil: yes

Hydrologic group: C

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
AC	— 0 to 12	stratified sand to silt	moderate	1.9 to 2.2	7.2 to 8.4	.28	.28	
2C	— 12 to 150	extremely cobbly coarse sand	rapid	5.5 to 11.0	7.2 to 8.4	.02	.10	

Characteristics of Boreal-riparian scrub loamy flood plains

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal

Landtype: Loamy Flood Plains (M135A_100)

Climax plant community: Poplar-feltleaf willow scrub

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: loamy alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 25 to 99 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	4.4 to 5.6			
AC	— 5 to 25	stratified fine sand to silt	moderate	2.6 to 3.2	6.9 to 7.4	.28	.28	
C	— 25 to 92	stratified fine sand to silt	moderate	8.7 to 10.7	7.0 to 7.6	.28	.28	
2C	— 92 to 150	very cobbly sand	rapid	1.7 to 3.5	7.4 to 7.9	.02	.10	

7FP2—Alpine Flood Plains

Soil name: Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Riverwash Complex

Composition

(All components are listed but only major components are described)

- Alpine-riparian scrub gravelly flood plains, moderately wet: 15 to 40 percent of the unit (RV=25 percent)
- Alpine-riparian scrub gravelly flood plains: 15 to 45 percent of the unit (RV=25 percent)
- Nonvegetated alluvium: 10 to 30 percent of the unit (RV=20 percent)
- Alpine-riparian scrub loamy flood plains, wet: 5 to 20 percent of the unit (RV=10 percent)
- Alpine-riparian scrub loamy flood plains: 5 to 25 percent of the unit (RV=10 percent)
- Alpine-scrub gravelly terraces: 5 to 25 percent of the unit (RV=10 percent)

Setting

Elevation: 609 to 1,298 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification**Section:** Alaska Mountains (M135A)**Subsection:** Alpine Flood Plains & Terraces & Fans (M135A.V1)**Characteristics of Alpine-riparian scrub gravelly flood plains, moderately wet****Soil name:** Oxyaquic Gelorthents, sandy-skeletal**Landtype:** Gravelly Low Flood Plains, High Elevation (M135A_257)**Climax plant community:** Feltleaf willow scrub, cool**Landform(s):** channels on flood plains**Slope gradient:** 0 to 2 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 8 to 12 cm**Water table (May to September):** 50 to 70 cm**Drainage class:** somewhat poorly drained**Hydric soil:** yes**Hydrologic group:** C**Flooding hazard:** frequent**Ponding hazard:** none**Potential frost action:** moderate**Representative soil profile:**

Horizon	—Depth (cm)	Texture	Permeability	Available Water		
				Capacity (cm)	pH	Kw Kf
AC	— 0 to 12	stratified sand to silt	moderate	1.9 to 2.2	7.2 to 8.4	.28 .28
2C	— 12 to 150	extremely cobbly loamy sand	rapid	5.5 to 11.0	7.2 to 8.4	.02 .10

Characteristics of Alpine-riparian scrub gravelly flood plains**Soil name:** Typic Gelorthents, sandy-skeletal**Landtype:** Gravelly Flood Plains, Cool (M135A_258)**Climax plant community:** Feltleaf willow-mixed shrub/herbaceous scrub**Landform(s):** flood plains**Slope gradient:** 0 to 2 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 0 to 18 cm**Water table (May to September):** more than 150 cm**Drainage class:** excessively drained**Hydric soil:** no**Hydrologic group:** A**Flooding hazard:** occasional**Ponding hazard:** none**Potential frost action:** low**Representative soil profile:**

Horizon	—Depth (cm)	Texture	Permeability	Available Water		
				Capacity (cm)	pH	Kw Kf
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	6.0 to 7.7	
AC	— 5 to 12	stratified fine sand to silt	moderate	0.9 to 1.1	6.0 to 7.8	.28 .28
2C	— 12 to 150	extremely cobbly coarse sand	rapid	5.5 to 11.0	6.2 to 8.4	.02 .10

Characteristics of Nonvegetated alluvium**Soil name:** Riverwash, nonvegetated**Landtype:** Alluvium, Nonvegetated (Riverwash)**Climax plant community:** Sparsely vegetated alluvium**Landform(s):** flood plains**Slope gradient:** 0 to 5 percent**Parent material:** sandy and silty alluvium and/or sandy and gravelly alluvium**Restrictive feature(s):** none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: not determined

7FP11—Boreal Diorite Flood Plains

Soil name: Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested loamy flood plains, very wet: 25 to 55 percent of the unit (RV=35 percent)
- Boreal-riparian forested gravelly high flood plains: 25 to 40 percent of the unit (RV=30 percent)
- Boreal-riparian scrub gravelly diorite flood plains, moderately wet: 10 to 25 percent of the unit (RV=20 percent)
- Boreal-riparian scrub loamy wet flood plains: 10 to 15 percent of the unit (RV=10 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 493 to 852 m

Precipitation: 344 to 923 mm

Air temperature: -6 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Boreal-riparian forested loamy flood plains, very wet

Soil name: Typic Cryaquents, coarse-loamy over sandy-skeletal, moderately wet

Landtype: Loamy Wet High Flood Plains (M135A_156)

Climax plant community: White spruce/Richardson willow/horsetail woodland

Landform(s): flood plains on alluvial fans

Slope gradient: 0 to 4 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 28 to 86 cm

Water table (May to September): 0 to 10 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oe — 0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	5.4 to 6.6			
A/C, Cg/Ab— 4 to 33	stratified fine sand to silt	moderate	3.8 to 4.6	6.3 to 7.2	.28	.28	
2Cg — 33 to 56	extremely cobbly sand	rapid	0.7 to 1.4	6.4 to 7.4	.02	.10	
2C — 56 to 150	extremely cobbly sand	rapid	2.8 to 5.6	6.4 to 7.4	.02	.10	

Characteristics of Boreal-riparian forested gravelly high flood plains

Soil name: Typic Cryorthents, sandy-skeletal, flood plains

Landtype: Gravelly High Flood Plains, High Elevation (M135A_185)

Climax plant community: White spruce/willow forest

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 7 to 18 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: rare

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oe	— 0 to 9	moderately decomposed plant	moderately rapid	2.9 to 3.1	4.5 to 5.9			
A	— 9 to 13	stratified sand to silt	moderate	0.5 to 0.6	5.3 to 6.9	.28	.28	
2C	— 13 to 150	extremely cobbly loamy coarse sand	rapid	5.5 to 11.0	6.3 to 7.6	.02	.10	

Characteristics of Boreal-riparian scrub gravelly diorite flood plains, moderately wet

Soil name: Oxyaquic Cryorthents, sandy-skeletal, diorite

Landtype: Gravelly Low Flood Plains, Acid (M135A_250)

Climax plant community: Feltleaf willow-green alder scrub

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 8 to 12 cm

Water table (May to September): approximately 70 cm

Drainage class: somewhat poorly drained

Hydric soil: yes

Hydrologic group: C

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
AC	— 0 to 12	stratified sand to silt	moderate	1.9 to 2.2	5.1 to 6.0	.28	.28	
2C	— 12 to 150	extremely cobbly coarse sand	rapid	5.5 to 11.0	5.8 to 6.4	.02	.10	

7FP21—Alpine Diorite Terraces and Flood Plains

Soil name: Typic Haplogelods, sandy-skeletal-Oxyaquic Gelorthents, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Alpine-scrub mosaic gravelly diorite terraces: 30 to 60 percent of the unit (RV=40 percent)
- Alpine-riparian scrub gravelly diorite flood plains, moderately wet: 15 to 45 percent of the unit (RV=25 percent)
- Alpine-scrub loamy terraces: 10 to 40 percent of the unit (RV=20 percent)
- Alpine-riparian scrub loamy wet diorite low flood plains, cool: 5 to 15 percent of the unit (RV=10 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 663 to 1,286 m
Precipitation: 497 to 1,229 mm
Air temperature: -8.3 to -2.5 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Alpine-scrub mosaic gravelly diorite terraces

Soil name: Typic Haplogelods, sandy-skeletal, diorite
Landtype: Gravelly Slopes, High Elevation (M135A_356)
Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic
Landform(s): stream terraces
Slope gradient: 0 to 4 percent
Parent material: silty eolian deposits over sandy and gravelly alluvium derived from diorite
Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm
Water table (May to September): more than 150 cm
Drainage class: somewhat excessively drained
Hydric soil: no
Hydrologic group: A
Flooding hazard: none
Ponding hazard: none
Potential frost action: low

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8		
E	— 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43	.43
Bs	— 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43	.43
2Bs	— 15 to 21	extremely gravelly coarse sand	rapid	0.1 to 0.2	4.4 to 5.6	.02	.10
2C	— 21 to 150	extremely gravelly coarse sand	rapid	2.6 to 5.2	5.6 to 6.2	.02	.10

Characteristics of Alpine-riparian scrub gravelly diorite flood plains, moderately wet

Soil name: Oxyaquic Gelorthents, sandy-skeletal, diorite
Landtype: Gravelly Low Flood Plains, High Elevation (M135A_257)
Climax plant community: Feltleaf willow scrub, cool
Landform(s): channels on flood plains
Slope gradient: 0 to 2 percent
Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from diorite
Restrictive feature(s): strongly contrasting textural stratification at 8 to 12 cm
Water table (May to September): 50 to 70 cm
Drainage class: somewhat poorly drained
Hydric soil: yes
Hydrologic group: C
Flooding hazard: frequent
Ponding hazard: none
Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
AC	— 0 to 12	stratified sand to silt	moderate	1.9 to 2.2	5.8 to 6.4	.28	.28
2C	— 12 to 150	extremely gravelly coarse sand	rapid	5.5 to 11.0	5.8 to 6.4	.02	.10

Characteristics of Alpine-scrub loamy terraces

Soil name: Typic Haplogelods, coarse-loamy over sandy-skeletal
Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)
Climax plant community: Shrub birch-bog blueberry/lichen scrub
Landform(s): stream terraces
Slope gradient: 0 to 4 percent
Parent material: silty eolian deposits over sandy and gravelly alluvium
Restrictive feature(s): strongly contrasting textural stratification at 11 to 17 cm; strongly contrasting textural stratification at 29 to 88 cm
Water table (May to September): more than 150 cm
Drainage class: somewhat excessively drained
Hydric soil: no
Hydrologic group: A
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.6 to 4.8			
E/A — 5 to 17	silt loam	moderate	2.0 to 2.4	3.8 to 4.8	.43	.43	
2Bs — 17 to 23	stratified fine sand to silt	moderate	0.8 to 1.0	3.9 to 4.8	.28	.28	
2BC — 23 to 34	stratified fine sand to silt	moderate	1.4 to 1.8	5.4 to 6.2	.28	.28	
3C — 34 to 150	extremely cobbly coarse sand	rapid	2.3 to 4.6	5.9 to 6.9	.02	.10	

7MFA—Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost

Soil name: Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal Association, 0 to 36 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-sedge-dwarf scrub gravelly schist slopes, frozen: 15 to 40 percent of the unit (RV=35 percent)
- Alpine-scrub-meadow mosaic gravelly schist swales: 20 to 45 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly schist steps and lobes: 15 to 30 percent of the unit (RV=20 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 2 to 20 percent of the unit (RV=15 percent)

Setting

Elevation: 855 to 1,423 m
Precipitation: 552 to 2,466 mm
Air temperature: -10.7 to -2.5 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-sedge-dwarf scrub gravelly schist slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, schist swales
Landtype: Gravelly Frozen Slopes, Cold (M135A_183)
Climax plant community: Sedge/dwarf willow-white mountain avens wet meadow
Landform(s): saddles on mountains
Slope gradient: 8 to 25 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 27 to 39 cm; permafrost at 51 to 144 cm; bedrock (paralithic) at 90 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 21	peat	moderately rapid	6.7 to 7.3	4.7 to 6.7	
A — 21 to 28	silt loam	moderately rapid	0.8 to 1.1	4.1 to 6.9	.43 .43
2Cg — 28 to 51	very channery silt loam	moderately rapid	1.8 to 3.2	5.3 to 6.6	.10 .32
2Cf — 51 to 150	permanently frozen very channery silt loam	impermeable	5.3 to 6.6		.10 .32
2Cr — 150 to 150	permanently frozen bedrock	impermeable			

Characteristics of Alpine-scrub-meadow mosaic gravelly schist swales

Soil name: (Oxyaquic) Humic Eutrogelepts, loamy-skeletal, schist

Landtype: Swales, High Elevation (M135A_420)

Climax plant community: Diamondleaf willow-mixed willow scrub mosaic

Landform(s): swales on mountains

Slope gradient: 20 to 36 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 20 to 40 cm; bedrock (paralithic) at 84 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 6	slightly decomposed plant material	moderately rapid	1.9 to 2.1	4.4 to 5.9	
A — 6 to 29	mucky silt loam	moderate	5.5 to 6.4	4.9 to 6.2	.43 .43
2C — 29 to 87	very channery loam	moderately rapid	4.6 to 8.1	5.2 to 6.6	.10 .55
2Cr — 87 to 150	bedrock				

Characteristics of Alpine-dwarf scrub gravelly schist steps and lobes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, steps

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): solifluction lobes on mountains

Slope gradient: 0 to 20 percent

Parent material: gravelly cryoturbate derived from schist

Restrictive feature(s): bedrock (paralithic) at 110 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
A — 0 to 3	gravelly silt loam	moderately rapid	0.4 to 0.5	4.0 to 4.6	.28 .55
AC/Bw — 3 to 45	very channery silt loam	moderately rapid	3.4 to 5.9	4.2 to 5.2	.10 .32
C — 45 to 150	very channery silt loam	moderately rapid	8.4 to 14.7	4.6 to 5.2	.10 .32
Cr —150 to 150	bedrock				

7MS1D—Alpine Dark Sedimentary Mountains

Soil name: Typic Haplogelolls, loamy-skeletal-Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub dark gravelly colluvial slopes: 25 to 45 percent of the unit (RV=30 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 10 to 35 percent of the unit (RV=25 percent)
- Alpine-scrub gravelly colluvial slopes: 20 to 35 percent of the unit (RV=25 percent)
- Subalpine-scrub-meadow mosaic dark gravelly swales: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub dark gravelly colluvial slopes, moist: 5 to 15 percent of the unit (RV=7 percent)
- Alpine-sedge-dwarf scrub gravelly swales, frozen: 0 to 5 percent of the unit (RV=3 percent)

Setting

Elevation: 836 to 1,592 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub dark gravelly colluvial slopes

Soil name: Typic Haplogelolls, loamy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Restrictive feature(s): strongly contrasting textural stratification at 5 to 20 cm; bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.2 to 7.4	
A — 3 to 9	silt loam	moderate	1.0 to 1.2	5.9 to 7.8	.43 .43
2A — 9 to 48	very channery loam	moderately rapid	3.1 to 4.7	6.0 to 8.2	.24 .64
2C — 48 to 72	extremely channery loam	moderately rapid	1.9 to 2.9	6.0 to 8.3	.24 .64
2Cr — 72 to 150	bedrock				

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior
Landtype: Rock and Ice, Nonvegetated (M135A_ROC)
Climax plant community: Sparsely vegetated mountain slopes, Interior
Landform(s):
Slope gradient: 25 to 70 percent
Parent material: rockfall deposits and/or scree and/or talus
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: not determined
Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: none
Ponding hazard: none
Potential frost action: not determined

Characteristics of Alpine-scrub gravelly colluvial slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, warm
Landtype: Gravelly Slopes (M135A_358)
Climax plant community: Shrub birch-bog blueberry scrub
Landform(s): mountains
Slope gradient: 25 to 70 percent
Parent material: silty eolian deposits over gravelly colluvium derived from shale
Restrictive feature(s): strongly contrasting textural stratification at 4 to 18 cm; bedrock (paralithic) at 49 to 150 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 7	moderately decomposed plant	moderately rapid	2.2 to 2.5	3.8 to 5.9	
A — 7 to 13	silt loam	moderate	1.0 to 1.2	4.2 to 5.0	.43 .43
2Bw — 13 to 44	very channery loam	moderately rapid	2.5 to 3.7	4.3 to 5.6	.10 .32
2C — 44 to 120	very channery loam	moderately rapid	6.1 to 9.1	5.4 to 6.0	.10 .32
2Cr —120 to 150	bedrock				

7MS1L—Alpine Mixed Lithology Mountains

Soil name: Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 20 to 35 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly colluvial slopes: 20 to 30 percent of the unit (RV=25 percent)
- Alpine-scrub gravelly colluvial slopes: 15 to 35 percent of the unit (RV=25 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, moist: 5 to 20 percent of the unit (RV=15 percent)
- Subalpine-scrub gravelly colluvial slopes: 2 to 10 percent of the unit (RV=3 percent)
- Alpine-sedge-dwarf scrub gravelly swales, frozen: 0 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 641 to 1,368 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Landform(s): mountains, ice, and moraines

Slope gradient: 25 to 70 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-dwarf scrub gravelly colluvial slopes

Soil name: Typic Eutrogelepts, loamy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 2 to 14 cm; bedrock (paralithic) at 84 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	— 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	4.0 to 5.4		
A	— 2 to 6	silt loam	moderate	0.7 to 0.8	4.0 to 5.4	.43	.43
2Bw	— 6 to 38	very channery loam	moderately rapid	2.6 to 3.8	4.6 to 5.7	.10	.32
2C	— 38 to 150	extremely channery loam	moderately rapid	9.0 to 13.4	5.0 to 6.2	.05	.32
2Cr	—150 to 150	bedrock					

Characteristics of Alpine-scrub gravelly colluvial slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, warm

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Restrictive feature(s): strongly contrasting textural stratification at 4 to 18 cm; bedrock (paralithic) at 49 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oe	— 0 to 7	moderately decomposed plant	moderately rapid	2.2 to 2.5	3.8 to 5.9		
A	— 7 to 13	silt loam	moderate	1.0 to 1.2	4.2 to 5.0	.43	.43
2Bw	— 13 to 44	very channery loam	moderately rapid	2.5 to 3.7	4.3 to 5.6	.10	.32
2C	— 44 to 120	very channery loam	moderately rapid	6.1 to 9.1	5.4 to 6.0	.10	.32
2Cr	—120 to 150	bedrock					

7MS2—Boreal Glaciated Lower Mountain Slopes

Soil name: Oxyaquic Eutrocryepts, coarse-loamy-Typic Eutrocryepts, loamy-skeletal Association, 10 to 45 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested gravelly till slopes, moderately wet: 30 to 70 percent of the unit (RV=55 percent)
- Boreal-forested gravelly warm till slopes: 15 to 40 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly till slopes: 5 to 15 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly till slopes, frozen: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 520 to 1,127 m

Precipitation: 511 to 783 mm

Air temperature: -5.7 to -3.4 °C

Frost-free period: 60 to 80 days

Ecoregion Classification**Section:** Alaska Mountains (M135A)**Subsection:** Boreal Mountains (M135A.M2L)**Characteristics of Boreal-forested gravelly till slopes, moderately wet****Soil name:** Oxyaquic Eutrocryepts, coarse-loamy**Landtype:** Loamy Slopes, Wet (M135A_354)**Climax plant community:** White spruce/willow woodland, wet**Landform(s):** mountains**Slope gradient:** 12 to 45 percent**Parent material:** silty eolian deposits over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 21 to 53 cm**Water table (May to September):** approximately 50 cm**Drainage class:** somewhat poorly drained**Hydric soil:** no**Hydrologic group:** C**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.8 to 6.2		
A	— 3 to 38	silt loam	moderate	13.3 to 14.7	4.9 to 6.2	.43	.43
2C	— 38 to 150	very cobbly loam	moderately rapid	10.1 to 13.4	5.1 to 6.6	.17	.37

Characteristics of Boreal-forested gravelly warm till slopes**Soil name:** Typic Eutrocryepts, loamy-skeletal**Landtype:** Gravelly Mountains, Warm (M135A_355)**Climax plant community:** White spruce/green alder forest**Landform(s):** mountains**Slope gradient:** 14 to 45 percent**Parent material:** silty eolian deposits over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 6 to 14 cm**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** moderate**Representative soil profile:**

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.7 to 4.8		
A	— 8 to 12	silt loam	moderate	1.5 to 1.7	4.3 to 4.8	.43	.43
2Bw	— 12 to 21	very gravelly sandy loam	moderately rapid	0.8 to 1.1	4.8 to 5.3	.24	.24
2C	— 21 to 150	very gravelly sandy loam	moderately rapid	11.6 to 15.5	5.8 to 7.0	.24	.24

7MS3—Alpine Glaciated Mountains with Discontinuous Permafrost

Soil name: Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Oxyaquic Eutrocryepts, coarse-loamy Association, 8 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-sedge gravelly till slopes, frozen: 35 to 60 percent of the unit (RV=55 percent)
- Alpine-scrub gravelly till circles, frozen: 10 to 30 percent of the unit (RV=25 percent)
- Subalpine-scrub-meadow mosaic gravelly till swales: 10 to 25 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub gravelly till slopes: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 517 to 1,492 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): mountains

Slope gradient: 8 to 20 percent

Parent material: woody organic material and/or grassy organic material over silty eolian deposits over gravelly till

Restrictive feature(s): permafrost at 32 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0	
A — 29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37 .37
2Cgf — 32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17 .37

Characteristics of Alpine-scrub gravelly till circles, frozen

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy

Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)

Climax plant community: Shrub birch/sedge scrub mosaic

Landform(s): nonsorted circles on mountains

Slope gradient: 8 to 22 percent

Parent material: silty eolian deposits over gravelly cryoturbate

Restrictive feature(s): strongly contrasting textural stratification at 2 to 32 cm; permafrost at 90 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
Oe — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.4 to 5.0		
A — 1 to 4	silt loam	moderate	1.1 to 1.3	4.4 to 5.6	.43	.43
2Bw/Cjj — 5 to 23	gravelly loam	moderately rapid	1.6 to 2.2	4.8 to 5.8	.28	.37
2C/Bwjj — 23 to 120	gravelly loam	moderately rapid	8.7 to 11.6	5.2 to 6.4	.28	.37
2Cf —120 to 150	permanently frozen permanently frozen gravelly loam	impermeable	5.2 to 6.4		.28	.37

Characteristics of Subalpine-scrub-meadow mosaic gravelly till swales

Soil name: Oxyaquic Eutrocryepts, coarse-loamy, drift

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 8 to 25 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 21 to 53 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	4.8 to 6.2		
A — 8 to 38	mucky silt loam	moderate	11.4 to 12.6	4.9 to 6.2	.43	.43
2Bw — 38 to 69	cobbly sandy loam	moderately rapid	2.8 to 3.7	5.1 to 6.6	.28	.37
2C — 69 to 150	gravelly sandy loam	moderately rapid	7.3 to 9.7	5.1 to 6.6	.28	.37

7MS4—Boreal Lower Mountain Slopes with Continuous Permafrost

Soil name: Typic Historthels, coarse-loamy, 10 to 22 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga loamy drift slopes, frozen: 70 to 90 percent of the unit (RV=85 percent)
- Boreal-forested gravelly till slopes, moderately wet: 2 to 10 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly till slopes: 5 to 15 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly till slopes, frozen: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 520 to 788 m

Precipitation: 511 to 783 mm

Air temperature: -5.7 to -3.4 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Boreal Mountains (M135A.M2L)

Characteristics of Boreal-taiga loamy drift slopes, frozen

Soil name: Typic Historthels, coarse-loamy, drift

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): mountains

Slope gradient: 10 to 22 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over loamy drift

Restrictive feature(s): permafrost at 42 to 68 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 21	peat	moderately rapid	6.7 to 7.3	3.5 to 5.4		
A	— 21 to 28	mucky silt loam	moderate	2.7 to 2.9	5.5 to 5.9	.37	.37
2Cg	— 28 to 58	sandy loam	moderately rapid	3.6 to 4.8	5.5 to 6.4	.37	.37
2Cf	— 58 to 150	permanently frozen sandy loam	impermeable	5.7 to 6.7		.37	.37

7MS31—Alpine Glaciated Mountain Summits and Benches with Discontinuous Permafrost

Soil name: Typic Entrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Entrogelepts, coarse-loamy Association, 2 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly till slopes: 35 to 55 percent of the unit (RV=40 percent)
- Alpine-scrub-sedge gravelly till slopes, frozen: 25 to 45 percent of the unit (RV=25 percent)
- Alpine-scrub-meadow mosaic gravelly till swales: 10 to 25 percent of the unit (RV=20 percent)
- Alpine-scrub gravelly till circles, frozen: 5 to 20 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub gravelly till slopes, moist: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 661 to 1,368 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly till slopes**Soil name:** Typic Eutrogelepts, loamy-skeletal, till**Landtype:** Gravelly Mountains, High Elevation (M135A_310)**Climax plant community:** White mountain avens-mixed ericaceous shrub dwarf alpine scrub**Landform(s):** mountains**Slope gradient:** 2 to 20 percent**Parent material:** silty eolian deposits over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 5 to 15 cm**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** moderate**Representative soil profile:**

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	3.9 to 5.3	
A — 3 to 9	silt loam	moderate	2.3 to 2.5	4.0 to 5.6	.43 .43
2Bw — 9 to 38	very gravelly sandy loam	moderately rapid	2.6 to 3.5	4.8 to 5.9	.10 .24
2C — 38 to 150	very gravelly sandy loam	moderately rapid	10.1 to 13.4	5.6 to 7.0	.10 .24

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen**Soil name:** Typic Historthels, loamy-skeletal, cool**Landtype:** Gravelly Frozen Slopes (M135A_180)**Climax plant community:** Shrub birch-mixed ericaceous shrub/sedge scrub**Landform(s):** mountains**Slope gradient:** 2 to 10 percent**Parent material:** woody organic material and/or grassy organic material over silty eolian deposits over gravelly till**Restrictive feature(s):** permafrost at 32 to 64 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0	
A — 29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37 .37
2Cgf — 32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17 .37

Characteristics of Alpine-scrub-meadow mosaic gravelly till swales**Soil name:** (Oxyaquic) Humic Eutrogelepts, coarse-loamy**Landtype:** Swales, High Elevation (M135A_420)**Climax plant community:** Diamondleaf willow-mixed willow scrub mosaic**Landform(s):** swales on hills**Slope gradient:** 5 to 15 percent**Parent material:** silty eolian deposits over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 12 to 32 cm**Water table (May to September):** 0 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.8 to 6.2		
A	— 3 to 21	silt loam	moderate	6.8 to 7.6	4.9 to 6.2	.43	.43
2AC	— 21 to 32	cobbly loam	moderately rapid	1.0 to 1.3	5.1 to 6.6	.28	.37
2C	— 32 to 150	cobbly loam	moderately rapid	10.6 to 14.2	5.1 to 6.6	.28	.37

7MSA—Alpine Diorite Mountains, Interior

Soil name: Typic Dystroglepts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly diorite colluvial slopes: 25 to 60 percent of the unit (RV=40 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 20 to 50 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly diorite colluvial slopes, moist: 10 to 25 percent of the unit (RV=20 percent)
- Alpine-dwarf scrub-meadow mosaic gravelly depressions: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 845 to 2,043 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly diorite colluvial slopes

Soil name: Typic Dystroglepts, loamy-skeletal, diorite

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 20 to 65 percent

Parent material: gravelly colluvium derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.8 to 4.9			
A — 3 to 9	gravelly loam	moderate	0.6 to 0.8	3.8 to 5.0	.28	.37	
Bw — 9 to 34	very cobbly sandy loam	moderately rapid	2.2 to 3.0	4.2 to 5.5	.10	.24	
C — 34 to 150	very cobbly sandy loam	moderately rapid	10.4 to 13.9	5.4 to 6.2	.10	.24	

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Landform(s): mountains, ice, and moraines

Slope gradient: 25 to 150 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-dwarf scrub gravelly diorite colluvial slopes, moist

Soil name: Typic Dystrogelepts, loamy-skeletal, diorite, cold

Landtype: Gravelly Mountains, Moist (M135A_306)

Climax plant community: Cassiope-polar willow-mountain avens dwarf alpine scrub

Landform(s): mountains

Slope gradient: 20 to 65 percent

Parent material: gravelly colluvium derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.8 to 4.9			
A — 3 to 9	gravelly loam	moderate	0.6 to 0.8	3.8 to 5.0	.28	.37	
Bw — 9 to 34	very cobbly sandy loam	moderately rapid	2.2 to 3.0	4.2 to 5.5	.10	.24	
C — 34 to 150	very cobbly sandy loam	moderately rapid	10.4 to 13.9	5.4 to 6.2	.10	.24	

7MSC—Alpine Mountain Fans

Soil name: Typic Eutrogelepts, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 15 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly fan terraces: 20 to 45 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub-meadow mosaic gravelly fan swales: 25 to 50 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly colluvial slopes: 20 to 40 percent of the unit (RV=25 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 2 to 10 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly colluvial slopes: 2 to 10 percent of the unit (RV=5 percent)
- Alpine-dwarf scrub gravelly fan terraces, moist: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 701 to 1,974 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly fan terraces

Soil name: Typic Eutrogelepts, sandy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 15 to 35 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 3 to 13 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	4.8 to 7.3			
A	— 2 to 8	silt loam	moderate	1.0 to 1.2	4.9 to 7.4	.43	.43	
2Bw	— 8 to 29	extremely cobbly loamy coarse sand	moderately rapid	1.9 to 2.5	5.4 to 7.6	.10	.24	
2C	— 29 to 150	extremely cobbly coarse sand	rapid	2.4 to 4.8	6.0 to 8.0	.02	.10	

Characteristics of Alpine-dwarf scrub-meadow mosaic gravelly fan swales

Soil name: Typic Gelorthents, sandy-skeletal, fans

Landtype: Loamy Depressions, High Elevation (M135A_551)

Climax plant community: Netleaf willow-mountain avens/herbaceous dwarf alpine scrub

Landform(s): flood plains on alluvial fans on mountains

Slope gradient: 15 to 35 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 10 to 13 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.8 to 7.3		
A	— 3 to 10	silt loam	moderate	1.2 to 1.4	4.9 to 7.4	.43	.43
2C	— 10 to 150	extremely cobbly sandy loam	moderately rapid	2.8 to 5.6	6.0 to 8.0	.05	.24

Characteristics of Alpine-dwarf scrub gravelly colluvial slopes

Soil name: Typic Eutrogelepts, loamy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 2 to 14 cm; bedrock (paralithic) at 84 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	4.0 to 5.4		
A	— 2 to 6	silt loam	moderate	0.7 to 0.8	4.0 to 5.4	.43	.43
2Bw	— 6 to 38	very channery loam	moderately rapid	2.6 to 3.8	4.6 to 5.7	.10	.32
2C	— 38 to 150	extremely channery loam	moderately rapid	9.0 to 13.4	5.0 to 6.2	.05	.32
2Cr	—150 to 150	bedrock					

7MSHD—Alpine Dark Sedimentary Mountains, High Elevation

Soil name: Rock Outcrop-Typic Haplogelolls, loamy-skeletal Association, 25 to 150 percent slopes

Composition

(All components are listed but only major components are described)

- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 25 to 60 percent of the unit (RV=35 percent)
- Alpine-dwarf scrub dark gravelly colluvial slopes: 15 to 40 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub dark gravelly colluvial slopes, moist: 15 to 30 percent of the unit (RV=20 percent)
- Alpine-scrub-meadow mosaic gravelly swales: 5 to 15 percent of the unit (RV=12 percent)
- Alpine-sedge-dwarf scrub gravelly swales, frozen: 0 to 5 percent of the unit (RV=3 percent)

Setting

Elevation: 798 to 1,806 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Landform(s): mountains, ice, and moraines

Slope gradient: 25 to 150 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-dwarf scrub dark gravelly colluvial slopes

Soil name: Typic Haplogelolls, loamy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Restrictive feature(s): strongly contrasting textural stratification at 5 to 20 cm; bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.2 to 7.4		
A	— 3 to 9	silt loam	moderate	1.0 to 1.2	5.9 to 7.8	.43	.43
2A	— 9 to 48	very channery loam	moderately rapid	3.1 to 4.7	6.0 to 8.2	.24	.64
2C	— 48 to 72	extremely channery loam	moderately rapid	1.9 to 2.9	6.0 to 8.3	.24	.64
2Cr	— 72 to 150	bedrock					

Characteristics of Alpine-dwarf scrub dark gravelly colluvial slopes, moist

Soil name: Typic Haplogelolls, loamy-skeletal, cold

Landtype: Gravelly Mountains, Moist (M135A_306)

Climax plant community: Cassiope-polar willow-mountain avens dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Restrictive feature(s): strongly contrasting textural stratification at 5 to 20 cm; bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oe	— 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	4.2 to 7.4		
A	— 3 to 9	silt loam	moderate	1.0 to 1.2	5.9 to 7.8	.43	.43
2A	— 9 to 48	very channery loam	moderately rapid	3.1 to 4.7	6.0 to 8.2	.24	.64
2C	— 48 to 72	extremely channery loam	moderately rapid	1.9 to 2.9	6.0 to 8.3	.24	.64
2Cr	— 72 to 150	bedrock					

7MSHL—Alpine Mixed Lithology Mountains, High Elevation

Soil name: Rock Outcrop-Typic Eutrogelepts, loamy-skeletal Association, 25 to 150 percent slopes

Composition

(All components are listed but only major components are described)

- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 25 to 55 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly colluvial slopes: 20 to 45 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, moist: 20 to 45 percent of the unit (RV=30 percent)
- Alpine-scrub-meadow mosaic gravelly swales: 5 to 10 percent of the unit (RV=5 percent)
- Alpine-sedge-dwarf scrub gravelly swales, frozen: 0 to 5 percent of the unit (RV=5 percent)

Setting

Elevation: 755 to 2,053 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Landform(s): mountains, ice, and moraines

Slope gradient: 25 to 150 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-dwarf scrub gravelly colluvial slopes

Soil name: Typic Eutrogelepts, loamy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 2 to 14 cm; bedrock (paralithic) at 84 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water			Kw	Kf
			Permeability	Capacity (cm)	pH		
Oi	— 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	4.0 to 5.4		
A	— 2 to 6	silt loam	moderate	0.7 to 0.8	4.0 to 5.4	.43	.43
2Bw	— 6 to 38	very channery loam	moderately rapid	2.6 to 3.8	4.6 to 5.7	.10	.32
2C	— 38 to 150	extremely channery loam	moderately rapid	9.0 to 13.4	5.0 to 6.2	.05	.32
2Cr	—150 to 150	bedrock					

Characteristics of Alpine-dwarf scrub gravelly colluvial slopes, moist

Soil name: Typic Eutrogelepts, loamy-skeletal, cool

Landtype: Gravelly Mountains, Moist (M135A_306)

Climax plant community: Cassiope-polar willow-mountain avens dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium

Restrictive feature(s): strongly contrasting textural stratification at 2 to 14 cm; bedrock (paralithic) at 84 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	—Depth (cm)	Texture	Available Water			Kw	Kf
			Permeability	Capacity (cm)	pH		
Oe	— 0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	4.0 to 5.4		
A	— 2 to 6	silt loam	moderate	0.7 to 0.8	4.0 to 5.4	.43	.43
2Bw	— 6 to 38	very cobbly loam	moderately rapid	2.6 to 3.8	4.6 to 5.7	.17	.37
2C	— 38 to 150	very cobbly loam	moderately rapid	9.0 to 13.4	5.0 to 6.2	.17	.37
2Cr	—150 to 150	bedrock					

7MSHS—Alpine Schist Mountains, High Elevation

Soil name: Rock Outcrop-Typic Dystrogelepts, loamy-skeletal Association, 0 to 150 percent slopes

Composition

(All components are listed but only major components are described)

- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 20 to 45 percent of the unit (RV=35 percent)
- Alpine-dwarf scrub gravelly schist colluvial slopes: 20 to 40 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly schist steps and lobes: 15 to 35 percent of the unit (RV=20 percent)
- Alpine-sedge-dwarf scrub gravelly schist slopes, frozen: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub gravelly schist colluvial slopes, moist: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 904 to 1,634 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Slope gradient: 25 to 150 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-dwarf scrub gravelly schist colluvial slopes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): ridges on mountains

Slope gradient: 12 to 45 percent

Parent material: gravelly colluvium derived from schist

Restrictive feature(s): bedrock (paralithic) at 50 to 90 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
A — 0 to 2	gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28 .55
Bw — 2 to 28	very channery silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17 .55
C — 28 to 86	extremely channery silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10 .55
Cr — 86 to 150	bedrock				

Characteristics of Alpine-dwarf scrub gravelly schist steps and lobes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, steps

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): solifluction lobes on mountains

Slope gradient: 0 to 20 percent

Parent material: gravelly cryoturbate derived from schist

Restrictive feature(s): bedrock (paralithic) at 110 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
A — 0 to 3	gravelly silt loam	moderately rapid	0.4 to 0.5	4.0 to 4.6	.28 .55
AC/Bw — 3 to 45	very channery silt loam	moderately rapid	3.4 to 5.9	4.2 to 5.2	.10 .32
C — 45 to 150	very channery silt loam	moderately rapid	8.4 to 14.7	4.6 to 5.2	.10 .32
Cr —150 to 150	bedrock				

7NG—Alpine Plains and Hills with Discontinuous Permafrost, Nenana Gravels

Soil name: Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub mosaic gravelly slopes: 40 to 60 percent of the unit (RV=50 percent)
- Alpine-scrub-sedge gravelly slopes, frozen: 15 to 40 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly circles, frozen: 5 to 25 percent of the unit (RV=15 percent)
- Alpine-scrub-meadow mosaic gravelly till swales: 2 to 10 percent of the unit (RV=3 percent)
- Alpine-scrub gravelly slopes: 2 to 10 percent of the unit (RV=2 percent)

Setting

Elevation: 648 to 1,440 m

Precipitation: 528 to 758 mm

Air temperature: -3.5 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Uplands (M135A.G1)

Characteristics of Alpine-scrub mosaic gravelly slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, Nenana Gravels
Landtype: Gravelly Slopes, High Elevation (M135A_356)
Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic
Landform(s): hills
Slope gradient: 2 to 16 percent
Parent material: silty eolian deposits over gravelly residuum
Restrictive feature(s): strongly contrasting textural stratification at 5 to 13 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate
Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oe — 0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	4.0 to 4.8	
A — 2 to 8	silt loam	moderate	1.0 to 1.2	4.4 to 5.5	.43 .43
2Bw — 8 to 48	very gravelly sandy loam	moderately rapid	3.6 to 4.8	5.3 to 6.0	.17 .24
2C — 48 to 150	extremely gravelly loamy coarse sand	rapid	2.0 to 4.1	5.6 to 6.2	.02 .10

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels, cool
Landtype: Gravelly Frozen Slopes (M135A_180)
Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub
Landform(s): mountains
Slope gradient: 5 to 25 percent
Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum
Restrictive feature(s): strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm
Water table (May to September): 0 to 50 cm
Drainage class: poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: none
Potential frost action: high
Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9	
A — 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37 .37
2Cg — 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10 .24
2Cgf — 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0		.10 .24

Characteristics of Alpine-scrub gravelly circles, frozen

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy, Nenana Gravels
Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)
Climax plant community: Shrub birch/sedge scrub mosaic
Landform(s): nonsorted circles on hills; nonsorted circles on plains
Slope gradient: 0 to 10 percent
Parent material: silty eolian deposits over gravelly cryoturbate
Restrictive feature(s): strongly contrasting textural stratification at 2 to 32 cm; permafrost at 90 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	—Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oe	— 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.4 to 5.0		
A	— 1 to 5	silt loam	moderate	1.5 to 1.7	4.4 to 5.6	.43	.43
2Bw/Cjj	— 5 to 23	cobbly sandy loam	moderately rapid	1.6 to 2.2	4.8 to 5.8	.28	.37
2C/Bwjj	— 23 to 120	cobbly sandy loam	moderately rapid	8.7 to 11.6	4.5 to 6.4	.28	.37
2Cf	—120 to 150	permanently frozen gravelly sandy loam	impermeable	4.5 to 6.4		.28	.37

7NG2—Alpine Backslopes on Hills, Nenana Gravels

Soil name: Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocrypts, coarse-loamy-(Oxyaquic) Humic Eutrogelepts, coarse-loamy Association, 12 to 45 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly slopes: 50 to 80 percent of the unit (RV=65 percent)
- Subalpine-scrub-meadow mosaic gravelly swales, Nenana Gravels: 15 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub-meadow mosaic gravelly till swales: 10 to 25 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub gravelly till slopes: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 648 to 1,234 m

Precipitation: 528 to 758 mm

Air temperature: -3.5 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Uplands (M135A.G1)

Characteristics of Alpine-scrub gravelly slopes

Soil name: Typic Haplogelods, loamy-skeletal, Nenana Gravels

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): hills

Slope gradient: 12 to 40 percent

Parent material: silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm) Texture	Available Water			
	Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 5 slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9	
A — 5 to 9 silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43 .43
E — 9 to 10 silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43 .43
2Bs — 10 to 40 very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10 .24
2C — 40 to 150 very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10 .24

Characteristics of Subalpine-scrub-meadow mosaic gravelly swales, Nenana Gravels

Soil name: Oxyaquic Eutrocryepts, coarse-loamy, till, Nenana Gravels

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on hills

Slope gradient: 15 to 45 percent

Parent material: silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 23 to 49 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm) Texture	Available Water			
	Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 7 slightly decomposed plant material	moderately rapid	2.2 to 2.5	4.7 to 5.9	
A — 7 to 28 mucky silt loam	moderate	8.0 to 8.8	4.9 to 6.3	.37 .37
2Bw — 28 to 61 very gravelly sandy loam	moderately rapid	3.0 to 4.0	5.1 to 5.6	.10 .24
2C — 61 to 150 very gravelly sandy loam	moderately rapid	8.0 to 10.7	5.4 to 6.6	.10 .24

Characteristics of Alpine-scrub-meadow mosaic gravelly till swales

Soil name: (Oxyaquic) Humic Eutrogelepts, coarse-loamy

Landtype: Swales, High Elevation (M135A_420)

Climax plant community: Diamondleaf willow-mixed willow scrub mosaic

Landform(s): swales on hills; hills

Slope gradient: 15 to 45 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 12 to 32 cm

Water table (May to September): 0 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm) Texture	Available Water			
	Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3 slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.8 to 6.2	
A — 3 to 21 silt loam	moderate	6.8 to 7.6	4.9 to 6.2	.43 .43
2AC — 21 to 32 cobbly loam	moderately rapid	1.0 to 1.3	5.1 to 6.6	.28 .37
2C — 32 to 150 cobbly loam	moderately rapid	10.6 to 14.2	5.1 to 6.6	.28 .37

7P1—Alpine Glaciated Plains and Hills with Discontinuous Permafrost

Soil name: Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Oxyaquic Eutrocrypts, coarse-loamy Association, 0 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly outwash slopes: 45 to 65 percent of the unit (RV=55 percent)
- Alpine-scrub-sedge loamy terraces, frozen: 15 to 30 percent of the unit (RV=30 percent)
- Subalpine-scrub-meadow mosaic gravelly till swales: 5 to 15 percent of the unit (RV=15 percent)

Setting

Elevation: 792 to 995 m

Precipitation: 528 to 758 mm

Air temperature: -3.5 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Uplands (M135A.G1)

Characteristics of Alpine-scrub gravelly outwash slopes

Soil name: Typic Haplogelods, sandy-skeletal

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): hills; pitted outwash plains

Slope gradient: 0 to 25 percent

Parent material: silty eolian deposits over sandy and gravelly outwash

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8	
E — 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43 .43
Bs — 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43 .43
2Bs — 15 to 21	extremely gravelly loamy coarse sand	rapid	0.1 to 0.2	4.4 to 5.6	.02 .10
2C — 21 to 150	extremely gravelly loamy coarse sand	rapid	2.6 to 5.2	5.6 to 6.2	.02 .10

Characteristics of Alpine-scrub-sedge loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy over sandy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): fan terraces on outwash plains on mountains

Slope gradient: 0 to 10 percent

Parent material: organic material over loamy alluvium over loamy alluvium and/or sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 41 to 150 cm; permafrost at 41 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 21	peat	moderately rapid	6.7 to 7.3	4.9 to 6.0	
Cg — 21 to 61	stratified gravelly sand to silt	moderately rapid	4.8 to 6.4	5.6 to 6.4	.17 .24
2Cf — 61 to 150	permanently frozen extremely cobbly coarse sand	impermeable	5.6 to 6.4		.02 .10

Characteristics of Subalpine-scrub-meadow mosaic gravelly till swales

Soil name: Oxyaquic Eutrocryepts, coarse-loamy, drift

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on hills; depressions on outwash plains

Slope gradient: 5 to 20 percent

Parent material: silty eolian deposits over loamy drift

Restrictive feature(s): strongly contrasting textural stratification at 21 to 53 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	4.8 to 6.2	
A — 8 to 38	mucky silt loam	moderate	11.4 to 12.6	4.9 to 6.2	.43 .43
2Bw — 38 to 69	cobbly sandy loam	moderately rapid	2.8 to 3.7	5.1 to 6.6	.28 .37
2C — 69 to 150	gravelly sandy loam	moderately rapid	7.3 to 9.7	5.1 to 6.6	.28 .37

7P2—Boreal Glaciated Plains and Hills

Soil name: Typic Eutrocryepts, sandy-skeletal-Typic Eutrocryepts, coarse-silty over sandy-skeletal Association, 0 to 30 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested gravelly outwash slopes: 60 to 85 percent of the unit (RV=75 percent)
- Boreal-meadow loamy outwash slope depressions: 10 to 25 percent of the unit (RV=15 percent)
- Alpine-wet meadow gravelly pond margins: 2 to 5 percent of the unit (RV=5 percent)
- Water: 2 to 5 percent of the unit (RV=5 percent)

Setting

Elevation: 475 to 878 m

Precipitation: 506 to 732 mm

Air temperature: -3.2 to -2.5 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Lowlands (M135A.G1L)

Characteristics of Boreal-forested gravelly outwash slopes

Soil name: Typic Eutrocryepts, sandy-skeletal

Landtype: Gravelly and Sandy Slopes (M135A_350)

Climax plant community: White spruce/shrub birch woodland

Landform(s): hills; pitted outwash plains

Slope gradient: 0 to 30 percent

Parent material: silty eolian deposits over sandy and gravelly outwash

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8		3.8 to 4.8		
A — 8 to 10	silt loam	moderate	0.3 to 0.4		3.8 to 5.0	.43	.43
Bw — 10 to 15	silt loam	moderate	0.9 to 1.0		4.0 to 5.6	.43	.43
2BC — 15 to 21	extremely gravelly loamy coarse sand	rapid	0.1 to 0.2		4.4 to 5.6	.02	.10
2C — 21 to 150	extremely gravelly loamy coarse sand	rapid	2.6 to 5.2		5.6 to 6.2	.02	.10

Characteristics of Boreal-meadow loamy outwash slope depressions

Soil name: Oxyaquic Eutrocryepts, coarse-silty over sandy-skeletal

Landtype: Loamy Depressions (M135A_550)

Climax plant community: Graminoid herbaceous meadow

Landform(s): kettles on hills; kettles on outwash plains

Slope gradient: 0 to 30 percent

Parent material: silty eolian deposits over sandy and gravelly outwash

Restrictive feature(s): strongly contrasting textural stratification at 58 to 123 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 7	slightly decomposed plant material	moderately rapid	2.2 to 2.5		5.1 to 6.1		
A — 7 to 33	silt loam	moderate	9.9 to 10.9		5.4 to 6.4	.43	.43
2C — 33 to 150	extremely cobbly coarse sand	rapid	2.3 to 4.7		5.9 to 6.4	.02	.10

7P4—Boreal Glaciated Plains and Hills with Discontinuous Permafrost

Soil name: Typic Haplocryods, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested gravelly till slopes: 25 to 45 percent of the unit (RV=35 percent)
- Boreal-taiga loamy drift slopes, frozen: 25 to 45 percent of the unit (RV=30 percent)
- Boreal-forested gravelly outwash slopes: 15 to 40 percent of the unit (RV=20 percent)
- Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains: 5 to 15 percent of the unit (RV=10 percent)
- Water: 2 to 5 percent of the unit (RV=3 percent)
- Alpine-wet meadow gravelly pond margins: 2 to 3 percent of the unit (RV=2 percent)

Setting

Elevation: 471 to 982 m

Precipitation: 506 to 732 mm

Air temperature: -3.2 to -2.5 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Lowlands (M135A.G1L)

Characteristics of Boreal-forested gravelly till slopes

Soil name: Typic Haplocryods, loamy-skeletal

Landtype: Gravelly and Sandy Slopes (M135A_350)

Climax plant community: White spruce/shrub birch woodland

Landform(s): hills; till plains

Slope gradient: 0 to 15 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw Kf	
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9		
A — 5 to 9	silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43	.43
E — 9 to 10	silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43	.43
2Bs — 10 to 40	very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10	.24
2C — 40 to 150	very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10	.24

Characteristics of Boreal-taiga loamy drift slopes, frozen

Soil name: Typic Historthels, coarse-loamy, drift

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): outwash plains

Slope gradient: 1 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over loamy drift

Restrictive feature(s): permafrost at 42 to 68 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 21	peat	moderately rapid	6.7 to 7.3	3.5 to 5.4	
A — 21 to 28	mucky silt loam	moderate	2.7 to 2.9	5.5 to 5.9	.37 .37
2Cg — 28 to 58	sandy loam	moderately rapid	3.6 to 4.8	5.5 to 6.4	.37 .37
2Cf — 58 to 150	permanently frozen sandy loam	impermeable	5.7 to 6.7		.37 .37

Characteristics of Boreal-forested gravelly outwash slopes

Soil name: Typic Eutrocryepts, sandy-skeletal

Landtype: Gravelly and Sandy Slopes (M135A_350)

Climax plant community: White spruce/shrub birch woodland

Landform(s): hills; pitted outwash plains

Slope gradient: 0 to 20 percent

Parent material: silty eolian deposits over sandy and gravelly outwash

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8	
A — 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43 .43
Bw — 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43 .43
2BC — 15 to 21	extremely gravelly loamy coarse sand	rapid	0.1 to 0.2	4.4 to 5.6	.02 .10
2C — 21 to 150	extremely gravelly loamy coarse sand	rapid	2.6 to 5.2	5.6 to 6.2	.02 .10

7P6—Boreal Outwash Plains with Continuous Permafrost

Soil name: Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 6 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga high elevation loamy terraces, frozen: 55 to 85 percent of the unit (RV=70 percent)
- Boreal-woodland gravelly terraces: 10 to 25 percent of the unit (RV=20 percent)
- Boreal-riparian tall scrub silty frozen drains: 5 to 10 percent of the unit (RV=10 percent)

Setting**Elevation:** 484 to 785 m**Precipitation:** 506 to 732 mm**Air temperature:** -3.2 to -2.5 °C**Frost-free period:** 60 to 80 days**Ecoregion Classification****Section:** Alaska Mountains (M135A)**Subsection:** Glaciated Lowlands (M135A.G1L)**Characteristics of Boreal-taiga high elevation loamy terraces, frozen****Soil name:** Typic Historthels, coarse-loamy, terraces**Landtype:** Loamy Frozen Terraces (M135A_104)**Climax plant community:** Spruce/shrub birch-bog blueberry woodland**Landform(s):** fan terraces on alluvial fans; outwash plains**Slope gradient:** 0 to 2 percent**Parent material:** mossy organic material and/or woody organic material over sandy and silty alluvium over sandy and gravelly alluvium**Restrictive feature(s):** permafrost at 63 to 91 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 27	peat	moderately rapid	8.6 to 9.4	4.2 to 6.6	
Cg — 27 to 72	stratified gravelly sand to silt	moderately rapid	5.4 to 7.2	5.2 to 7.0	.17 .24
Cgf — 72 to 150	permanently frozen stratified gravelly sand to silt	impermeable	5.6 to 7.0		.28 .28

Characteristics of Boreal-woodland gravelly terraces**Soil name:** Typic Eutrocryepts, sandy-skeletal, terraces, cool**Landtype:** Gravelly and Sandy Slopes (M135A_350)**Climax plant community:** White spruce/shrub birch woodland**Landform(s):** outwash plains**Slope gradient:** 0 to 5 percent**Parent material:** silty eolian deposits over sandy and gravelly alluvium and/or sandy and gravelly outwash**Restrictive feature(s):** strongly contrasting textural stratification at 10 to 29 cm**Water table (May to September):** more than 150 cm**Drainage class:** somewhat excessively drained**Hydric soil:** no**Hydrologic group:** A**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** low**Representative soil profile:**

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 10	slightly decomposed plant material	moderately rapid	3.2 to 3.5	4.0 to 6.1	
A/E — 10 to 20	silt loam	moderate	1.7 to 2.0	4.1 to 5.6	.43 .43
2Bw — 20 to 29	very gravelly loamy sand	rapid	0.2 to 0.4	5.2 to 6.2	.02 .10
2C — 29 to 150	very gravelly coarse sand	rapid	2.4 to 4.8	5.6 to 7.4	.02 .10

7SA1—Alpine and Subalpine Mountains

Soil name: Rock Outcrop-Typic Haplogelolls, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 25 to 85 percent slopes

Composition

(All components are listed but only major components are described)

- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 15 to 40 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub dark gravelly colluvial slopes: 20 to 35 percent of the unit (RV=25 percent)
- Alpine-scrub gravelly colluvial slopes: 10 to 20 percent of the unit (RV=20 percent)
- Subalpine-scrub gravelly colluvial slopes, dry: 10 to 20 percent of the unit (RV=15 percent)
- Subalpine-scrub-meadow mosaic dark gravelly swales: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 656 to 1,707 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior

Landtype: Rock and Ice, Nonvegetated (M135A_ROC)

Climax plant community: Sparsely vegetated mountain slopes, Interior

Landform(s): mountains, ice, and moraines

Slope gradient: 25 to 85 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-dwarf scrub dark gravelly colluvial slopes

Soil name: Typic Haplogelolls, loamy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Restrictive feature(s): strongly contrasting textural stratification at 5 to 20 cm; bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.2 to 7.4	
A — 3 to 9	silt loam	moderate	1.0 to 1.2	5.9 to 7.8	.43 .43
2A — 9 to 48	very channery loam	moderately rapid	3.1 to 4.7	6.0 to 8.2	.24 .64
2C — 48 to 72	extremely channery loam	moderately rapid	1.9 to 2.9	6.0 to 8.3	.24 .64
2Cr — 72 to 150	bedrock				

Characteristics of Alpine-scrub gravelly colluvial slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, warm

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 35 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Restrictive feature(s): strongly contrasting textural stratification at 4 to 18 cm; bedrock (paralithic) at 49 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oe — 0 to 7	moderately decomposed plant	moderately rapid	2.2 to 2.5	3.8 to 5.9	
A — 7 to 13	silt loam	moderate	1.0 to 1.2	4.2 to 5.0	.43 .43
2Bw — 13 to 44	very channery loam	moderately rapid	2.5 to 3.7	4.3 to 5.6	.10 .32
2C — 44 to 120	very channery loam	moderately rapid	6.1 to 9.1	5.4 to 6.0	.10 .32
2Cr —120 to 150	bedrock				

7SA3—Alpine and Subalpine Glaciated Mountains with Discontinuous Permafrost

Soil name: Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 20 to 55 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub-meadow mosaic gravelly till swales: 30 to 60 percent of the unit (RV=45 percent)
- Alpine-scrub gravelly till slopes, frozen: 20 to 45 percent of the unit (RV=35 percent)
- Alpine-scrub gravelly till slopes: 15 to 30 percent of the unit (RV=20 percent)

Setting

Elevation: 693 to 1,213 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Subalpine-scrub-meadow mosaic gravelly till swales

Soil name: Oxyaquic Eutrocryepts, coarse-loamy, drift

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 20 to 55 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 21 to 53 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water		pH	Kw	Kf
		Permeability	Capacity (cm)			
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	4.8 to 6.2		
A — 8 to 38	mucky silt loam	moderate	11.4 to 12.6	4.9 to 6.2	.43	.43
2Bw — 38 to 69	cobbly sandy loam	moderately rapid	2.8 to 3.7	5.1 to 6.6	.28	.37
2C — 69 to 150	gravelly sandy loam	moderately rapid	7.3 to 9.7	5.1 to 6.6	.28	.37

Characteristics of Alpine-scrub gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, steep

Landtype: Loamy Frozen Slopes, High Elevation (M135A_177)

Climax plant community: Shrub birch-bog blueberry/moss scrub

Landform(s): benches on mountains

Slope gradient: 20 to 45 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 21 to 29 cm; permafrost at 48 to 130 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water		pH	Kw	Kf
		Permeability	Capacity (cm)			
Oi — 0 to 18	slightly decomposed plant material	moderately rapid	5.8 to 6.3	3.6 to 5.5		
A — 18 to 26	mucky silt loam	moderate	3.0 to 3.4	4.4 to 5.6	.37	.37
2A — 26 to 78	very cobbly loam	moderate	5.2 to 7.3	5.4 to 6.2	.17	.37
2C — 78 to 96	very cobbly sandy loam	moderately rapid	1.6 to 2.2	5.4 to 6.2	.17	.37
2Cf — 96 to 150	permanently frozen very cobbly sandy loam	impermeable	5.4 to 6.2		.17	.37

Characteristics of Alpine-scrub gravelly till slopes

Soil name: Typic Haplogelods, loamy-skeletal

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 4 to 35 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9			
A — 5 to 9	silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43	.43	
E — 9 to 10	silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43	.43	
2Bs — 10 to 40	very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10	.24	
2C — 40 to 150	very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10	.24	

7SA31—Subalpine Mountains

Soil name: Typic Dystrocryepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal Association, 8 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub gravelly colluvial slopes: 30 to 55 percent of the unit (RV=45 percent)
- Subalpine-scrub-meadow mosaic gravelly till swales: 10 to 25 percent of the unit (RV=20 percent)
- Alpine-scrub gravelly till slopes: 15 to 30 percent of the unit (RV=20 percent)
- Alpine-scrub mosaic gravelly till slopes: 10 to 20 percent of the unit (RV=10 percent)
- Alpine-sedge-dwarf scrub gravelly swales, frozen: 0 to 10 percent of the unit (RV=3 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 2 to 10 percent of the unit (RV=2 percent)

Setting

Elevation: 617 to 1,554 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Subalpine-scrub gravelly colluvial slopes

Soil name: Typic Dystrocryepts, loamy-skeletal

Landtype: Gravelly Mountains, Acid (M135A_303)

Climax plant community: Green alder/red current/bluejoint scrub

Landform(s): mountains

Slope gradient: 20 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 9 to 26 cm; bedrock (paralithic) at 46 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.5 to 4.4	
A — 3 to 11	silt loam	moderate	1.4 to 1.6	3.7 to 4.5	.43 .43
2Bw — 11 to 26	very channery loam	moderately rapid	1.2 to 1.8	4.6 to 5.5	.10 .32
2C — 26 to 88	very channery loam	moderately rapid	5.0 to 7.4	4.6 to 5.5	.10 .32
2Cr — 88 to 150	bedrock				

Characteristics of Subalpine-scrub-meadow mosaic gravelly till swales

Soil name: Oxyaquic Eutrocryepts, coarse-loamy, drift

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 10 to 50 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 21 to 53 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	4.8 to 6.2	
A — 8 to 38	mucky silt loam	moderate	11.4 to 12.6	4.9 to 6.2	.43 .43
2Bw — 38 to 69	cobbly sandy loam	moderately rapid	2.8 to 3.7	5.1 to 6.6	.28 .37
2C — 69 to 150	gravelly sandy loam	moderately rapid	7.3 to 9.7	5.1 to 6.6	.28 .37

Characteristics of Alpine-scrub gravelly till slopes

Soil name: Typic Haplogelods, loamy-skeletal

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 8 to 60 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9	
A — 5 to 9	silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43 .43
E — 9 to 10	silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43 .43
2Bs — 10 to 40	very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10 .24
2C — 40 to 150	very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10 .24

7ST—Alpine Terraces

Soil name: Typic Haplogelods, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Association, 0 to 10 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly terraces: 55 to 75 percent of the unit (RV=70 percent)
- Alpine-scrub loamy terraces: 15 to 30 percent of the unit (RV=25 percent)
- Alpine-riparian scrub gravelly flood plains: 2 to 15 percent of the unit (RV=5 percent)

Setting

Elevation: 706 to 1,278 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Alpine-scrub gravelly terraces

Soil name: Typic Haplogelods, sandy-skeletal, terraces

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): stream terraces

Slope gradient: 2 to 10 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8	
E — 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43 .43
Bs — 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43 .43
2Bs/C — 15 to 21	loamy sand	rapid	0.1 to 0.2	4.4 to 5.6	.02 .10
2C — 21 to 150	extremely gravelly loamy sand	rapid	2.6 to 5.2	5.6 to 6.2	.02 .10

Characteristics of Alpine-scrub loamy terraces

Soil name: Typic Haplogelods, coarse-loamy over sandy-skeletal

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): stream terraces

Slope gradient: 2 to 10 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 11 to 17 cm; strongly contrasting textural stratification at 29 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.6 to 4.8			
E/A — 5 to 17	silt loam	moderate	2.0 to 2.4	3.8 to 4.8	.43	.43	
2Bs — 17 to 23	stratified fine sand to silt	moderate	0.8 to 1.0	3.9 to 4.8	.28	.28	
2BC — 23 to 34	stratified fine sand to silt	moderate	1.4 to 1.8	5.4 to 6.2	.28	.28	
3C — 34 to 150	extremely cobbly coarse sand	rapid	2.3 to 4.6	5.9 to 6.9	.02	.10	

7STF—Alpine Terraces and Outwash Plains with Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association, 0 to 2 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga/tussock silty frozen terraces, Alaska Mountains: 20 to 75 percent of the unit (RV=60 percent)
- Boreal-taiga high elevation loamy terraces, frozen: 15 to 50 percent of the unit (RV=35 percent)
- Boreal-forested gravelly till slopes: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 448 to 685 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Boreal-taiga/tussock silty frozen terraces, Alaska Mountains

Soil name: Typic Histoturbels, coarse-silty, Alaska Mountains

Landtype: Loamy Frozen Terraces, Wet (M135A_105)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on outwash plains; turf hummocks on stream terraces

Slope gradient: 0 to 2 percent

Parent material: grassy organic material over silty cryoturbate over silty alluvium

Restrictive feature(s): permafrost at 43 to 54 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	4.4 to 6.0	
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	5.5 to 6.0	.37 .37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	5.8 to 6.6	.37 .37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	5.8 to 6.6		.43 .43

Characteristics of Boreal-taiga high elevation loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy, terraces

Landtype: Loamy Frozen Terraces (M135A_104)

Climax plant community: Spruce/shrub birch-bog blueberry woodland

Landform(s): outwash plains; stream terraces

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): permafrost at 63 to 91 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 27	peat	moderately rapid	8.6 to 9.4	4.2 to 6.6	
Cg — 27 to 72	stratified gravelly sand to silt	moderately rapid	5.4 to 7.2	5.2 to 7.0	.17 .24
Cgf — 72 to 150	permanently frozen stratified gravelly sand to silt	impermeable	5.6 to 7.0		.28 .28

7TM—Alpine Glaciated Low Mountains with Discontinuous Permafrost

Soil name: Typic Eutrogelepts, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Typic Historthels, loamy-skeletal Association, 2 to 42 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly till slopes: 20 to 50 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly till circles, frozen: 15 to 35 percent of the unit (RV=25 percent)
- Alpine-scrub-sedge gravelly till slopes, frozen: 15 to 35 percent of the unit (RV=20 percent)
- Alpine-scrub-meadow mosaic gravelly till swales: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub gravelly till slopes, moist: 5 to 20 percent of the unit (RV=10 percent)

Setting

Elevation: 761 to 1,468 m
Precipitation: 552 to 2,466 mm
Air temperature: -10.7 to -2.5 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly till slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, till
Landtype: Gravelly Mountains, High Elevation (M135A_310)
Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub
Landform(s): mountains
Slope gradient: 6 to 42 percent
Parent material: silty eolian deposits over gravelly till
Restrictive feature(s): strongly contrasting textural stratification at 5 to 15 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	3.9 to 5.3	
A — 3 to 9	silt loam	moderate	2.3 to 2.5	4.0 to 5.6	.43 .43
2Bw — 9 to 38	very gravelly sandy loam	moderately rapid	2.6 to 3.5	4.8 to 5.9	.10 .24
2C — 38 to 150	very gravelly sandy loam	moderately rapid	10.1 to 13.4	5.6 to 7.0	.10 .24

Characteristics of Alpine-scrub gravelly till circles, frozen

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy
Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)
Climax plant community: Shrub birch/sedge scrub mosaic
Landform(s): nonsorted circles on mountains
Slope gradient: 8 to 16 percent
Parent material: silty eolian deposits over gravelly cryoturbate
Restrictive feature(s): strongly contrasting textural stratification at 2 to 32 cm; permafrost at 90 to 150 cm
Water table (May to September): 80 to 120 cm
Drainage class: moderately well drained
Hydric soil: no
Hydrologic group: D
Flooding hazard: none
Ponding hazard: none
Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.4 to 5.0	
A — 1 to 4	silt loam	moderate	1.1 to 1.3	4.4 to 5.6	.43 .43
2Bw/Cjj — 5 to 23	gravelly loam	moderately rapid	1.6 to 2.2	4.8 to 5.8	.28 .37
2C/Bwj — 23 to 120	gravelly loam	moderately rapid	8.7 to 11.6	5.2 to 6.4	.28 .37
2Cf —120 to 150	permanently frozen permanently frozen gravelly loam	impermeable	5.2 to 6.4		.28 .37

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen**Soil name:** Typic Historthels, loamy-skeletal, cool**Landtype:** Gravelly Frozen Slopes (M135A_180)**Climax plant community:** Shrub birch-mixed ericaceous shrub/sedge scrub**Landform(s):** mountains**Slope gradient:** 2 to 20 percent**Parent material:** woody organic material and/or grassy organic material over silty eolian deposits over gravelly till**Restrictive feature(s):** permafrost at 32 to 64 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0	
A — 29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37 .37
2Cgf — 32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17 .37

7TM1—Alpine Glaciated Mountains with Discontinuous Permafrost, High Elevation**Soil name:** Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy Association, 2 to 50 percent slopes**Composition****(All components are listed but only major components are described)**

- Alpine-dwarf scrub gravelly till steps and lobes: 20 to 50 percent of the unit (RV=40 percent)
- Alpine-scrub-sedge gravelly till slopes, frozen: 15 to 30 percent of the unit (RV=25 percent)
- Alpine-scrub-meadow mosaic gravelly till swales: 10 to 25 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub gravelly till slopes, moist: 5 to 20 percent of the unit (RV=10 percent)
- Subalpine-scrub-meadow mosaic gravelly till swales: 2 to 10 percent of the unit (RV=5 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 5 to 15 percent of the unit (RV=5 percent)

Setting**Elevation:** 709 to 1,920 m**Precipitation:** 552 to 2,466 mm**Air temperature:** -10.7 to -2.5 °C**Frost-free period:** 50 to 70 days**Ecoregion Classification****Section:** Alaska Mountains (M135A)**Subsection:** Alpine Mountains (M135A.M2)**Characteristics of Alpine-dwarf scrub gravelly till steps and lobes****Soil name:** Typic Eutrogelepts, loamy-skeletal, till steps**Landtype:** Gravelly Mountains, High Elevation (M135A_310)**Climax plant community:** White mountain avens-mixed ericaceous shrub dwarf alpine scrub**Landform(s):** solifluction lobes on mountains

Slope gradient: 10 to 50 percent
Parent material: gravelly till
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate
Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 5	moderately decomposed plant	moderately rapid	1.6 to 1.8	4.7 to 5.8	
A — 5 to 8	gravelly loam	moderate	1.1 to 1.3	4.7 to 5.8	.28 .37
Bw — 8 to 38	very gravelly loam	moderately rapid	2.7 to 3.6	4.9 to 5.9	.17 .37
C — 38 to 150	very gravelly loam	moderately rapid	10.1 to 13.4	5.4 to 6.4	.17 .37

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, cool
Landtype: Gravelly Frozen Slopes (M135A_180)
Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub
Landform(s): mountains
Slope gradient: 2 to 20 percent
Parent material: woody organic material and/or grassy organic material over silty eolian deposits over gravelly till
Restrictive feature(s): permafrost at 32 to 64 cm
Water table (May to September): 0 to 50 cm
Drainage class: poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: none
Potential frost action: high
Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0	
A — 29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37 .37
2Cgf — 32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17 .37

Characteristics of Alpine-scrub-meadow mosaic gravelly till swales

Soil name: (Oxyaquic) Humic Eutrogelepts, coarse-loamy
Landtype: Swales, High Elevation (M135A_420)
Climax plant community: Diamondleaf willow-mixed willow scrub mosaic
Landform(s): swales on hills
Slope gradient: 5 to 15 percent
Parent material: silty eolian deposits over gravelly till
Restrictive feature(s): strongly contrasting textural stratification at 12 to 32 cm
Water table (May to September): 0 to 50 cm
Drainage class: somewhat poorly drained
Hydric soil: no
Hydrologic group: C
Flooding hazard: none
Ponding hazard: none
Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.8 to 6.2	
A — 3 to 21	silt loam	moderate	6.8 to 7.6	4.9 to 6.2	.43 .43
2AC — 21 to 32	cobbly loam	moderately rapid	1.0 to 1.3	5.1 to 6.6	.28 .37
2C — 32 to 150	cobbly loam	moderately rapid	10.6 to 14.2	5.1 to 6.6	.28 .37

7TM2—Alpine Glaciated Mountains with Discontinuous Permafrost, Cool

Soil name: Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 10 to 50 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly till slopes, frozen: 30 to 60 percent of the unit (RV=40 percent)
- Alpine-dwarf scrub gravelly till slopes: 15 to 30 percent of the unit (RV=25 percent)
- Subalpine-scrub-meadow mosaic gravelly till swales: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly till slopes: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub gravelly till slopes, moist: 3 to 10 percent of the unit (RV=4 percent)
- Alpine-scrub-meadow mosaic gravelly till swales: 0 to 5 percent of the unit (RV=1 percent)

Setting

Elevation: 685 to 1,479 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-scrub gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, steep

Landtype: Loamy Frozen Slopes, High Elevation (M135A_177)

Climax plant community: Shrub birch-bog blueberry/moss scrub

Landform(s): benches on mountains

Slope gradient: 14 to 30 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 21 to 29 cm; permafrost at 48 to 130 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 18	slightly decomposed plant material	moderately rapid	5.8 to 6.3	3.6 to 5.5		
A — 18 to 26	mucky silt loam	moderate	3.0 to 3.4	4.4 to 5.6	.37	.37
2A — 26 to 78	very cobbly loam	moderate	5.2 to 7.3	5.4 to 6.2	.17	.37
2C — 78 to 96	very cobbly sandy loam	moderately rapid	1.6 to 2.2	5.4 to 6.2	.17	.37
2Cf — 96 to 150	permanently frozen very cobbly sandy loam	impermeable	5.4 to 6.2		.17	.37

Characteristics of Alpine-dwarf scrub gravelly till slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, till

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 10 to 50 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 5 to 15 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oe — 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	3.9 to 5.3		
A — 3 to 9	silt loam	moderate	2.3 to 2.5	4.0 to 5.6	.43	.43
2Bw — 9 to 38	very gravelly sandy loam	moderately rapid	2.6 to 3.5	4.8 to 5.9	.10	.24
2C — 38 to 150	very gravelly sandy loam	moderately rapid	10.1 to 13.4	5.6 to 7.0	.10	.24

Characteristics of Subalpine-scrub-meadow mosaic gravelly till swales

Soil name: Oxyaquic Eutrocryepts, coarse-loamy, drift

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 12 to 34 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 21 to 53 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	4.8 to 6.2		
A — 8 to 38	mucky silt loam	moderate	11.4 to 12.6	4.9 to 6.2	.43	.43
2Bw — 38 to 69	cobbly sandy loam	moderately rapid	2.8 to 3.7	5.1 to 6.6	.28	.37
2C — 69 to 150	gravelly sandy loam	moderately rapid	7.3 to 9.7	5.1 to 6.6	.28	.37

7TM21—Alpine Glaciated Low Diorite Mountains with Discontinuous Permafrost

Soil name: Typic Dystrogelepts, sandy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 8 to 40 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly diorite till slopes: 25 to 40 percent of the unit (RV=35 percent)
- Alpine-dwarf scrub gravelly diorite till hummocks and lobes: 20 to 35 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly diorite till slopes: 10 to 25 percent of the unit (RV=20 percent)
- Alpine-scrub-meadow mosaic gravelly diorite swales: 10 to 25 percent of the unit (RV=15 percent)

Setting

Elevation: 695 to 1,792 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly diorite till slopes

Soil name: Typic Dystrogelepts, sandy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 10 to 37 percent

Parent material: gravelly drift derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon —Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	3.8 to 5.2			
A — 1 to 7	gravelly loam	moderately rapid	0.5 to 0.7	3.8 to 5.3	.17	.43	
Bw — 7 to 47	extremely cobbly loamy coarse sand	moderately rapid	3.6 to 4.8	3.9 to 5.4	.17	.24	
C — 47 to 150	extremely cobbly coarse sand	rapid	2.1 to 4.1	4.7 to 6.2	.02	.10	

Characteristics of Alpine-dwarf scrub gravelly diorite till hummocks and lobes

Soil name: Typic Eutrogelepts, loamy-skeletal, diorite

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): hummocks on mountains; solifluction lobes on mountains

Slope gradient: 8 to 40 percent

Parent material: gravelly till derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 5	moderately decomposed plant	moderately rapid	1.6 to 1.8	4.7 to 5.8	
A — 5 to 8	gravelly loam	moderate	1.1 to 1.3	4.7 to 5.8	.28 .37
Bw — 8 to 38	very gravelly loam	moderately rapid	2.7 to 3.6	4.9 to 5.9	.17 .37
C — 38 to 150	very gravelly loam	moderately rapid	10.1 to 13.4	5.4 to 6.4	.17 .37

Characteristics of Alpine-scrub gravelly diorite till slopes

Soil name: Typic Haplogelods, loamy-skeletal, diorite

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 8 to 35 percent

Parent material: silty eolian deposits over gravelly till derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon —Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	3.7 to 4.9	
A — 2 to 5	silt loam	moderate	1.1 to 1.3	3.5 to 4.9	.43 .43
E — 5 to 9	silt loam	moderate	1.5 to 1.7	3.5 to 4.9	.32 .43
2Bs — 9 to 41	very cobbly sandy loam	moderately rapid	2.9 to 3.8	4.6 to 5.6	.10 .24
2C — 41 to 150	very cobbly sandy loam	moderately rapid	9.8 to 13.1	5.0 to 6.0	.10 .24

7TM24—Alpine Diorite Mountains with Discontinuous Permafrost

Soil name: Typic Dystrogelepts, loamy-skeletal Association, 14 to 65 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly diorite colluvial slopes: 25 to 45 percent of the unit (RV=40 percent)
- Alpine-dwarf scrub gravelly diorite fans: 20 to 35 percent of the unit (RV=25 percent)
- Alpine-scrub gravelly diorite till slopes, frozen: 10 to 30 percent of the unit (RV=15 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 5 to 20 percent of the unit (RV=10 percent)
- Subalpine-scrub-meadow mosaic gravelly till swales: 2 to 10 percent of the unit (RV=5 percent)
- Alpine-scrub-meadow mosaic gravelly diorite swales: 5 to 15 percent of the unit (RV=5 percent)

Setting

Elevation: 670 to 1,562 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification**Section:** Alaska Mountains (M135A)**Subsection:** Alpine Mountains (M135A.M2)**Characteristics of Alpine-dwarf scrub gravelly diorite colluvial slopes****Soil name:** Typic Dystrogelepts, loamy-skeletal, diorite**Landtype:** Gravelly Mountains, High Elevation (M135A_310)**Climax plant community:** White mountain avens-mixed ericaceous shrub dwarf alpine scrub**Landform(s):** mountains**Slope gradient:** 20 to 65 percent**Parent material:** gravelly colluvium derived from diorite**Restrictive feature(s):** none**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** moderate**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi and Oe — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0		3.8 to 4.9		
A — 3 to 9	gravelly loam	moderate	0.6 to 0.8		3.8 to 5.0	.28	.37
Bw — 9 to 34	very cobbly sandy loam	moderately rapid	2.2 to 3.0		4.2 to 5.5	.10	.24
C — 34 to 150	very cobbly sandy loam	moderately rapid	10.4 to 13.9		5.4 to 6.2	.10	.24

Characteristics of Alpine-dwarf scrub gravelly diorite fans**Soil name:** Typic Dystrogelepts, loamy-skeletal, diorite, fans**Landtype:** Gravelly Mountains, High Elevation (M135A_310)**Climax plant community:** White mountain avens-mixed ericaceous shrub dwarf alpine scrub**Landform(s):** fan terraces on alluvial fans on mountains**Slope gradient:** 20 to 65 percent**Parent material:** silty eolian deposits over gravelly colluvium derived from diorite**Restrictive feature(s):** strongly contrasting textural stratification at 9 to 14 cm**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** moderate**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi and Oe — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0		3.2 to 4.9		
A — 3 to 12	silt loam	moderate	1.3 to 1.5		4.4 to 5.7	.43	.43
2Bw — 12 to 20	very cobbly sandy loam	moderately rapid	0.7 to 1.0		4.8 to 6.3	.10	.24
2C — 20 to 150	very cobbly sandy loam	moderately rapid	11.7 to 15.6		5.1 to 6.3	.10	.24

7TMS—Alpine Glaciated Low Mountain Summits

Soil name: Typic Entroglepts, loamy-skeletal Association, 0 to 50 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly till slopes: 35 to 70 percent of the unit (RV=40 percent)
- Alpine-dwarf scrub gravelly till steps and lobes: 20 to 50 percent of the unit (RV=35 percent)
- Alpine-dwarf scrub gravelly till slopes, moist: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub gravelly diorite fans, cool: 5 to 20 percent of the unit (RV=10 percent)

Setting

Elevation: 798 to 1,471 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly till slopes

Soil name: Typic Entroglepts, loamy-skeletal, till

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 0 to 12 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 5 to 15 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oe — 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	3.9 to 5.3		
A — 3 to 9	silt loam	moderate	2.3 to 2.5	4.0 to 5.6	.43	.43
2Bw — 9 to 38	very gravelly sandy loam	moderately rapid	2.6 to 3.5	4.8 to 5.9	.10	.24
2C — 38 to 150	very gravelly sandy loam	moderately rapid	10.1 to 13.4	5.6 to 7.0	.10	.24

Characteristics of Alpine-dwarf scrub gravelly till steps and lobes

Soil name: Typic Entroglepts, loamy-skeletal, till steps

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): solifluction lobes on cirque floors; solifluction lobes on mountains

Slope gradient: 10 to 50 percent

Parent material: gravelly till

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 5	moderately decomposed plant	moderately rapid	1.6 to 1.8	4.7 to 5.8	
A — 5 to 8	gravelly loam	moderate	1.1 to 1.3	4.7 to 5.8	.28 .37
Bw — 8 to 38	very gravelly loam	moderately rapid	2.7 to 3.6	4.9 to 5.9	.17 .37
C — 38 to 150	very gravelly loam	moderately rapid	10.1 to 13.4	5.4 to 6.4	.17 .37

Characteristics of Alpine-dwarf scrub gravelly till slopes, moist

Soil name: Typic Eutrogelepts, loamy-skeletal, till, cold

Landtype: Gravelly Mountains, Moist (M135A_306)

Climax plant community: Cassiope-polar willow-mountain avens dwarf alpine scrub

Landform(s): mountains

Slope gradient: 2 to 20 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 5 to 15 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	3.9 to 5.3	
A — 3 to 9	silt loam	moderate	2.3 to 2.5	4.0 to 5.6	.43 .43
2Bw — 9 to 38	very gravelly sandy loam	moderately rapid	2.6 to 3.5	4.8 to 5.9	.10 .24
2C — 38 to 150	very gravelly sandy loam	moderately rapid	10.1 to 13.4	5.6 to 7.0	.10 .24

7TP—Alpine Till Plains with Discontinuous Permafrost

Soil name: Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 16 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-sedge gravelly till slopes, frozen: 40 to 70 percent of the unit (RV=55 percent)
- Alpine-scrub-meadow mosaic gravelly till swales: 5 to 25 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly till circles, frozen: 5 to 20 percent of the unit (RV=15 percent)
- Alpine-sedge wet meadow organic depressions, frozen: 5 to 15 percent of the unit (RV=10 percent)
- Water: 2 to 5 percent of the unit (RV=3 percent)
- Alpine-wet meadow gravelly pond margins: 2 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 502 to 1,471 m

Precipitation: 528 to 758 mm

Air temperature: -3.5 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Uplands (M135A.G1)

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): hills; till plains

Slope gradient: 2 to 16 percent

Parent material: woody organic material and/or grassy organic material over silty eolian deposits over gravelly till

Restrictive feature(s): permafrost at 32 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0	
A — 29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37 .37
2Cg — 32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17 .37

Characteristics of Alpine-scrub-meadow mosaic gravelly till swales

Soil name: (Oxyaquic) Humic Eutrogelepts, coarse-loamy

Landtype: Swales, High Elevation (M135A_420)

Climax plant community: Diamondleaf willow-mixed willow scrub mosaic

Landform(s): swales on hills; swales on till plains

Slope gradient: 2 to 10 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 12 to 32 cm

Water table (May to September): 0 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.8 to 6.2	
A — 3 to 21	silt loam	moderate	6.8 to 7.6	4.9 to 6.2	.43 .43
2AC — 21 to 32	cobbly loam	moderately rapid	1.0 to 1.3	5.1 to 6.6	.28 .37
2C — 32 to 150	cobbly loam	moderately rapid	10.6 to 14.2	5.1 to 6.6	.28 .37

Characteristics of Alpine-scrub gravelly till circles, frozen

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy

Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)

Climax plant community: Shrub birch/sedge scrub mosaic

Landform(s): nonsorted circles on hills; nonsorted circles on till plains

Slope gradient: 0 to 12 percent

Parent material: silty eolian deposits over gravelly cryoturbate

Restrictive feature(s): strongly contrasting textural stratification at 2 to 32 cm; permafrost at 90 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.4 to 5.0	
A — 1 to 4	silt loam	moderate	1.1 to 1.3	4.4 to 5.6	.43 .43
2Bw/Cjj — 5 to 23	gravelly loam	moderately rapid	1.6 to 2.2	4.8 to 5.8	.28 .37
2C/Bwjj — 23 to 120	gravelly loam	moderately rapid	8.7 to 11.6	5.2 to 6.4	.28 .37
2Cf — 120 to 150	permanently frozen permanently frozen gravelly loam	impermeable	5.2 to 6.4		.28 .37

7TP2—Alpine Till Plains and Hills with Discontinuous Permafrost

Soil name: Typic Haplogelods, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 2 to 35 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly till slopes: 25 to 50 percent of the unit (RV=30 percent)
- Alpine-scrub mosaic gravelly till slopes: 20 to 35 percent of the unit (RV=25 percent)
- Alpine-scrub-sedge gravelly till slopes, frozen: 15 to 30 percent of the unit (RV=25 percent)
- Subalpine-scrub-meadow mosaic gravelly till swales: 10 to 25 percent of the unit (RV=15 percent)
- Water: 2 to 5 percent of the unit (RV=3 percent)
- Alpine-wet meadow gravelly pond margins: 2 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 563 to 1,536 m

Precipitation: 528 to 758 mm

Air temperature: -3.5 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Uplands (M135A.G1)

Characteristics of Alpine-scrub gravelly till slopes

Soil name: Typic Haplogelods, loamy-skeletal

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): hills

Slope gradient: 8 to 35 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	— 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9		
A	— 5 to 9	silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43	.43
E	— 9 to 10	silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43	.43
2Bs	— 10 to 40	very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10	.24
2C	— 40 to 150	very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10	.24

Characteristics of Alpine-scrub mosaic gravelly till slopes

Soil name: Typic Entrogelepts, loamy-skeletal, till summits

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): hills; ridges

Slope gradient: 4 to 35 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 5 to 15 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oe	— 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	3.9 to 5.3		
A	— 3 to 9	silt loam	moderate	2.3 to 2.5	4.0 to 5.6	.43	.43
2Bw	— 9 to 38	gravelly sandy loam	moderately rapid	2.6 to 3.5	4.8 to 5.9	.17	.24
2C	— 38 to 150	very gravelly sandy loam	moderately rapid	10.1 to 13.4	5.6 to 7.0	.10	.24

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): hills; till plains

Slope gradient: 2 to 16 percent

Parent material: woody organic material and/or grassy organic material over silty eolian deposits over gravelly till

Restrictive feature(s): permafrost at 32 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0		
A — 29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37	.37
2Cgf — 32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17	.37

7TP3—Boreal and Alpine Hills with Discontinuous Permafrost

Soil name: Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocrypts, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 35 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly till slopes: 15 to 40 percent of the unit (RV=30 percent)
- Boreal-forested gravelly till slopes, moderately wet: 20 to 40 percent of the unit (RV=25 percent)
- Boreal-taiga gravelly till slopes, frozen: 20 to 35 percent of the unit (RV=25 percent)
- Alpine-scrub-sedge gravelly till slopes, frozen: 10 to 20 percent of the unit (RV=15 percent)
- Water: 2 to 5 percent of the unit (RV=3 percent)
- Alpine-wet meadow gravelly pond margins: 2 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 445 to 946 m

Precipitation: 506 to 732 mm

Air temperature: -3.2 to -2.5 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Lowlands (M135A.G1L)

Characteristics of Alpine-scrub gravelly till slopes

Soil name: Typic Haplogelods, loamy-skeletal

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): hills

Slope gradient: 8 to 35 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9		
A — 5 to 9	silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43	.43
E — 9 to 10	silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43	.43
2Bs — 10 to 40	very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10	.24
2C — 40 to 150	very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10	.24

Characteristics of Boreal-forested gravelly till slopes, moderately wet**Soil name:** Oxyaquic Eutrocryepts, coarse-loamy**Landtype:** Loamy Slopes, Wet (M135A_354)**Climax plant community:** White spruce/willow woodland, wet**Landform(s):** hills**Slope gradient:** 4 to 12 percent**Parent material:** silty eolian deposits over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 21 to 53 cm**Water table (May to September):** 10 to 50 cm**Drainage class:** somewhat poorly drained**Hydric soil:** no**Hydrologic group:** C**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.8 to 6.2	
A — 3 to 38	silt loam	moderate	13.3 to 14.7	4.9 to 6.2	.43 .43
2C — 38 to 150	very cobbly loam	moderately rapid	10.1 to 13.4	5.1 to 6.6	.17 .37

Characteristics of Boreal-taiga gravelly till slopes, frozen**Soil name:** Typic Historthels, loamy-skeletal**Landtype:** Loamy Frozen Slopes (M135A_400)**Climax plant community:** Black spruce/bog blueberry-Labrador tea woodland**Landform(s):** hills; till plains**Slope gradient:** 0 to 10 percent**Parent material:** mossy organic material and/or woody organic material over silty eolian deposits over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 33 to 45 cm; permafrost at 40 to 64 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0	
A — 29 to 33	mucky silt loam	moderate	1.5 to 1.7	4.6 to 6.0	.37 .37
2Cg — 33 to 51	gravelly loam	moderately rapid	1.6 to 2.2	5.0 to 6.8	.28 .37
2Cgf — 51 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17 .37

7TP4—Boreal and Alpine Till Plains with Continuous Permafrost

Soil name: Typic Historthels, loamy-skeletal Association 0 to 12 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-sedge gravelly till slopes, frozen: 35 to 50 percent of the unit (RV=45 percent)
- Boreal-taiga gravelly till slopes, frozen: 35 to 60 percent of the unit (RV=40 percent)
- Boreal-sedge/sphagnum bog organic depressions: 2 to 5 percent of the unit (RV=5 percent)
- Boreal-riparian tall scrub silty frozen drains: 1 to 5 percent of the unit (RV=5 percent)
- Water: 2 to 5 percent of the unit (RV=5 percent)

Setting

Elevation: 511 to 852 m

Precipitation: 506 to 732 mm

Air temperature: -3.2 to -2.5 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Lowlands (M135A.G1L)

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): till plains

Slope gradient: 0 to 12 percent

Parent material: woody organic material and/or grassy organic material over silty eolian deposits over gravelly till

Restrictive feature(s): permafrost at 32 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)		Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi and Oe	0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0		
A	29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37	.37
2Cgf	32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17	.37

Characteristics of Boreal-taiga gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): hills; till plains

Slope gradient: 0 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 33 to 45 cm; permafrost at 40 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi and Oe	0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0		
A	29 to 33	mucky silt loam	moderate	1.5 to 1.7	4.6 to 6.0	.37	.37
2Cg	33 to 51	gravelly loam	moderately rapid	1.6 to 2.2	5.0 to 6.8	.28	.37
2Cgf	51 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17	.37

7TP5—Boreal and Alpine Till Plains and Hills with Discontinuous Permafrost

Soil name: Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 2 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga gravelly till slopes, frozen: 55 to 75 percent of the unit (RV=70 percent)
- Alpine-scrub gravelly till slopes: 15 to 35 percent of the unit (RV=20 percent)
- Boreal-riparian tall scrub silty frozen drains: 2 to 10 percent of the unit (RV=5 percent)
- Boreal-sedge/sphagnum bog organic depressions: 1 to 5 percent of the unit (RV=3 percent)
- Water: 1 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 497 to 887 m

Precipitation: 506 to 732 mm

Air temperature: -3.2 to -2.5 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Lowlands (M135A.G1L)

Characteristics of Boreal-taiga gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): hills; till plains

Slope gradient: 2 to 16 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 33 to 45 cm; permafrost at 40 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0	
A — 29 to 33	mucky silt loam	moderate	1.5 to 1.7	4.6 to 6.0	.37 .37
2Cg — 33 to 51	gravelly loam	moderately rapid	1.6 to 2.2	5.0 to 6.8	.28 .37
2Cgf — 51 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17 .37

Characteristics of Alpine-scrub gravelly till slopes

Soil name: Typic Haplogelods, loamy-skeletal

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): hills

Slope gradient: 8 to 25 percent

Parent material: silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.7 to 4.9	
A — 5 to 9	silt loam	moderate	1.5 to 1.7	4.2 to 5.0	.43 .43
E — 9 to 10	silt loam	moderate	0.4 to 0.4	4.2 to 5.0	.43 .43
2Bs — 10 to 40	very gravelly sandy loam	moderately rapid	2.7 to 3.6	4.6 to 5.6	.10 .24
2C — 40 to 150	very gravelly sandy loam	moderately rapid	9.9 to 13.2	5.0 to 6.2	.10 .24

7TP8—Alpine Glaciated Diorite Plains and Hills

Soil name: Typic Haplogelods, loamy-skeletal-Typic Dystrogelepts, sandy-skeletal-(Oxyaquic) Humic Entrogelepts, loamy-skeletal Association, 2 to 35 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly diorite till slopes: 25 to 45 percent of the unit (RV=40 percent)
- Alpine-dwarf scrub gravelly diorite till slopes: 25 to 40 percent of the unit (RV=38 percent)
- Alpine-scrub-meadow mosaic gravelly diorite swales: 5 to 20 percent of the unit (RV=15 percent)
- Water: 2 to 5 percent of the unit (RV=3 percent)
- Boreal-sedge/sphagnum bog organic depressions: 1 to 5 percent of the unit (RV=2 percent)
- Alpine-wet meadow gravelly pond margins: 2 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 670 to 1,087 m

Precipitation: 528 to 758 mm

Air temperature: -3.5 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Glaciated Uplands (M135A.G1)

Characteristics of Alpine-scrub gravelly diorite till slopes

Soil name: Typic Haplogelods, loamy-skeletal, diorite

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): hills; till plains

Slope gradient: 8 to 35 percent

Parent material: silty eolian deposits over gravelly till derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 9 to 21 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water			Kw	Kf
			Permeability	Capacity (cm)	pH		
Oi	— 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	3.7 to 4.9		
A	— 2 to 5	silt loam	moderate	1.1 to 1.3	3.5 to 4.9	.43	.43
E	— 5 to 9	silt loam	moderate	1.5 to 1.7	3.5 to 4.9	.32	.43
2Bs	— 9 to 41	very cobbly sandy loam	moderately rapid	2.9 to 3.8	4.6 to 5.6	.10	.24
2C	— 41 to 150	very cobbly sandy loam	moderately rapid	9.8 to 13.1	5.0 to 6.0	.10	.24

Characteristics of Alpine-dwarf scrub gravelly diorite till slopes

Soil name: Typic Dystrogelepts, sandy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): hills

Slope gradient: 2 to 20 percent

Parent material: gravelly drift derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water			Kw	Kf
			Permeability	Capacity (cm)	pH		
Oi	— 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	3.8 to 5.2		
A	— 1 to 7	gravelly loam	moderately rapid	0.5 to 0.7	3.8 to 5.3	.17	.43
Bw	— 7 to 47	extremely cobbly loamy coarse sand	moderately rapid	3.6 to 4.8	3.9 to 5.4	.17	.24
C	— 47 to 150	extremely cobbly coarse sand	rapid	2.1 to 4.1	4.7 to 6.2	.02	.10

Characteristics of Alpine-scrub-meadow mosaic gravelly diorite swales

Soil name: (Oxyaquic) Humic Eutrogelepts, loamy-skeletal, diorite

Landtype: Swales, High Elevation (M135A_420)

Climax plant community: Diamondleaf willow-mixed willow scrub mosaic

Landform(s): swales on hills; swales on till plains

Slope gradient: 5 to 20 percent

Parent material: silty eolian deposits over gravelly colluvium derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 20 to 52 cm

Water table (May to September): 0 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 6	slightly decomposed plant material	moderately rapid	1.9 to 2.1	5.2 to 6.1			
A — 6 to 34	silt loam	moderate	3.9 to 4.8	5.2 to 6.1	.43	.43	
2Bw — 34 to 62	very gravelly sandy loam	moderately rapid	2.5 to 3.4	5.2 to 5.9	.05	.24	
2C — 62 to 150	very gravelly sandy loam	moderately rapid	7.9 to 10.6	5.6 to 5.9	.05	.24	

7V1—Alpine Lower Mountain Slopes and Fans with Discontinuous Permafrost

Soil name: Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Historthels, loamy-skeletal Association, 0 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly terraces: 20 to 50 percent of the unit (RV=40 percent)
- Alpine-scrub-sedge loamy terraces, frozen: 15 to 30 percent of the unit (RV=25 percent)
- Alpine-scrub-sedge gravelly till slopes, frozen: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-riparian scrub gravelly flood plains: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-scrub silty fan terraces: 2 to 10 percent of the unit (RV=5 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 762 to 1,460 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-scrub gravelly terraces

Soil name: Typic Haplogelods, sandy-skeletal, terraces

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 4 to 15 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8			
E	— 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43	.43	
Bs	— 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43	.43	
2Bs/C	— 15 to 21	loamy sand	rapid	0.1 to 0.2	4.4 to 5.6	.02	.10	
2C	— 21 to 150	extremely gravelly loamy sand	rapid	2.6 to 5.2	5.6 to 6.2	.02	.10	

Characteristics of Alpine-scrub-sedge loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy over sandy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 3 to 17 percent

Parent material: organic material over loamy alluvium over loamy alluvium and/or sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 41 to 150 cm; permafrost at 41 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi and Oe	— 0 to 21	peat	moderately rapid	6.7 to 7.3	4.9 to 6.0			
Cg	— 21 to 61	stratified gravelly sand to silt	moderately rapid	4.8 to 6.4	5.6 to 6.4	.17	.24	
2Cf	— 61 to 150	permanently frozen extremely cobbly coarse sand	impermeable	5.6 to 6.4		.02	.10	

Characteristics of Alpine-scrub-sedge gravelly till slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): mountains

Slope gradient: 2 to 20 percent

Parent material: woody organic material and/or grassy organic material over silty eolian deposits over gravelly till

Restrictive feature(s): permafrost at 32 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0		
A — 29 to 32	mucky silt loam	moderate	1.1 to 1.3	4.6 to 6.0	.37	.37
2Cgf — 32 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17	.37

7V1A—Alpine Diorite Fans

Soil name: Typic Dystroglepts, loamy-skeletal-Typic Haplogelods, sandy-skeletal Association, 4 to 12 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly diorite fans: 40 to 70 percent of the unit (RV=65 percent)
- Alpine-scrub mosaic gravelly diorite terraces: 20 to 40 percent of the unit (RV=25 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)
- Alpine-scrub loamy diorite terraces, frozen: 5 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 727 to 1,514 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly diorite fans

Soil name: Typic Dystroglepts, loamy-skeletal, diorite, fans

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 4 to 12 percent

Parent material: silty eolian deposits over gravelly colluvium derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 9 to 14 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.2 to 4.9		
A — 3 to 12	silt loam	moderate	1.3 to 1.5	4.4 to 5.7	.43	.43
2Bw — 12 to 20	very cobbly sandy loam	moderately rapid	0.7 to 1.0	4.8 to 6.3	.10	.24
2C — 20 to 150	very cobbly sandy loam	moderately rapid	11.7 to 15.6	5.1 to 6.3	.10	.24

Characteristics of Alpine-scrub mosaic gravelly diorite terraces

Soil name: Typic Haplogelods, sandy-skeletal, diorite

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): stream terraces

Slope gradient: 4 to 12 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8		
E	— 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43	.43
Bs	— 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43	.43
2Bs	— 15 to 21	extremely gravelly coarse sand	rapid	0.1 to 0.2	4.4 to 5.6	.02	.10
2C	— 21 to 150	extremely gravelly coarse sand	rapid	2.6 to 5.2	5.6 to 6.2	.02	.10

7V1B—Alpine and Subalpine Diorite Fans and Flood Plains with Discontinuous Permafrost

Soil name: Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 3 to 15 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub mosaic gravelly diorite terraces: 30 to 45 percent of the unit (RV=40 percent)
- Alpine-scrub loamy diorite terraces, frozen: 25 to 45 percent of the unit (RV=33 percent)
- Subalpine-riparian scrub gravelly diorite flood plains: 15 to 25 percent of the unit (RV=20 percent)
- Alpine-riparian scrub gravelly diorite flood plains, moderately wet: 2 to 25 percent of the unit (RV=5 percent)
- Nonvegetated alluvium: 2 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 593 to 948 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-scrub mosaic gravelly diorite terraces

Soil name: Typic Haplogelods, sandy-skeletal, diorite

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 3 to 12 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8		3.8 to 4.8		
E — 8 to 10	silt loam	moderate	0.3 to 0.4		3.8 to 5.0	.43	.43
Bs — 10 to 15	silt loam	moderate	0.9 to 1.0		4.0 to 5.6	.43	.43
2Bs — 15 to 21	extremely gravelly coarse sand	rapid	0.1 to 0.2		4.4 to 5.6	.02	.10
2C — 21 to 150	extremely gravelly coarse sand	rapid	2.6 to 5.2		5.6 to 6.2	.02	.10

Characteristics of Alpine-scrub loamy diorite terraces, frozen

Soil name: Typic Historthels, coarse-loamy over sandy-skeletal, diorite

Landtype: Loamy Frozen Slopes, High Elevation (M135A_177)

Climax plant community: Shrub birch-bog blueberry/moss scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 3 to 15 percent

Parent material: organic material over silty eolian deposits over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 41 to 68 cm; permafrost at 41 to 68 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi and Oe — 0 to 28	peat	moderately rapid	9.0 to 9.8		3.0 to 3.5		
A — 28 to 31	silt loam	moderate	0.5 to 0.6		3.0 to 3.9	.43	.43
2C — 31 to 68	stratified gravelly sand to silt	moderately rapid	4.4 to 5.9		4.2 to 5.5	.17	.24
3Cf — 68 to 150	permanently frozen extremely gravelly coarse sand	impermeable	4.7 to 5.6			.02	.10

Characteristics of Subalpine-riparian scrub gravelly diorite flood plains

Soil name: Typic Cryorthents, sandy-skeletal, diorite

Landtype: Gravelly Mountains, Acid (M135A_303)

Climax plant community: Green alder/red current/bluejoint scrub

Landform(s): flood plains on alluvial fans on mountains

Slope gradient: 3 to 12 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: rare

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oe	— 0 to 5	moderately decomposed plant	moderately rapid	1.6 to 1.8	4.2 to 5.2		
C1	— 5 to 7	cobbly sandy loam	moderately rapid	0.2 to 0.3	4.4 to 5.2	.15	.24
Ab	— 7 to 12	sandy loam	moderate	0.9 to 1.1	4.8 to 5.4	.24	.32
C2	— 12 to 150	extremely gravelly coarse sand	rapid	2.8 to 5.5	5.6 to 6.0	.02	.10

7V2—Boreal Fans and Mountain Footslopes

Soil name: Oxyaquic Eutrocryepts, coarse-loamy over sandy-skeletal-Typic Eutrocryepts, sandy-skeletal-Typic Haplogelods, sandy-skeletal Association, 2 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested loamy fan terraces: 40 to 60 percent of the unit (RV=50 percent)
- Boreal-woodland gravelly terraces: 15 to 30 percent of the unit (RV=20 percent)
- Alpine-scrub gravelly terraces: 10 to 20 percent of the unit (RV=15 percent)
- Boreal-riparian forested gravelly fans: 5 to 15 percent of the unit (RV=10 percent)
- Boreal-riparian scrub gravelly flood plains, moderately wet: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 446 to 1,107 m

Precipitation: 511 to 783 mm

Air temperature: -5.7 to -3.4 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Boreal Mountains (M135A.M2L)

Characteristics of Boreal-forested loamy fan terraces

Soil name: Oxyaquic Eutrocryepts, coarse-loamy, terraces

Landtype: Loamy Slopes, Wet (M135A_354)

Climax plant community: White spruce/willow woodland, wet

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 3 to 25 percent

Parent material: silty eolian deposits over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 22 to 25 cm; strongly contrasting textural stratification at 32 to 78 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oe — 0 to 5	moderately decomposed plant	moderately rapid	1.6 to 1.8	5.0 to 5.9	
A — 5 to 22	mucky silt loam	moderate	6.5 to 7.1	5.8 to 6.6	.37 .37
2C — 22 to 62	stratified fine sand to mucky silt	moderate	15.2 to 16.8	5.7 to 6.6	.28 .28
3C — 62 to 150	extremely cobbly loamy coarse sand	rapid	2.6 to 5.3	5.9 to 7.4	.02 .10

Characteristics of Boreal-woodland gravelly terraces

Soil name: Typic Eutrocryepts, sandy-skeletal, terraces, cool

Landtype: Gravelly and Sandy Slopes (M135A_350)

Climax plant community: White spruce/shrub birch woodland

Landform(s): fan terraces on alluvial fans; outwash plains

Slope gradient: 2 to 5 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium and/or sandy and gravelly outwash

Restrictive feature(s): strongly contrasting textural stratification at 10 to 29 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 10	slightly decomposed plant material	moderately rapid	3.2 to 3.5	4.0 to 6.1	
A/E — 10 to 20	silt loam	moderate	1.7 to 2.0	4.1 to 5.6	.43 .43
2Bw — 20 to 29	very gravelly loamy sand	rapid	0.2 to 0.4	5.2 to 6.2	.02 .10
2C — 29 to 150	very gravelly coarse sand	rapid	2.4 to 4.8	5.6 to 7.4	.02 .10

Characteristics of Alpine-scrub gravelly terraces

Soil name: Typic Haplogelods, sandy-skeletal, terraces

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 14 to 25 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8	
E — 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43 .43
Bs — 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43 .43
2Bs/C — 15 to 21	loamy sand	rapid	0.1 to 0.2	4.4 to 5.6	.02 .10
2C — 21 to 150	extremely gravelly loamy sand	rapid	2.6 to 5.2	5.6 to 6.2	.02 .10

7V5—Alpine Fans with Discontinuous Permafrost

Soil name: Typic Eutrogelepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Gelorthents, sandy-skeletal Association, 2 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly fan terraces: 45 to 65 percent of the unit (RV=50 percent)
- Alpine-scrub-sedge loamy terraces, frozen: 15 to 30 percent of the unit (RV=20 percent)
- Alpine-riparian scrub gravelly flood plains, cool: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly terraces: 5 to 20 percent of the unit (RV=10 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 868 to 1,569 m

Precipitation: 552 to 2,466 mm

Air temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-dwarf scrub gravelly fan terraces

Soil name: Typic Eutrogelepts, sandy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 2 to 20 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 3 to 13 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	4.8 to 7.3		
A	2 to 8	silt loam	moderate	1.0 to 1.2	4.9 to 7.4	.43	.43
2Bw	8 to 29	extremely cobbly loamy coarse sand	moderately rapid	1.9 to 2.5	5.4 to 7.6	.10	.24
2C	29 to 150	extremely cobbly coarse sand	rapid	2.4 to 4.8	6.0 to 8.0	.02	.10

Characteristics of Alpine-scrub-sedge loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy over sandy-skeletal, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 2 to 5 percent

Parent material: organic material over loamy alluvium over loamy alluvium and/or sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 41 to 68 cm; permafrost at 41 to 68 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 21	peat	moderately rapid	6.7 to 7.3	4.9 to 6.0	
Cg — 21 to 61	stratified gravelly sand to silt	moderately rapid	4.8 to 6.4	5.6 to 6.4	.17 .24
2Cf — 61 to 150	permanently frozen extremely cobbly coarse sand	impermeable	5.6 to 6.4		.02 .10

Characteristics of Alpine-riparian scrub gravelly flood plains, cool

Soil name: Typic Gelorthents, sandy-skeletal, cool

Landtype: Gravelly Flood Plains, Cool (M135A_258)

Climax plant community: Feltleaf willow-mixed shrub/herbaceous scrub

Landform(s): flood plains on alluvial fans on mountains

Slope gradient: 4 to 15 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 0 to 18 cm

Water table (May to September): more than 150 cm

Drainage class: excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oe — 0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	6.0 to 7.7	
AC — 2 to 10	stratified sand to silt	moderate	1.0 to 1.3	6.0 to 7.8	.28 .28
2AC — 10 to 25	extremely cobbly coarse sand	rapid	0.6 to 1.2	6.2 to 8.4	.02 .10
2C — 25 to 150	extremely cobbly coarse sand	rapid	5.0 to 10.0	6.2 to 8.4	.02 .10

7V11—Alpine Fans

Soil name: Typic Gelorthents, sandy-skeletal-Riverwash-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-riparian scrub gravelly flood plains: 20 to 55 percent of the unit (RV=30 percent)
- Nonvegetated alluvium: 10 to 40 percent of the unit (RV=20 percent)
- Alpine-scrub gravelly terraces: 15 to 40 percent of the unit (RV=20 percent)
- Alpine-riparian scrub gravelly flood plains, moderately wet: 10 to 35 percent of the unit (RV=15 percent)
- Alpine-riparian scrub loamy flood plains: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub gravelly fan terraces: 5 to 15 percent of the unit (RV=5 percent)

Setting

Elevation: 816 to 1,305 m
Precipitation: 552 to 2,466 mm
Air temperature: -10.7 to -2.5 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Mountains (M135A.M2)

Characteristics of Alpine-riparian scrub gravelly flood plains

Soil name: Typic Gelorthents, sandy-skeletal
Landtype: Gravelly Flood Plains, Cool (M135A_258)
Climax plant community: Feltleaf willow-mixed shrub/herbaceous scrub
Landform(s): flood plains
Slope gradient: 0 to 5 percent
Parent material: sandy and silty alluvium over sandy and gravelly alluvium
Restrictive feature(s): strongly contrasting textural stratification at 0 to 18 cm
Water table (May to September): more than 150 cm
Drainage class: excessively drained
Hydric soil: no
Hydrologic group: A
Flooding hazard: occasional
Ponding hazard: none
Potential frost action: low
Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	6.0 to 7.7		
AC — 5 to 12	stratified fine sand to silt	moderate	0.9 to 1.1	6.0 to 7.8	.28	.28
2C — 12 to 150	extremely cobbly coarse sand	rapid	5.5 to 11.0	6.2 to 8.4	.02	.10

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated
Landtype: Alluvium, Nonvegetated (Riverwash)
Climax plant community: Sparsely vegetated alluvium
Landform(s): flood plains
Slope gradient: 0 to 5 percent
Parent material: sandy and gravelly alluvium and/or sandy and silty alluvium
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: not determined
Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: frequent
Ponding hazard: none
Potential frost action: not determined

Characteristics of Alpine-scrub gravelly terraces

Soil name: Typic Haplogelods, sandy-skeletal, terraces
Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)
Climax plant community: Shrub birch-bog blueberry/lichen scrub
Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 2 to 15 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8	
E — 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43 .43
Bs — 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43 .43
2Bs/C — 15 to 21	loamy sand	rapid	0.1 to 0.2	4.4 to 5.6	.02 .10
2C — 21 to 150	extremely gravelly loamy sand	rapid	2.6 to 5.2	5.6 to 6.2	.02 .10

8FP1—Alpine Schist Flood Plains and Terraces

Soil name: Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Typic Gelaquents, coarse-loamy over sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Alpine-riparian scrub gravelly schist flood plains, moderately wet: 15 to 60 percent of the unit (RV=40 percent)
- Alpine-riparian scrub gravelly schist flood plains: 20 to 60 percent of the unit (RV=35 percent)
- Alpine-riparian scrub loamy schist flood plains, wet: 10 to 30 percent of the unit (RV=20 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 729 to 955 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Alpine-riparian scrub gravelly schist flood plains, moderately wet

Soil name: Oxyaquic Gelorthents, sandy-skeletal, schist

Landtype: Gravelly Low Flood Plains, High Elevation (M135A_257)

Climax plant community: Fettleaf willow scrub, cool

Landform(s): channels on flood plains

Slope gradient: 1 to 3 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 8 to 18 cm

Water table (May to September): 50 to 70 cm

Drainage class: somewhat poorly drained

Hydric soil: yes

Hydrologic group: C

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oe	— 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	5.6 to 7.4		
AC	— 1 to 11	stratified highly decomposed plant material to sand to silt	moderate	1.8 to 2.2	5.8 to 7.4	.28	.28
2C	— 11 to 150	extremely gravelly coarse sand, extremely cobbly loamy coarse sand	rapid	5.6 to 11.1	6.0 to 7.4	.02	.10

Characteristics of Alpine-riparian scrub gravelly schist flood plains

Soil name: Typic Gelorthents, sandy-skeletal, schist

Landtype: Gravelly Flood Plains, Cool (M135A_258)

Climax plant community: Feltleaf willow-mixed shrub/herbaceous scrub

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: silty alluvium over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 18 to 27 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oe	— 0 to 7	moderately decomposed plant	moderately rapid	2.2 to 2.5	4.0 to 5.6		
A	— 7 to 19	silt loam	moderate	2.2 to 2.6	4.8 to 6.0	.43	.43
2C	— 19 to 150	extremely cobbly loamy coarse sand	rapid	10.5 to 15.7	5.2 to 6.6	.02	.10

Characteristics of Alpine-riparian scrub loamy schist flood plains, wet

Soil name: Typic Gelaquents, coarse-loamy over sandy-skeletal, schist

Landtype: Loamy Wet Flood Plains, High Elevation (M135A_152)

Climax plant community: Diamondleaf willow/horsetail-fragile sedge scrub

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 40 to 66 cm

Water table (May to September): 0 to 10 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: frequent

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	— 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	5.4 to 5.8		
Cg/Oa	— 9 to 25	stratified highly decomposed plant material to sand to silt	moderate	2.9 to 3.5	5.6 to 6.1	.28	.28
Cg	— 25 to 66	stratified sand to silt	moderate	7.0 to 9.0	5.6 to 6.1	.28	.28
2C	— 66 to 150	extremely cobbly coarse sand	rapid	3.4 to 6.7	5.8 to 6.8	.02	.10

8FP2—Boreal Schist Flood Plains and Terraces

Soil name: Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal-Typic Haplogelods, sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian scrub gravelly schist flood plains, moderately wet: 20 to 40 percent of the unit (RV=35 percent)
- Boreal-riparian forested gravelly schist flood plains: 20 to 40 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly schist terraces: 15 to 30 percent of the unit (RV=20 percent)
- Boreal-riparian scrub loamy schist flood plains, wet: 10 to 20 percent of the unit (RV=10 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 280 to 989 m

Precipitation: 344 to 923 mm

Air temperature: -6 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Boreal-riparian scrub gravelly schist flood plains, moderately wet

Soil name: Oxyaquic Cryorthents, sandy-skeletal, schist

Landtype: Gravelly Low Flood Plains, Acid (M135A_250)

Climax plant community: Feltleaf willow-green alder scrub

Landform(s): channels on flood plains

Slope gradient: 1 to 3 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 8 to 18 cm

Water table (May to September): approximately 70 cm

Drainage class: somewhat poorly drained

Hydric soil: yes

Hydrologic group: C

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	5.6 to 6.7			
AC — 1 to 11	stratified very fine sand to silt	moderate	1.8 to 2.2	5.8 to 7.4	.28	.28	
2C — 11 to 150	extremely cobbly sand	rapid	5.6 to 11.1	6.0 to 7.4	.02	.10	

Characteristics of Boreal-riparian forested gravelly schist flood plains

Soil name: Typic Cryorthents, sandy-skeletal, schist

Landtype: Loamy High Flood Plains (M135A_151)

Climax plant community: White spruce/bog blueberry/feathermoss forest

Landform(s): flood plains

Slope gradient: 0 to 4 percent

Parent material: sandy and gravelly alluvium derived from schist

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	— 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	5.4 to 6.4		
AC	— 3 to 44	extremely cobbly loamy sand	rapid	2.5 to 4.9	6.5 to 7.9	.02	.20
C	— 44 to 150	extremely cobbly loamy sand	rapid	6.4 to 12.7	6.5 to 7.9	.02	.20

Characteristics of Alpine-scrub gravelly schist terraces

Soil name: Typic Haplogelods, sandy-skeletal, schist

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): stream terraces

Slope gradient: 2 to 10 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	— 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8		
E	— 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43	.43
Bs	— 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43	.43
2Bs	— 15 to 21	extremely gravelly coarse sand	rapid	0.1 to 0.2	4.4 to 5.6	.02	.10
2C	— 21 to 150	extremely gravelly coarse sand	rapid	2.6 to 5.2	5.6 to 6.2	.02	.10

8LM—Alpine Low Loess Mountains with Discontinuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 5 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-sedge silty hummocks, frozen: 30 to 45 percent of the unit (RV=40 percent)
- Alpine-tussock-scrub mica-rich silty slopes, frozen: 20 to 45 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly schist circles, frozen: 5 to 25 percent of the unit (RV=15 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 5 to 15 percent of the unit (RV=10 percent)
- Boreal-taiga gravelly schist slopes, frozen: 2 to 15 percent of the unit (RV=5 percent)

Setting

Elevation: 275 to 1,119 m

Precipitation: 446 to 870 mm

Air temperature: -5.1 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification**Section:** Alaska Mountains (M135A)**Subsection:** Alpine Outer Range & Kantishna Hills (M135A.M1)**Characteristics of Alpine-scrub-sedge silty hummocks, frozen****Soil name:** Typic Histoturbels, coarse-silty, mica-rich, steps**Landtype:** Gravelly Frozen Slopes (M135A_180)**Climax plant community:** Shrub birch-mixed ericaceous shrub/sedge scrub**Landform(s):** hummocks on mountains**Slope gradient:** 5 to 20 percent**Parent material:** mossy organic material and/or woody organic material over silty cryoturbate**Restrictive feature(s):** permafrost at 51 to 82 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
Oi and Oe — 0 to 31	peat	moderately rapid	9.9 to 10.8	3.3 to 5.2		
Cg/Oajj — 31 to 61	silt loam, muck	moderate	5.1 to 6.0	4.5 to 5.3	.32	.32
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43	.43

Characteristics of Alpine-tussock-scrub mica-rich silty slopes, frozen**Soil name:** Typic Histoturbels, coarse-silty, mica-rich, cool**Landtype:** Loamy Frozen Wet Terraces, High Elevation (M135A_175)**Climax plant community:** Tussock cottongrass/mixed ericaceous shrub meadow**Landform(s):** turf hummocks on mountains**Slope gradient:** 5 to 14 percent**Parent material:** woody organic material and/or grassy organic material over silty cryoturbate**Restrictive feature(s):** permafrost at 51 to 82 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
Oi and Oe — 0 to 31	peat	moderately rapid	9.9 to 10.8	3.3 to 5.2		
Cg/Oajj — 31 to 61	silt loam, muck	moderate	5.1 to 6.0	4.5 to 5.3	.32	.32
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6	.43	.43	

Characteristics of Alpine-scrub gravelly schist circles, frozen**Soil name:** Ruptic-Histic Aquiturbels, loamy-skeletal**Landtype:** Gravelly Frozen Slopes, Ruptic (M135A_182)**Climax plant community:** Shrub birch/sedge scrub mosaic**Landform(s):** nonsorted circles on mountains**Slope gradient:** 8 to 14 percent**Parent material:** silty eolian deposits over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 1 to 12 cm; bedrock (paralithic) at 88 to 150 cm; permafrost at 88 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	4.2 to 5.4			
A	1 to 3	silt loam	moderate	0.5 to 0.6	4.2 to 5.8	.43	.43	
2Bw/Cjj	3 to 11	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 6.0	.10	.32	
2C/Bwjj	11 to 150	very channery silt loam	moderately rapid	11.1 to 19.5	4.8 to 6.5	.10	.32	
2Cr _f	150 to 150	permanently frozen bedrock	impermeable					

8LM1—Alpine Low Schist Mountains with Discontinuous Permafrost

Soil name: Typic Histoturbels, loamy-skeletal-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 0 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-sedge-gravelly schist hummocks, frozen: 35 to 50 percent of the unit (RV=40 percent)
- Alpine-scrub gravelly schist circles, frozen: 10 to 25 percent of the unit (RV=20 percent)
- Alpine-tussock-scrub gravelly schist slopes, frozen: 15 to 35 percent of the unit (RV=20 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub gravelly schist colluvial slopes: 5 to 30 percent of the unit (RV=10 percent)

Setting

Elevation: 615 to 1,238 m

Precipitation: 446 to 870 mm

Air temperature: -5.1 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-scrub-sedge-gravelly schist hummocks, frozen

Soil name: Typic Histoturbels, loamy-skeletal, schist, steps

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): hummocks on mountains

Slope gradient: 0 to 20 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 29 to 44 cm; permafrost at 33 to 77 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	3.6 to 5.2	
A/Oajj — 20 to 34	silt loam, muck	moderate	3.4 to 3.9	4.4 to 5.3	.32 .32
2Cg — 34 to 42	very cobbly loam	moderately rapid	0.6 to 1.1	4.4 to 5.8	.10 .32
2Cgf — 42 to 150	permanently frozen very cobbly loam	impermeable	4.5 to 6.0		.10 .32

Characteristics of Alpine-scrub gravelly schist circles, frozen

Soil name: Ruptic-Histic Aquiturbels, loamy-skeletal

Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)

Climax plant community: Shrub birch/sedge scrub mosaic

Landform(s): nonsorted circles on mountains

Slope gradient: 0 to 12 percent

Parent material: silty eolian deposits over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 1 to 12 cm; permafrost at 88 to 150 cm; bedrock (paralithic) at 88 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 1	slightly decomposed plant material	moderately rapid	0.3 to 0.3	4.2 to 5.4	
A — 1 to 3	silt loam	moderate	0.5 to 0.6	4.2 to 5.8	.43 .43
2Bw/Cjj — 3 to 11	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 6.0	.10 .32
2C/Bwjj — 11 to 150	very channery silt loam	moderately rapid	11.1 to 19.5	4.8 to 6.5	.10 .32
2CrF — 150 to 150	permanently frozen bedrock	impermeable			

Characteristics of Alpine-tussock-scrub gravelly schist slopes, frozen

Soil name: Typic Histoturbels, loamy-skeletal, cool

Landtype: Loamy Frozen Wet Terraces, High Elevation (M135A_175)

Climax plant community: Tussock cottongrass/mixed ericaceous shrub meadow

Landform(s): turf hummocks on mountains

Slope gradient: 0 to 8 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 29 to 44 cm; permafrost at 33 to 77 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	3.6 to 5.2		
A/Oajj — 20 to 34	silt loam, muck	moderate	3.4 to 3.9	4.4 to 5.3	.32	.32
2Cg — 34 to 42	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 5.8	.10	.32
2Cgf — 42 to 150	permanently frozen very channery loam	impermeable	4.5 to 6.0		.10	.32

8LMF—Boreal Lower Mountain Slopes, Thermokarsted

Soil name: Typic Umbrorthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 22 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga high elevation silty mica-rich loess hills, frozen: 50 to 75 percent of the unit (RV=70 percent)
- Boreal-taiga/tussock mica-rich silty loess slopes, frozen: 10 to 30 percent of the unit (RV=25 percent)
- Boreal-riparian tall scrub silty frozen drains: 2 to 5 percent of the unit (RV=5 percent)

Setting

Elevation: 211 to 641 m

Precipitation: 358 to 776 mm

Air temperature: -4 to -2.4 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Boreal Outer Range & Kantishna Hills (M135A.M1L)

Characteristics of Boreal-taiga high elevation silty mica-rich loess hills, frozen

Soil name: Typic Umbrorthels, coarse-silty, mica-rich

Landtype: Loamy Frozen Slopes, Ice Cored (M135A_113)

Climax plant community: Black spruce/green alder woodland

Landform(s): mountains

Slope gradient: 5 to 22 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits derived from schist

Restrictive feature(s): permafrost at 33 to 75 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oe — 0 to 23	moderately decomposed plant	moderately rapid	7.4 to 8.1	3.5 to 4.8		
A — 23 to 46	silt loam	moderate	5.5 to 6.4	4.9 to 5.7	.32	.32
Af — 46 to 58	permanently frozen silt loam	impermeable	2.4 to 2.9	5.0 to 6.6	.43	.43
Cf — 58 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43	.43

Characteristics of Boreal-taiga/tussock mica-rich silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty, mica-rich
Landtype: Loamy Frozen Terraces, Wet (M135A_105)
Climax plant community: Black spruce/tussock cottongrass woodland
Landform(s): turf hummocks on mountains
Slope gradient: 0 to 12 percent
Parent material: grassy organic material over silty cryoturbate
Restrictive feature(s): permafrost at 51 to 82 cm
Water table (May to September): 0 to 50 cm
Drainage class: very poorly drained
Hydric soil: yes
Hydrologic group: D
Flooding hazard: none
Ponding hazard: frequent
Potential frost action: high
Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 40	peat	moderately rapid	12.8 to 14.0	3.3 to 5.2	
Cg/Oajj — 40 to 77	silt loam, muck	moderate	6.3 to 7.4	4.5 to 5.3	.37 .37
Cgf — 77 to 150	permanently frozen silt loam	impermeable	4.8 to 5.6		.43 .43

8LMV—Alpine and Subalpine Schist Mountain Valleys

Soil name: Typic Dystrogelepts, loamy-skeletal Association, 8 to 60 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly schist colluvial slopes: 20 to 50 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly schist colluvial slopes, thick surface: 20 to 35 percent of the unit (RV=30 percent)
- Subalpine-scrub gravelly schist colluvial slopes: 15 to 30 percent of the unit (RV=20 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly schist colluvial toeslopes, frozen: 2 to 5 percent of the unit (RV=5 percent)

Setting

Elevation: 301 to 1,204 m
Precipitation: 446 to 870 mm
Air temperature: -5.1 to -2.4 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-dwarf scrub gravelly schist colluvial slopes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist
Landtype: Gravelly Mountains, High Elevation (M135A_310)
Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub
Landform(s): ridges on mountains
Slope gradient: 15 to 40 percent
Parent material: gravelly colluvium derived from schist
Restrictive feature(s): bedrock (paralithic) at 50 to 90 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water			
			Permeability	Capacity (cm)	pH	Kw Kf
A	— 0 to 2	gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28 .55
Bw	— 2 to 28	very channery silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17 .55
C	— 28 to 86	extremely channery silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10 .55
Cr	— 86 to 150	bedrock				

Characteristics of Alpine-scrub gravelly schist colluvial slopes, thick surface

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, thick surface

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 30 to 50 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 5 to 25 cm; bedrock (paralithic) at 110 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water			
			Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.0 to 5.4	
A	— 3 to 8	silt loam	moderate	0.9 to 1.0	3.8 to 5.1	.43 .43
2Bw	— 8 to 20	very channery silt loam	moderately rapid	1.0 to 1.7	4.2 to 5.4	.10 .32
2C	— 20 to 150	extremely channery silt loam	moderately rapid	10.4 to 18.2	5.0 to 6.2	.10 .55
2Cr	— 150 to 150	bedrock				

Characteristics of Subalpine-scrub gravelly schist colluvial slopes

Soil name: Typic Dystrocryepts, loamy-skeletal, schist

Landtype: Gravelly Mountains, Acid (M135A_303)

Climax plant community: Green alder/red current/bluejoint scrub

Landform(s): mountains

Slope gradient: 26 to 60 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 4 to 32 cm; bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	3.7 to 5.4	
A — 9 to 30	silt loam	moderate	5.0 to 5.9	3.7 to 5.8	.43 .43
2Bw — 30 to 58	very channery loam	moderately rapid	2.2 to 3.9	4.8 to 6.1	.10 .32
2C — 58 to 84	extremely channery loam	moderately rapid	2.1 to 3.6	5.0 to 6.4	.10 .32
2Cr — 84 to 150	bedrock				

8MBS—Alpine Schist Mountains with Discontinuous Permafrost

Soil name: Typic Dystrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 8 to 50 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly schist colluvial slopes: 25 to 45 percent of the unit (RV=30 percent)
- Alpine-scrub mosaic gravelly colluvial schist slopes: 20 to 35 percent of the unit (RV=20 percent)
- Alpine-sedge-dwarf scrub gravelly schist slopes, frozen: 15 to 40 percent of the unit (RV=20 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub-meadow mosaic gravelly schist swales: 5 to 20 percent of the unit (RV=13 percent)
- Alpine-riparian scrub gravelly schist flood plains, moderately wet: 2 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 261 to 1,393 m

Precipitation: 446 to 870 mm

Air temperature: -5.1 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-scrub gravelly schist colluvial slopes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, warm

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 15 to 50 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 5 to 25 cm; bedrock (paralithic) at 110 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
A — 0 to 2	gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28	.55
Bw — 2 to 28	very channery silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17	.55
C — 28 to 86	extremely channery silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10	.55
Cr — 86 to 150	bedrock					

Characteristics of Alpine-scrub mosaic gravelly colluvial schist slopes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, summits

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): ridges on mountains

Slope gradient: 15 to 40 percent

Parent material: gravelly colluvium derived from schist

Restrictive feature(s): bedrock (paralithic) at 19 to 90 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
A — 0 to 2	very gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28	.55
Bw — 2 to 28	very gravelly silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17	.55
C — 28 to 86	extremely cobbly silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10	.55
Cr — 86 to 150	bedrock					

Characteristics of Alpine-sedge-dwarf scrub gravelly schist slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, schist swales

Landtype: Gravelly Frozen Slopes, Cold (M135A_183)

Climax plant community: Sedge/dwarf willow-white mountain avens wet meadow

Landform(s): saddles on mountains

Slope gradient: 8 to 25 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 27 to 39 cm; permafrost at 51 to 144 cm; bedrock (paralithic) at 90 to 150 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 21	peat	moderately rapid	6.7 to 7.3	4.7 to 6.7		
A — 21 to 28	silt loam	moderately rapid	0.8 to 1.1	4.1 to 6.9	.43	.43
2Cg — 28 to 51	very channery silt loam	moderately rapid	1.8 to 3.2	5.3 to 6.6	.10	.32
2Cf — 51 to 150	permanently frozen very channery silt loam	impermeable	5.3 to 6.6		.10	.32
2Crf — 150 to 150	permanently frozen bedrock	impermeable				

8MFS—Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost

Soil name: Typic Historthels, coarse-loamy-Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 8 to 45 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly schist colluvial toeslopes, frozen: 25 to 50 percent of the unit (RV=45 percent)
- Alpine-scrub gravelly schist colluvial slopes: 25 to 55 percent of the unit (RV=30 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 15 to 40 percent of the unit (RV=25 percent)

Setting

Elevation: 400 to 1,226 m

Precipitation: 446 to 870 mm

Air temperature: -5.1 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Outer Range & Kantishna Hills (M135A.M1)

Characteristics of Alpine-scrub gravelly schist colluvial toeslopes, frozen

Soil name: Typic Historthels, coarse-loamy, schist

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): mountains

Slope gradient: 8 to 25 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 33 to 62 cm; permafrost at 33 to 62 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 23	peat	moderately rapid	7.4 to 8.1	5.4 to 5.8	
A — 23 to 31	silt loam	moderate	1.9 to 2.2	3.7 to 5.8	.43 .43
C — 31 to 45	silt loam	moderately rapid	1.1 to 2.0	4.8 to 6.1	.43 .43
2Cf — 45 to 150	permanently frozen gravelly silt loam	impermeable	4.8 to 6.1		.28 .43

Characteristics of Alpine-scrub gravelly schist colluvial slopes

Soil name: Typic Dystrogelepts, loamy-skeletal, schist, warm

Landtype: Gravelly Slopes (M135A_358)

Climax plant community: Shrub birch-bog blueberry scrub

Landform(s): mountains

Slope gradient: 15 to 45 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 5 to 25 cm; bedrock (paralithic) at 110 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
A	0 to 2	gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28	.55
Bw	2 to 28	very channery silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17	.55
C	28 to 86	extremely channery silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10	.55
Cr	86 to 150	bedrock					

Characteristics of Subalpine-scrub-meadow mosaic gravelly schist swales

Soil name: Oxyaquic Eutrocryepts, loamy-skeletal

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 10 to 35 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 8 to 30 cm; bedrock (paralithic) at 78 to 150 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
Oi	0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.1 to 6.0		
A	3 to 9	channery loam	moderate	1.4 to 1.7	4.5 to 6.3	.32	.32
2C	9 to 124	very channery loam	moderately rapid	9.2 to 16.1	5.2 to 6.8	.10	.32
2Cr	124 to 150	bedrock					

8MFS1—Boreal Schist Lower Mountain Slopes with Continuous Permafrost

Soil name: Typic Historthels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, loamy-skeletal Association, 0 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga gravelly schist slopes, frozen: 55 to 70 percent of the unit (RV=60 percent)
- Alpine-scrub gravelly schist colluvial toeslopes, frozen: 10 to 35 percent of the unit (RV=15 percent)
- Alpine-tussock-scrub gravelly schist slopes, frozen: 10 to 35 percent of the unit (RV=15 percent)
- Boreal-riparian scrub loamy schist flood plains, wet: 2 to 5 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly schist colluvial slopes, thick surface: 2 to 10 percent of the unit (RV=5 percent)

Setting**Elevation:** 357 to 897 m**Precipitation:** 358 to 776 mm**Air temperature:** -4 to -2.4 °C**Frost-free period:** 60 to 80 days**Ecoregion Classification****Section:** Alaska Mountains (M135A)**Subsection:** Boreal Outer Range & Kantishna Hills (M135A.M1L)**Characteristics of Boreal-taiga gravelly schist slopes, frozen****Soil name:** Typic Historthels, loamy-skeletal, schist**Landtype:** Loamy Frozen Slopes (M135A_400)**Climax plant community:** Black spruce/bog blueberry-Labrador tea woodland**Landform(s):** mountain slopes**Slope gradient:** 8 to 25 percent**Parent material:** mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist**Restrictive feature(s):** permafrost at 25 to 49 cm; strongly contrasting textural stratification at 25 to 49 cm; bedrock (paralithic) at 70 to 150 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
Oi and Oe — 0 to 25	peat	moderately rapid	8.0 to 8.8	3.4 to 5.4		
A — 25 to 35	silt loam	moderate	2.4 to 2.8	4.1 to 5.4	.43	.43
2Cgf — 35 to 89	permanently frozen extremely channery silt loam	impermeable	4.8 to 5.8		.10	.55
2Crf — 84 to 150	permanently frozen bedrock	impermeable				

Characteristics of Alpine-scrub gravelly schist colluvial toeslopes, frozen**Soil name:** Typic Historthels, coarse-loamy, schist**Landtype:** Gravelly Frozen Slopes (M135A_180)**Climax plant community:** Shrub birch-mixed ericaceous shrub/sedge scrub**Landform(s):** mountains**Slope gradient:** 8 to 25 percent**Parent material:** mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist**Restrictive feature(s):** permafrost at 33 to 62 cm; strongly contrasting textural stratification at 33 to 62 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi — 0 to 23	peat	moderately rapid	7.4 to 8.1	5.4 to 5.8		
A — 23 to 31	silt loam	moderate	1.9 to 2.2	3.7 to 5.8	.43	.43
C — 31 to 45	silt loam	moderately rapid	1.1 to 2.0	4.8 to 6.1	.43	.43
2Cf — 45 to 150	permanently frozen gravelly silt loam	impermeable	4.8 to 6.1		.28	.43

Characteristics of Alpine-tussock-scrub gravelly schist slopes, frozen

Soil name: Typic Histoturbels, loamy-skeletal, cool

Landtype: Loamy Frozen Wet Terraces, High Elevation (M135A_175)

Climax plant community: Tussock cottongrass/mixed ericaceous shrub meadow

Landform(s): turf hummocks on mountains

Slope gradient: 0 to 8 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 29 to 44 cm; permafrost at 33 to 77 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	3.6 to 5.2		
A/Oajj — 20 to 34	silt loam, muck	moderate	3.4 to 3.9	4.4 to 5.3	.32	.32
2Cg — 34 to 42	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 5.8	.10	.32
2Cgf — 42 to 150	permanently frozen very channery loam	impermeable	4.5 to 6.0		.10	.32

8MS—Alpine Schist Mountain Ridges with Discontinuous Permafrost

Soil name: Typic Dystrogelepts, loamy-skeletal-Rock Outcrop-Typic Aquiturbels, loamy-skeletal Association, 8 to 45 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly schist colluvial slopes: 20 to 60 percent of the unit (RV=45 percent)
- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 10 to 30 percent of the unit (RV=20 percent)
- Alpine-sedge-dwarf scrub gravelly schist lobes and stripes, frozen: 10 to 25 percent of the unit (RV=15 percent)
- Alpine-sedge-dwarf scrub gravelly schist slopes, frozen: 10 to 20 percent of the unit (RV=10 percent)
- Alpine-scrub gravelly schist circles, frozen: 5 to 15 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly schist colluvial slopes, thick surface: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 489 to 1,499 m

Precipitation: 446 to 870 mm

Air temperature: -5.1 to -2.4 °C

Frost-free period: 50 to 70 days

Ecoregion Classification**Section:** Alaska Mountains (M135A)**Subsection:** Alpine Outer Range & Kantishna Hills (M135A.M1)**Characteristics of Alpine-dwarf scrub gravelly schist colluvial slopes****Soil name:** Typic Dystrogelepts, loamy-skeletal, schist**Landtype:** Gravelly Mountains, High Elevation (M135A_310)**Climax plant community:** White mountain avens-mixed ericaceous shrub dwarf alpine scrub**Landform(s):** ridges on mountains**Slope gradient:** 12 to 45 percent**Parent material:** gravelly colluvium derived from schist**Restrictive feature(s):** bedrock (paralithic) at 50 to 90 cm**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** moderate**Representative soil profile:**

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw	Kf
A	— 0 to 2	gravelly silt loam	moderately rapid	0.2 to 0.3	4.0 to 5.2	.28	.55
Bw	— 2 to 28	very channery silt loam	moderately rapid	2.1 to 3.6	4.4 to 5.4	.17	.55
C	— 28 to 86	extremely channery silt loam	moderately rapid	4.6 to 8.1	4.7 to 5.8	.10	.55
Cr	— 86 to 150	bedrock					

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift**Soil name:** Nonvegetated rock outcrop, ice, talus, and/or drift, Interior**Landtype:** Rock and Ice, Nonvegetated (M135A_ROC)**Climax plant community:** Sparsely vegetated mountain slopes, Interior**Landform(s):** mountains, ice, and moraines**Slope gradient:** 20 to 150 percent**Parent material:** rockfall deposits and/or scree and/or talus**Restrictive feature(s):** none**Water table (May to September):** more than 150 cm**Drainage class:** not determined**Hydric soil:** unranked**Hydrologic group:** not determined**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** not determined**Characteristics of Alpine-sedge-dwarf scrub gravelly schist lobes and stripes, frozen****Soil name:** Typic Aquiturbels, loamy-skeletal**Landtype:** Gravelly Frozen Slopes, Cold (M135A_183)**Climax plant community:** Sedge/dwarf willow-white mountain avens wet meadow**Landform(s):** solifluction lobes on mountains; stripes on mountains**Slope gradient:** 8 to 25 percent**Parent material:** gravelly cryoturbate derived from schist**Restrictive feature(s):** bedrock (paralithic) at 68 to 150 cm; permafrost at 68 to 150 cm**Water table (May to September):** 0 to 130 cm**Drainage class:** very poorly drained**Hydric soil:** yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 17	moderately decomposed plant	moderately rapid	5.4 to 5.9	5.7 to 6.9	
A/Cgjj — 17 to 21	very gravelly silt loam	moderately rapid	0.5 to 0.6	5.1 to 6.9	.17 .55
Cg — 21 to 130	very gravelly loam	moderately rapid	8.7 to 15.3	5.6 to 6.9	.10 .32
Crf — 130 to 150	permanently frozen bedrock	impermeable			

8MVF—Boreal and Subalpine Schist Mountain Valleys

Soil name: Humic Cryaquepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal-Typic Dystrocryepts, loamy-skeletal Association, 12 to 50 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested silty schist slopes, wet: 35 to 60 percent of the unit (RV=40 percent)
- Subalpine-scrub-meadow mosaic gravelly schist swales: 10 to 25 percent of the unit (RV=20 percent)
- Boreal-forested gravelly schist colluvial slopes: 10 to 40 percent of the unit (RV=20 percent)
- Subalpine-scrub gravelly schist colluvial slopes: 10 to 20 percent of the unit (RV=10 percent)
- Alpine-scrub gravelly schist colluvial slopes: 5 to 20 percent of the unit (RV=10 percent)

Setting

Elevation: 273 to 1,152 m

Precipitation: 358 to 776 mm

Air temperature: -4 to -2.4 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Boreal Outer Range & Kantishna Hills (M135A.M1L)

Characteristics of Boreal-forested silty schist slopes, wet

Soil name: Humic Cryaquepts, loamy-skeletal

Landtype: Loamy Slopes, Wet (M135A_354)

Climax plant community: White spruce/willow woodland, wet

Landform(s): valleys on mountains

Slope gradient: 12 to 36 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 16 to 43 cm; bedrock (paralithic) at 84 to 150 cm

Water table (May to September): 0 to 25 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	4.2 to 6.0	
A — 9 to 18	mucky silt loam	moderate	2.2 to 2.5	5.5 to 7.4	.43 .43
2A — 18 to 27	gravelly silt loam	moderately rapid	0.7 to 1.3	5.5 to 7.4	.24 .32
2C — 27 to 103	very channery silt loam	moderately rapid	6.1 to 10.6	5.7 to 7.4	.10 .55
2Cr — 103 to 150	bedrock				

Characteristics of Subalpine-scrub-meadow mosaic gravelly schist swales

Soil name: Oxyaquic Eutrocryepts, loamy-skeletal

Landtype: Swales (M135A_405)

Climax plant community: Green alder scrub mosaic

Landform(s): swales on mountains

Slope gradient: 12 to 36 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 8 to 30 cm; bedrock (paralithic) at 78 to 150 cm

Water table (May to September): 10 to 50 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	4.1 to 6.0	
A — 3 to 9	channery loam	moderate	1.4 to 1.7	4.5 to 6.3	.32 .32
2C — 9 to 124	very channery loam	moderately rapid	9.2 to 16.1	5.2 to 6.8	.10 .32
2Cr — 124 to 150	bedrock				

Characteristics of Boreal-forested gravelly schist colluvial slopes

Soil name: Typic Dystricryepts, loamy-skeletal, schist, warm

Landtype: Gravelly Mountains, Warm (M135A_355)

Climax plant community: White spruce/green alder forest

Landform(s): valleys on mountains

Slope gradient: 26 to 48 percent

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 4 to 22 cm; bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	3.7 to 5.4	
A — 9 to 20	mucky silt loam	moderate	2.6 to 3.1	3.7 to 5.8	.43 .43
2Bw — 20 to 41	very channery loam	moderately rapid	1.7 to 2.9	4.8 to 6.1	.10 .32
2C — 41 to 96	extremely channery loam	moderately rapid	4.4 to 7.7	5.0 to 7.1	.10 .32
2Cr — 96 to 150	bedrock				

8ST1—Alpine Schist Terraces and Mountain Toeslopes with Discontinuous Permafrost

Soil name: Typic Histoturbels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Haplogelods, sandy-skeletal Association, 0 to 10 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-tussock-scrub gravelly schist slopes, frozen: 25 to 50 percent of the unit (RV=35 percent)
- Alpine-scrub gravelly schist colluvial toeslopes, frozen: 15 to 45 percent of the unit (RV=30 percent)
- Alpine-scrub gravelly schist terraces: 15 to 30 percent of the unit (RV=20 percent)
- Boreal-taiga/tussock mica-rich silty loess slopes, frozen: 5 to 20 percent of the unit (RV=15 percent)

Setting

Elevation: 458 to 838 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Alpine-tussock-scrub gravelly schist slopes, frozen

Soil name: Typic Histoturbels, loamy-skeletal, cool

Landtype: Loamy Frozen Wet Terraces, High Elevation (M135A_175)

Climax plant community: Tussock cottongrass/mixed ericaceous shrub meadow

Landform(s): turf hummocks on fans on mountains

Slope gradient: 0 to 8 percent

Parent material: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 29 to 44 cm; permafrost at 33 to 77 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	3.6 to 5.2		
A/Oajj — 20 to 34	silt loam, muck	moderate	3.4 to 3.9	4.4 to 5.3	.32	.32
2Cg — 34 to 42	very channery silt loam	moderately rapid	0.6 to 1.1	4.4 to 5.8	.10	.32
2Cgf — 42 to 150	permanently frozen very channery loam	impermeable	4.5 to 6.0		.10	.32

Characteristics of Alpine-scrub gravelly schist colluvial toeslopes, frozen

Soil name: Typic Historthels, coarse-loamy, schist

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): fans on mountains

Slope gradient: 0 to 10 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 33 to 62 cm; permafrost at 33 to 62 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 23	peat	moderately rapid	7.4 to 8.1	5.4 to 5.8	
A — 23 to 31	silt loam	moderate	1.9 to 2.2	3.7 to 5.8	.43 .43
C — 31 to 45	silt loam	moderately rapid	1.1 to 2.0	4.8 to 6.1	.43 .43
2Cf — 45 to 150	permanently frozen gravelly silt loam	impermeable	4.8 to 6.1		.28 .43

Characteristics of Alpine-scrub gravelly schist terraces

Soil name: Typic Haplogelods, sandy-skeletal, schist

Landtype: Gravelly and Sandy Terraces, High Elevation (M135A_352)

Climax plant community: Shrub birch-bog blueberry/lichen scrub

Landform(s): stream terraces

Slope gradient: 0 to 2 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium derived from schist

Restrictive feature(s): strongly contrasting textural stratification at 15 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 8	slightly decomposed plant material	moderately rapid	2.6 to 2.8	3.8 to 4.8	
E — 8 to 10	silt loam	moderate	0.3 to 0.4	3.8 to 5.0	.43 .43
Bs — 10 to 15	silt loam	moderate	0.9 to 1.0	4.0 to 5.6	.43 .43
2Bs — 15 to 21	extremely gravelly coarse sand	rapid	0.1 to 0.2	4.4 to 5.6	.02 .10
2C — 21 to 150	extremely gravelly coarse sand	rapid	2.6 to 5.2	5.6 to 6.2	.02 .10

9AF—Subalpine Fans

Soil name: Spodic Dystrocryepts, sandy-skeletal, 4 to 18 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub gravelly fan terraces: 70 to 90 percent of the unit (RV=85 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly wet till swales: 2 to 10 percent of the unit (RV=5 percent)
- Boreal-riparian forested gravelly high flood plains, Cook Inlet: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 232 to 992 m

Precipitation: 408 to 3,051 mm

Air temperature: -6.9 to 0.7 °C

Frost-free period: 60 to 90 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Subalpine Mountains (M135S.M5L)

Characteristics of Subalpine-scrub gravelly fan terraces

Soil name: Spodic Dystricrypts, sandy-skeletal

Landtype: Silty Slopes, High Elevation (M135S_405)

Climax plant community: Sitka alder/shield fern scrub mosaic

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 4 to 18 percent

Parent material: loamy volcanic ash and/or loamy eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 4 to 18 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: rare

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 10	slightly decomposed plant material	moderately rapid	3.2 to 3.5	2.8 to 3.4		
A — 10 to 18	silt loam	moderate	1.0 to 1.3	3.0 to 3.6	.43	.43
2Bs — 18 to 32	very cobbly sandy loam	rapid	0.3 to 0.6	3.3 to 4.6	.10	.24
2BC — 32 to 66	extremely cobbly loamy sand	rapid	0.7 to 1.4	4.0 to 4.6	.02	.10
2C — 66 to 150	extremely cobbly loamy sand	rapid	1.7 to 3.4	4.0 to 5.3	.02	.10

9AF2—Boreal Fans

Soil name: Typic Cryorthents, sandy-skeletal-Spodic Dystricrypts, sandy-skeletal Association, 2 to 10 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested gravelly high flood plains, Cook Inlet: 30 to 75 percent of the unit (RV=55 percent)
- Boreal-forested gravelly fan terraces: 20 to 60 percent of the unit (RV=35 percent)
- Boreal-riparian forested hardwood gravelly flood plains: 2 to 10 percent of the unit (RV=5 percent)
- Nonvegetated alluvium: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 90 to 969 m

Precipitation: 408 to 3,051 mm

Air temperature: -6.9 to 0.7 °C

Frost-free period: 60 to 90 days

Ecoregion Classification**Section:** Cook Inlet Lowlands (135A)**Subsection:** Lowland Flood Plains & Terraces & Fans (135A.V1)**Characteristics of Boreal-riparian forested gravelly high flood plains, Cook Inlet****Soil name:** Typic Cryorthents, sandy-skeletal, Cook Inlet**Landtype:** Loamy Flood Plains (135A_100)**Climax plant community:** Poplar/alder forest**Landform(s):** flood plains on alluvial fans on mountains**Slope gradient:** 2 to 8 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 12 to 32 cm**Water table (May to September):** more than 150 cm**Drainage class:** somewhat excessively drained**Hydric soil:** no**Hydrologic group:** A**Flooding hazard:** occasional**Ponding hazard:** none**Potential frost action:** low**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oe — 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	4.5 to 6.6		
AC — 3 to 16	stratified sand to silt	moderate	1.7 to 2.1	4.8 to 6.6	.28	.28
2C — 16 to 150	extremely cobbly coarse sand	rapid	5.4 to 10.7	5.0 to 7.6	.02	.10

Characteristics of Boreal-forested gravelly fan terraces**Soil name:** Spodic Dystrocrypts, sandy-skeletal, warm**Landtype:** Till Slopes (135A_359)**Climax plant community:** Mixed paper birch-white spruce forest**Landform(s):** fan terraces on alluvial fans on mountains**Slope gradient:** 2 to 8 percent**Parent material:** loamy volcanic ash and/or loamy eolian deposits over sandy and gravelly alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 4 to 18 cm**Water table (May to September):** more than 150 cm**Drainage class:** somewhat excessively drained**Hydric soil:** no**Hydrologic group:** A**Flooding hazard:** rare**Ponding hazard:** none**Potential frost action:** low**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 10	slightly decomposed plant material	moderately rapid	3.2 to 3.5	2.8 to 3.4		
A — 10 to 18	silt loam	moderate	1.0 to 1.3	3.0 to 3.6	.43	.43
2Bs — 18 to 32	very cobbly sandy loam	rapid	0.3 to 0.6	3.3 to 4.6	.10	.24
2BC — 32 to 66	extremely cobbly loamy sand	rapid	0.7 to 1.4	4.0 to 4.6	.02	.10
2C — 66 to 150	extremely cobbly loamy sand	rapid	1.7 to 3.4	4.0 to 5.3	.02	.10

Characteristics of Boreal-riparian forested hardwood gravelly flood plains**Soil name:** Typic Cryorthents, sandy-skeletal, dry, Cook Inlet**Landtype:** Gravelly Flood Plains (135A_201)**Climax plant community:** Poplar/soapberry forest**Landform(s):** flood plains on alluvial fans

Slope gradient: 2 to 8 percent
Parent material: sandy and gravelly alluvium
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: excessively drained
Hydric soil: no
Hydrologic group: A
Flooding hazard: occasional
Ponding hazard: none
Potential frost action: low
Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	5.4 to 6.9	
AC — 1 to 7	extremely cobbly coarse sand	rapid	0.2 to 0.5	7.4 to 7.9	.02 .10
C — 7 to 150	extremely cobbly coarse sand	rapid	5.7 to 11.4	7.6 to 8.2	.02 .10

9CE—Alpine, Subalpine, and Boreal Recent Moraines

Soil name: Typic Cryorthents-Nonvegetated Drift-Typic Eutrocryepts, loamy-skeletal Association, 0 to 65 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub gravelly moraines: 30 to 60 percent of the unit (RV=45 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 20 to 50 percent of the unit (RV=30 percent)
- Boreal-woodland gravelly moraines: 20 to 40 percent of the unit (RV=20 percent)
- Nonvegetated alluvium: 0 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 183 to 1,320 m
Precipitation: 408 to 3,051 mm
Air temperature: -6.9 to 0.7 °C
Frost-free period: 60 to 90 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)
Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Subalpine-scrub gravelly moraines

Soil name: Typic Cryorthents, loamy-skeletal, moraines
Landtype: Moraines, Ice Cored (135A_803)
Climax plant community: Moraine poplar/alder woodland
Landform(s): moraines
Slope gradient: 10 to 45 percent
Parent material: gravelly ablation till
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	6.9 to 7.8			
A — 2 to 12	very cobbly sandy loam	moderately rapid	0.9 to 1.2	6.5 to 8.0	.10	.24	
CA and C — 12 to 150	very cobbly sandy loam	moderately rapid	12.4 to 16.6	7.5 to 8.2	.10	.24	

Characteristics of South Central nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift

Landtype: South Central Rock and Ice, Nonvegetated (M135S_ROC)

Climax plant community: Sparsely vegetated mountain slopes, South Central

Landform(s): moraines

Slope gradient: 0 to 65 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

Characteristics of Boreal-woodland gravelly moraines

Soil name: Typic Eutrocryepts, loamy-skeletal, moraines

Landtype: Moraines, Ice Cored (135A_803)

Climax plant community: Moraine poplar/alder woodland

Landform(s): moraines

Slope gradient: 10 to 45 percent

Parent material: silty eolian deposits over gravelly ablation till

Restrictive feature(s): strongly contrasting textural stratification at 7 to 12 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	3.0 to 3.8			
A — 5 to 9	silt loam	moderate	1.5 to 1.7	3.2 to 4.6	.43	.43	
2Bw — 9 to 20	very cobbly sandy loam	moderately rapid	1.0 to 1.3	4.2 to 5.2	.10	.24	
2C — 20 to 150	very cobbly sandy loam	moderately rapid	11.7 to 15.6	4.8 to 6.2	.10	.24	

9MSA—Alpine Diorite Mountains

Soil name: Andic Dystrocryepts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly diorite colluvial slopes, warm: 20 to 40 percent of the unit (RV=30 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 20 to 40 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly diorite colluvial slopes, cool: 15 to 30 percent of the unit (RV=25 percent)
- Alpine-dwarf scrub-meadow mosaic gravelly diorite swales: 5 to 20 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub silty hummocks: 0 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 575 to 1,751 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-dwarf scrub gravelly diorite colluvial slopes, warm

Soil name: Andic Dystrocryepts, loamy-skeletal, diorite

Landtype: Gravelly Mountains, Moist (M135S_307)

Climax plant community: Steller cassiope-crowberry dwarf alpine scrub

Landform(s): mountains

Slope gradient: 20 to 65 percent

Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from diorite

Restrictive feature(s): bedrock (paralithic) at 100 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oe	0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	3.0 to 4.2		
A	3 to 9	gravelly loam	moderate	0.6 to 0.8	3.8 to 5.0	.24	.37
Bw	9 to 34	very cobbly sandy loam	moderately rapid	2.2 to 3.0	4.2 to 5.5	.10	.24
C	34 to 109	extremely cobbly sandy loam	moderately rapid	6.8 to 9.0	5.4 to 6.2	.05	.24
Cr	109 to 150	bedrock					

Characteristics of South Central nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift

Landtype: South Central Rock and Ice, Nonvegetated (M135S_ROC)

Climax plant community: Sparsely vegetated mountain slopes, South Central

Landform(s): mountains, ice, and moraines

Slope gradient: 25 to 150 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined
Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: none
Ponding hazard: none
Potential frost action: not determined

Characteristics of Alpine-dwarf scrub gravelly diorite colluvial slopes, cool

Soil name: Andic Dystricrypts, loamy-skeletal, diorite, cold
Landtype: Gravelly Mountains, Moist (M135S_307)
Climax plant community: Steller cassiope-crowberry dwarf alpine scrub
Landform(s): mountains
Slope gradient: 20 to 65 percent
Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from diorite
Restrictive feature(s): bedrock (paralithic) at 100 to 150 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate
Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oe — 0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0		3.0 to 4.2		
A — 3 to 9	gravelly loam	moderate	0.6 to 0.8		3.8 to 5.0	.24	.37
Bw — 9 to 34	very cobbly sandy loam	moderately rapid	2.2 to 3.0		4.2 to 5.5	.10	.24
C — 34 to 109	extremely cobbly sandy loam	moderately rapid	6.8 to 9.0		5.4 to 6.2	.05	.24
Cr — 109 to 150	bedrock						

9MSH—Alpine Mountains

Soil name: Rock Outcrop-Andic Dystricrypts, loamy-skeletal Association, 20 to 150 percent slopes

Composition

(All components are listed but only major components are described)

- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 25 to 40 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, warm: 10 to 35 percent of the unit (RV=25 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, cool: 10 to 30 percent of the unit (RV=15 percent)
- Alpine-scrub-meadow mosaic gravelly colluvial slopes: 10 to 25 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub-meadow mosaic gravelly colluvial slopes: 5 to 20 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub silty hummocks: 0 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 406 to 2,018 m
Precipitation: 509 to 3,285 mm
Air temperature: -11.4 to -1.7 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)
Subsection: Alpine Mountains (M135S.M5)

Characteristics of South Central nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift
Landtype: South Central Rock and Ice, Nonvegetated (M135S_ROC)
Climax plant community: Sparsely vegetated mountain slopes, South Central
Landform(s):
Slope gradient: 25 to 150 percent
Parent material: rockfall deposits and/or scree and/or talus
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: not determined
Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: none
Ponding hazard: none
Potential frost action: not determined

Characteristics of Alpine-dwarf scrub gravelly colluvial slopes, warm

Soil name: Andic Dystricryepts, loamy-skeletal, cool
Landtype: Gravelly Mountains (M135S_310)
Climax plant community: Lichen/mixed ericaceous shrub dwarf alpine scrub
Landform(s): mountains
Slope gradient: 20 to 70 percent
Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock
Restrictive feature(s): strongly contrasting textural stratification at 19 to 40 cm; bedrock (paralithic) at 33 to 150 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B
Flooding hazard: none
Ponding hazard: none
Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	3.8 to 4.7		
A — 2 to 6	silt loam	moderate	0.7 to 0.8	4.0 to 5.6	.43	.43
Bw — 6 to 23	gravelly loam	moderately rapid	1.4 to 2.0	4.2 to 5.6	.15	.37
2C — 23 to 63	extremely channery loam	moderately rapid	3.2 to 4.8	4.7 to 6.6	.05	.32
3Cr — 63 to 150	bedrock					

Characteristics of Alpine-dwarf scrub gravelly colluvial slopes, cool

Soil name: Andic Dystricryepts, loamy-skeletal, cold
Landtype: Gravelly Mountains, Moist (M135S_307)
Climax plant community: Steller cassiope-crowberry dwarf alpine scrub
Landform(s): mountains
Slope gradient: 20 to 70 percent
Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock
Restrictive feature(s): strongly contrasting textural stratification at 4 to 15 cm; bedrock (paralithic) at 33 to 150 cm
Water table (May to September): more than 150 cm
Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	3.8 to 4.7	
A — 2 to 6	silt loam	moderate	0.7 to 0.8	4.0 to 5.6	.43 .43
2A — 6 to 24	very channery loam	moderately rapid	1.4 to 2.2	4.2 to 5.6	.15 .37
2Bw — 24 to 43	extremely channery loam	moderately rapid	1.5 to 2.3	4.4 to 5.6	.05 .32
2C — 43 to 72	extremely channery loam	moderately rapid	2.3 to 3.5	4.7 to 6.6	.05 .32
3Cr — 72 to 150	bedrock				

9MSH1—Alpine Low Mountains

Soil name: Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Humic Vitricryands, medial-skeletal Association, 10 to 80 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub silty hummocks: 20 to 40 percent of the unit (RV=25 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, warm: 15 to 30 percent of the unit (RV=20 percent)
- Alpine-scrub-meadow mosaic gravelly colluvial slopes: 10 to 30 percent of the unit (RV=20 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 10 to 30 percent of the unit (RV=20 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, cool: 5 to 20 percent of the unit (RV=10 percent)
- Alpine-scrub gravelly colluvial slopes, warm: 5 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 395 to 1,549 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-dwarf scrub silty hummocks

Soil name: Andic Humicryods, medial over loamy-skeletal, hummocks, moderately deep

Landtype: Hummocks (M135S_363)

Climax plant community: Steller cassiope-crowberry-partridge foot alpine dwarf scrub

Landform(s): earth hummocks on mountains

Slope gradient: 10 to 45 percent

Parent material: silty volcanic ash and/or loess over gravelly colluvium derived from sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 20 to 42 cm; bedrock (paralithic) at 53 to 91 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.8 to 4.6	
E — 4 to 11	silt loam	moderate	2.2 to 2.5	3.8 to 4.6	.37 .37
Bhs/Bs — 11 to 36	silt loam	moderate	8.0 to 9.0	4.7 to 5.7	.43 .43
2BC — 36 to 61	extremely channery loam	moderately rapid	2.2 to 3.0	5.3 to 5.8	.05 .32
2C — 61 to 83	extremely channery loam	moderately rapid	1.8 to 2.6	5.4 to 6.0	.05 .32
2Cr — 83 to 150	bedrock				

Characteristics of Alpine-dwarf scrub gravelly colluvial slopes, warm

Soil name: Andic Dystrocryepts, loamy-skeletal, cool

Landtype: Gravelly Mountains (M135S_310)

Climax plant community: Lichen/mixed ericaceous shrub dwarf alpine scrub

Landform(s): hummocks on mountains

Slope gradient: 26 to 70 percent

Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 19 to 40 cm; bedrock (paralithic) at 33 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	3.8 to 4.7	
A — 2 to 6	silt loam	moderate	0.7 to 0.8	4.0 to 5.6	.43 .43
Bw — 6 to 23	gravelly loam	moderately rapid	1.4 to 2.0	4.2 to 5.6	.15 .37
2C — 23 to 63	extremely channery loam	moderately rapid	3.2 to 4.8	4.7 to 6.6	.05 .32
3Cr — 63 to 150	bedrock				

Characteristics of Alpine-scrub-meadow mosaic gravelly colluvial slopes

Soil name: Humic Vitricryands, medial-skeletal

Landtype: Gravelly Colluvial Slopes (M135S_421)

Climax plant community: Barclay willow/mixed forb scrub mosaic

Landform(s): mountains

Slope gradient: 46 to 80 percent

Parent material: silty volcanic ash and/or gravelly colluvium derived from sedimentary rock

Restrictive feature(s): bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.2 to 5.7	
A — 1 to 26	gravelly loam	moderate	4.2 to 5.0	3.6 to 4.9	.24 .37
Bw — 26 to 79	gravelly loam	moderately rapid	4.2 to 6.4	4.2 to 6.3	.24 .37
2C — 79 to 107	extremely gravelly loam	moderately rapid	2.2 to 3.4	4.7 to 6.3	.24 .64
Cr —107 to 150	bedrock				

9SA4—Alpine Lower Mountain Colluvial Slopes

Soil name: Humic Vitricryands, medial-skeletal-Rock Outcrop-Andic Dystrocryepts, loamy-skeletal Association, 20 to 75 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-meadow mosaic gravelly colluvial slopes: 50 to 80 percent of the unit (RV=60 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 10 to 30 percent of the unit (RV=20 percent)
- Alpine-scrub gravelly colluvial slopes, warm: 5 to 20 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, cool: 3 to 10 percent of the unit (RV=5 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, warm: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 336 to 1,660 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-scrub-meadow mosaic gravelly colluvial slopes

Soil name: Humic Vitricryands, medial-skeletal

Landtype: Gravelly Colluvial Slopes (M135S_421)

Climax plant community: Barclay willow/mixed forb scrub mosaic

Landform(s): mountains

Slope gradient: 20 to 75 percent

Parent material: silty volcanic ash and/or gravelly colluvium derived from sedimentary rock

Restrictive feature(s): bedrock (paralithic) at 53 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.2 to 5.7	
A — 1 to 26	gravelly loam	moderate	4.2 to 5.0	3.6 to 4.9	.24 .37
Bw — 26 to 79	gravelly loam	moderately rapid	4.2 to 6.4	4.2 to 6.3	.24 .37
2C — 79 to 107	extremely gravelly loam	moderately rapid	2.2 to 3.4	4.7 to 6.3	.24 .64
Cr —107 to 150	bedrock				

Characteristics of South Central nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift
Landtype: South Central Rock and Ice, Nonvegetated (M135S_ROC)
Climax plant community: Sparsely vegetated mountain slopes, South Central
Landform(s): mountains, ice, and moraines
Slope gradient: 20 to 150 percent
Parent material: rockfall deposits and/or scree and/or talus
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: not determined
Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: none
Ponding hazard: none
Potential frost action: not determined

9SA5—Subalpine Mountain Colluvial Slopes

Soil name: Andic Humicryods, medial-skeletal-Andic Dystricrypts, loamy-skeletal-Rock Outcrop-Association, 20 to 75 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub-meadow mosaic gravelly colluvial slopes: 45 to 80 percent of the unit (RV=60 percent)
- Alpine-scrub gravelly colluvial slopes, warm: 10 to 20 percent of the unit (RV=15 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 5 to 25 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub silty till hummocks: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 183 to 1,408 m
Precipitation: 408 to 3,051 mm
Air temperature: -6.9 to 0.7 °C
Frost-free period: 60 to 90 days

Ecoregion Classification

Section: South Central Mountains (M135S)
Subsection: Subalpine Mountains (M135S.M5L)

Characteristics of Subalpine-scrub-meadow mosaic gravelly colluvial slopes

Soil name: Andic Humicryods, medial-skeletal
Landtype: Silty Slopes, High Elevation (M135S_405)
Climax plant community: Sitka alder/shield fern scrub mosaic
Landform(s): mountains
Slope gradient: 15 to 70 percent
Parent material: silty volcanic ash and/or gravelly colluvium over gravelly till
Restrictive feature(s): strongly contrasting textural stratification at 4 to 10 cm; bedrock (paralithic) at 56 to 150 cm
Water table (May to September): more than 150 cm
Drainage class: well drained
Hydric soil: no
Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.4 to 4.9	
A — 4 to 14	silt loam	moderate	3.2 to 3.6	3.4 to 5.0	.37 .37
2E — 14 to 21	cobbly loam	moderately rapid	0.6 to 0.8	3.6 to 5.0	.10 .24
2Bhs — 21 to 36	very cobbly loam	moderately rapid	1.4 to 1.8	3.6 to 5.0	.10 .24
2Bs — 36 to 92	very cobbly loam	moderately rapid	5.0 to 6.7	4.3 to 5.5	.10 .24
2Cr — 92 to 150	bedrock				

Characteristics of Alpine-scrub gravelly colluvial slopes, warm

Soil name: Andic Dystricryepts, loamy-skeletal, warm

Landtype: Gravelly Slopes (M135S_358)

Climax plant community: Bog blueberry dwarf alpine scrub

Landform(s): mountains

Slope gradient: 20 to 75 percent

Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 19 to 58 cm; bedrock (paralithic) at 46 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.5 to 4.4	
A — 3 to 11	silt loam	moderate	1.4 to 1.6	3.7 to 4.5	.43 .43
Bw — 11 to 26	silt loam	moderately rapid	1.2 to 1.8	4.6 to 5.5	.43 .43
2C — 26 to 88	extremely channery loam	moderately rapid	5.0 to 7.4	4.6 to 5.5	.05 .32
2Cr — 88 to 150	bedrock				

Characteristics of South Central nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift

Landtype: South Central Rock and Ice, Nonvegetated (M135S_ROC)

Climax plant community: Sparsely vegetated mountain slopes, South Central

Landform(s): mountains, ice, and moraines

Slope gradient: 20 to 150 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

9SA6—Subalpine Glaciated Mountains

Soil name: Andic Humicryods, medial over loamy-skeletal, 15 to 50 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub-meadow mosaic silty till slopes: 65 to 85 percent of the unit (RV=80 percent)
- Alpine-scrub-meadow mosaic silty till slopes: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-scrub gravelly till slopes, warm: 5 to 10 percent of the unit (RV=5 percent)
- Alpine-dwarf scrub silty till hummocks: 2 to 5 percent of the unit (RV=3 percent)
- Alpine-sedge wet meadow organic depressions: 0 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 140 to 1,248 m

Precipitation: 408 to 3,051 mm

Air temperature: -6.9 to 0.7 °C

Frost-free period: 60 to 90 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Subalpine Mountains (M135S.M5L)

Characteristics of Subalpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Humicryods, medial over loamy-skeletal, till

Landtype: Silty Slopes, High Elevation (M135S_405)

Climax plant community: Sitka alder/shield fern scrub mosaic

Landform(s): mountains

Slope gradient: 15 to 50 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): abrupt textural change at 17 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw Kf	
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9		
A — 4 to 10	silt loam	moderate	1.9 to 2.2	3.6 to 5.0	.43	.43
E — 10 to 14	silt loam	moderate	1.3 to 1.4	3.6 to 5.0	.43	.43
Bhs,Bs — 14 to 48	fine sandy loam	moderate	10.9 to 12.2	3.6 to 5.0	.43	.43
2BC — 48 to 72	gravelly loam	moderately rapid	2.2 to 2.9	4.5 to 5.5	.10	.24
2C — 72 to 150	very cobbly loam	moderately rapid	7.0 to 9.4	4.5 to 5.5	.10	.24

9SA44—Alpine Glaciated Lower Mountain Slopes

Soil name: Andic Dystricryepts, loamy-skeletal Association, 20 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-meadow mosaic silty till slopes: 30 to 70 percent of the unit (RV=45 percent)
- Alpine-scrub gravelly till slopes, warm: 15 to 25 percent of the unit (RV=20 percent)
- Alpine-dwarf scrub gravelly till hummocks: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly wet till swales: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub silty till hummocks: 2 to 15 percent of the unit (RV=5 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 545 to 1,378 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Dystricryepts, loamy-skeletal, till

Landtype: Gravelly Colluvial Slopes (M135S_421)

Climax plant community: Barclay willow/mixed forb scrub mosaic

Landform(s): mountains

Slope gradient: 35 to 70 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 13 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw Kf	
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.4 to 5.2		
A — 3 to 25	silt loam	moderate	7.0 to 7.9	4.2 to 5.2	.43	.43
2Bw — 25 to 37	very cobbly sandy loam	moderately rapid	1.1 to 1.4	4.2 to 5.4	.10	.24
2C — 37 to 150	very cobbly sandy loam	moderately rapid	10.2 to 13.6	4.5 to 5.5	.10	.24

Characteristics of Alpine-scrub gravelly till slopes, warm

Soil name: Andic Dystricryepts, loamy-skeletal

Landtype: Gravelly Slopes (M135S_358)

Climax plant community: Bog blueberry dwarf alpine scrub

Landform(s): mountains

Slope gradient: 20 to 55 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 11 to 26 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
				Capacity (cm)				
Oi	0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	2.9 to 4.4			
A	4 to 19	silt loam	moderate	4.8 to 5.4	3.3 to 5.0	.37	.37	
2Bw	19 to 44	very gravelly sandy loam	moderately rapid	2.2 to 3.0	3.9 to 5.3	.10	.24	
2C	44 to 150	very gravelly sandy loam	moderately rapid	9.5 to 12.7	4.4 to 5.8	.10	.24	

Characteristics of Alpine-dwarf scrub gravelly till hummocks

Soil name: Andic Dystrocryepts, loamy-skeletal, hummocks

Landtype: Gravelly Mountains (M135S_310)

Climax plant community: Lichen/mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 15 to 55 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 20 to 49 cm; bedrock (paralithic) at 83 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
				Capacity (cm)				
Oe	0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	3.0 to 4.2			
A/E	2 to 8	silt loam	moderate	2.3 to 2.5	3.2 to 4.7	.43	.43	
Bhs/Bs	8 to 20	silt loam	moderate	4.6 to 5.0	4.0 to 5.0	.43	.43	
2C	20 to 150	very cobbly sandy loam	moderately rapid	11.7 to 15.6	4.4 to 5.6	.10	.24	
3Cr	150 to 150	bedrock						

9SA61—Subalpine Glaciated Benches on Lower Mountain Slopes

Soil name: Andic Humicryods, medial over loamy-skeletal-Cryochemists, euic-Typic Cryaquands, medial over loamy Association, 0 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub-meadow mosaic silty till slopes: 50 to 70 percent of the unit (RV=65 percent)
- Alpine-sedge wet meadow organic depressions: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly wet till swales: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub-meadow mosaic silty till slopes: 2 to 20 percent of the unit (RV=5 percent)

Setting

Elevation: 191 to 1,117 m

Precipitation: 408 to 3,051 mm

Air temperature: -6.9 to 0.7 °C

Frost-free period: 60 to 90 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Subalpine Mountains (M135S.M5L)

Characteristics of Subalpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Humicryods, medial over loamy-skeletal, till

Landtype: Silty Slopes, High Elevation (M135S_405)

Climax plant community: Sitka alder/shield fern scrub mosaic

Landform(s): benches on mountains

Slope gradient: 8 to 20 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 17 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw Kf	
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9		
A — 4 to 10	silt loam	moderate	1.9 to 2.2	3.6 to 5.0	.43	.43
E — 10 to 14	silt loam	moderate	1.3 to 1.4	3.6 to 5.0	.43	.43
Bhs,Bs — 14 to 48	fine sandy loam	moderate	10.9 to 12.2	3.6 to 5.0	.43	.43
2BC — 48 to 72	gravelly loam	moderately rapid	2.2 to 2.9	4.5 to 5.5	.10	.24
2C — 72 to 150	very cobbly loam	moderately rapid	7.0 to 9.4	4.5 to 5.5	.10	.24

Characteristics of Alpine-sedge wet meadow organic depressions

Soil name: Cryohemists, euic

Landtype: Organic Depressions (M135S_536)

Climax plant community: Water sedge-tufted bulrush-forb wet meadow

Landform(s): fens on benches on mountains

Slope gradient: 0 to 4 percent

Parent material: grassy organic material over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 58 to 150 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw Kf	
Oi — 0 to 13	peat	moderately rapid	4.2 to 4.5	4.5 to 6.2		
Oe — 13 to 84	mucky peat	moderately rapid	22.7 to 24.9	5.0 to 6.2		
Cg — 84 to 150	very gravelly loam	moderate	8.6 to 10.6	5.4 to 6.2	.28	.43

Characteristics of Alpine-scrub gravelly wet till swales

Soil name: Typic Cryaquands, medial over loamy-skeletal

Landtype: Swales (M135S_422)

Climax plant community: Barclay willow-diamondleaf willow scrub

Landform(s): depressions on benches on mountains

Slope gradient: 2 to 18 percent

Parent material: silty volcanic ash and/or silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 24 to 58 cm

Water table (May to September): 0 to 25 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	4.9 to 5.6			
A	— 9 to 42	silt loam	moderate	12.5 to 13.9	4.6 to 5.8	.37	.37	
2Cg	— 42 to 59	very cobbly loam	moderately rapid	1.5 to 2.0	4.5 to 5.0	.10	.24	
2C	— 59 to 150	very cobbly loam	moderately rapid	8.2 to 10.9	4.8 to 5.6	.10	.24	

9SA62—Subalpine and Alpine Glaciated Benches on Lower Mountain Slopes

Soil name: Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy Association, 2 to 30 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub-meadow mosaic silty till slopes: 65 to 80 percent of the unit (RV=75 percent)
- Alpine-scrub gravelly wet till swales: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly till slopes, warm: 0 to 15 percent of the unit (RV=5 percent)
- Alpine-sedge wet meadow organic depressions: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 164 to 790 m

Precipitation: 408 to 3,051 mm

Air temperature: -6.9 to 0.7 °C

Frost-free period: 60 to 90 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Subalpine Mountains (M135S.M5L)

Characteristics of Subalpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Humicryods, medial over loamy-skeletal, till

Landtype: Silty Slopes, High Elevation (M135S_405)

Climax plant community: Sitka alder/shield fern scrub mosaic

Landform(s): mountains

Slope gradient: 10 to 30 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 17 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4		3.7 to 4.9		
A — 4 to 10	silt loam	moderate	1.9 to 2.2		3.6 to 5.0	.43	.43
E — 10 to 14	silt loam	moderate	1.3 to 1.4		3.6 to 5.0	.43	.43
Bhs,Bs — 14 to 48	fine sandy loam	moderate	10.9 to 12.2		3.6 to 5.0	.43	.43
2BC — 48 to 72	gravelly loam	moderately rapid	2.2 to 2.9		4.5 to 5.5	.10	.24
2C — 72 to 150	very cobbly loam	moderately rapid	7.0 to 9.4		4.5 to 5.5	.10	.24

Characteristics of Alpine-scrub gravelly wet till swales

Soil name: Typic Cryaquands, medial over loamy-skeletal

Landtype: Swales (M135S_422)

Climax plant community: Barclay willow-diamondleaf willow scrub

Landform(s): depressions on mountains; drainageways on mountains

Slope gradient: 2 to 18 percent

Parent material: silty volcanic ash and/or silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 24 to 58 cm

Water table (May to September): 0 to 25 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1		4.9 to 5.6		
A — 9 to 42	silt loam	moderate	12.5 to 13.9		4.6 to 5.8	.37	.37
2Cg — 42 to 59	very cobbly loam	moderately rapid	1.5 to 2.0		4.5 to 5.0	.10	.24
2C — 59 to 150	very cobbly loam	moderately rapid	8.2 to 10.9		4.8 to 5.6	.10	.24

9SA66—Subalpine Glaciated Lower Mountain Backslopes

Soil name: Andic Humicryods, medial-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal Complex, 10 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Subalpine-scrub-meadow mosaic gravelly colluvial slopes: 20 to 45 percent of the unit (RV=35 percent)
- Subalpine-scrub-meadow mosaic silty till slopes: 20 to 30 percent of the unit (RV=25 percent)
- Alpine-scrub gravelly colluvial slopes, warm: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-dwarf scrub silty till hummocks: 5 to 15 percent of the unit (RV=10 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 5 to 15 percent of the unit (RV=10 percent)
- Alpine-scrub gravelly wet till swales: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 103 to 961 m

Precipitation: 408 to 3,051 mm

Air temperature: -6.9 to 0.7 °C

Frost-free period: 60 to 90 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Subalpine Mountains (M135S.M5L)

Characteristics of Subalpine-scrub-meadow mosaic gravelly colluvial slopes

Soil name: Andic Humicryods, medial-skeletal

Landtype: Silty Slopes, High Elevation (M135S_405)

Climax plant community: Sitka alder/shield fern scrub mosaic

Landform(s): mountains

Slope gradient: 25 to 70 percent

Parent material: silty volcanic ash over gravelly volcanic ash over gravelly colluvium and/or gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 4 to 10 cm; bedrock (paralithic) at 56 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9	
A — 4 to 14	silt loam	moderate	3.2 to 3.6	3.6 to 5.0	.37 .37
2E — 14 to 21	cobbly loam	moderately rapid	0.6 to 0.8	3.6 to 5.0	.10 .24
2Bhs — 21 to 36	very cobbly sandy loam	moderately rapid	1.4 to 1.8	3.6 to 5.0	.10 .24
2Bs — 36 to 92	very cobbly sandy loam	moderately rapid	5.0 to 6.7	4.5 to 5.5	.10 .24
2Cr — 92 to 150	bedrock				

Characteristics of Subalpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Humicryods, medial over loamy-skeletal, till

Landtype: Silty Slopes, High Elevation (M135S_405)

Climax plant community: Sitka alder/shield fern scrub mosaic

Landform(s): mountains

Slope gradient: 10 to 30 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 17 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9	
A — 4 to 10	silt loam	moderate	1.9 to 2.2	3.6 to 5.0	.43 .43
E — 10 to 14	silt loam	moderate	1.3 to 1.4	3.6 to 5.0	.43 .43
Bhs,Bs — 14 to 48	fine sandy loam	moderate	10.9 to 12.2	3.6 to 5.0	.43 .43
2BC — 48 to 72	gravelly loam	moderately rapid	2.2 to 2.9	4.5 to 5.5	.10 .24
2C — 72 to 150	very cobbly loam	moderately rapid	7.0 to 9.4	4.5 to 5.5	.10 .24

Characteristics of Alpine-scrub gravelly colluvial slopes, warm

Soil name: Andic Dystrocryepts, loamy-skeletal, warm

Landtype: Gravelly Slopes (M135S_358)

Climax plant community: Bog blueberry dwarf alpine scrub

Landform(s): mountains

Slope gradient: 20 to 70 percent

Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock

Restrictive feature(s): strongly contrasting textural stratification at 19 to 58 cm; bedrock (paralithic) at 46 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.5 to 4.4	
A — 3 to 11	silt loam	moderate	1.4 to 1.6	3.7 to 4.5	.43 .43
Bw — 11 to 26	silt loam	moderately rapid	1.2 to 1.8	4.6 to 5.5	.43 .43
2C — 26 to 88	extremely channery loam	moderately rapid	5.0 to 7.4	4.6 to 5.5	.05 .32
2Cr — 88 to 150	bedrock				

9TM—Alpine and Subalpine Glaciated Mountain Backslopes

Soil name: Andic Dystrocryepts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal Association, 10 to 55 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-meadow mosaic silty till slopes: 20 to 50 percent of the unit (RV=40 percent)
- Subalpine-scrub-meadow mosaic silty till slopes: 10 to 30 percent of the unit (RV=25 percent)
- Alpine-scrub gravelly till slopes, warm: 10 to 30 percent of the unit (RV=15 percent)
- Alpine-scrub-meadow mosaic gravelly colluvial slopes: 5 to 20 percent of the unit (RV=10 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 2 to 10 percent of the unit (RV=5 percent)
- Alpine-scrub gravelly wet till swales: 2 to 20 percent of the unit (RV=5 percent)

Setting

Elevation: 273 to 1,298 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Dystrocryepts, loamy-skeletal, till

Landtype: Gravelly Colluvial Slopes (M135S_421)

Climax plant community: Barclay willow/mixed forb scrub mosaic

Landform(s): mountains

Slope gradient: 10 to 35 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 13 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	— 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.4 to 5.2		
A	— 3 to 25	silt loam	moderate	7.0 to 7.9	4.2 to 5.2	.43	.43
2Bw	— 25 to 37	very cobbly sandy loam	moderately rapid	1.1 to 1.4	4.2 to 5.4	.10	.24
2C	— 37 to 150	very cobbly sandy loam	moderately rapid	10.2 to 13.6	4.5 to 5.5	.10	.24

Characteristics of Subalpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Humicryods, medial over loamy-skeletal, till

Landtype: Silty Slopes, High Elevation (M135S_405)

Climax plant community: Sitka alder/shield fern scrub mosaic

Landform(s): mountains

Slope gradient: 15 to 30 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 17 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	— 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9		
A	— 4 to 10	silt loam	moderate	1.9 to 2.2	3.6 to 5.0	.43	.43
E	— 10 to 14	silt loam	moderate	1.3 to 1.4	3.6 to 5.0	.43	.43
Bhs,Bs	— 14 to 48	fine sandy loam	moderate	10.9 to 12.2	3.6 to 5.0	.43	.43
2BC	— 48 to 72	gravelly loam	moderately rapid	2.2 to 2.9	4.5 to 5.5	.10	.24
2C	— 72 to 150	very cobbly loam	moderately rapid	7.0 to 9.4	4.5 to 5.5	.10	.24

Characteristics of Alpine-scrub gravelly till slopes, warm

Soil name: Andic Dystrocryepts, loamy-skeletal

Landtype: Gravelly Slopes (M135S_358)

Climax plant community: Bog blueberry dwarf alpine scrub

Landform(s): mountains

Slope gradient: 15 to 55 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 11 to 26 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	2.9 to 4.4	
A — 4 to 19	silt loam	moderate	4.8 to 5.4	3.3 to 5.0	.37 .37
2Bw — 19 to 44	very gravelly sandy loam	moderately rapid	2.2 to 3.0	3.9 to 5.3	.10 .24
2C — 44 to 150	very gravelly sandy loam	moderately rapid	9.5 to 12.7	4.4 to 5.8	.10 .24

9TM3—Alpine Cirque Valleys

Soil name: Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Aquandic Cryaquepts, loamy-skeletal Complex, 8 to 60 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub silty till hummocks: 20 to 45 percent of the unit (RV=30 percent)
- Alpine-dwarf scrub gravelly till hummocks: 15 to 45 percent of the unit (RV=25 percent)
- Alpine-scrub mosaic gravelly till drains: 5 to 25 percent of the unit (RV=15 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 5 to 15 percent of the unit (RV=15 percent)
- Alpine-scrub-meadow mosaic silty till slopes: 5 to 25 percent of the unit (RV=10 percent)
- Alpine-dwarf scrub-meadow mosaic gravelly colluvial slopes: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 499 to 1,614 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-dwarf scrub silty till hummocks

Soil name: Andic Humicryods, medial over loamy-skeletal, hummocks

Landtype: Hummocks (M135S_363)

Climax plant community: Steller cassiope-crowberry-partridge foot alpine dwarf scrub

Landform(s): earth hummocks on mountains

Slope gradient: 10 to 40 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 20 to 42 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	2.9 to 3.4	
A/E — 4 to 11	silt loam	moderate	2.2 to 2.5	3.2 to 3.8	.37 .37
Bhs/Bs — 11 to 36	silt loam	moderate	8.0 to 9.0	3.4 to 4.7	.43 .43
2Bs — 36 to 68	very gravelly sandy loam	moderately rapid	2.9 to 3.8	4.2 to 5.2	.10 .24
2C — 68 to 150	very gravelly sandy loam	moderately rapid	7.4 to 9.8	4.8 to 5.4	.10 .24

Characteristics of Alpine-dwarf scrub gravelly till hummocks

Soil name: Andic Dystrocryepts, loamy-skeletal, hummocks

Landtype: Gravelly Mountains (M135S_310)

Climax plant community: Lichen/mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 8 to 60 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 20 to 49 cm; bedrock (paralithic) at 83 to 150 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	3.0 to 4.2	
A/E — 2 to 8	silt loam	moderate	2.3 to 2.5	3.2 to 4.7	.43 .43
Bhs/Bs — 8 to 20	silt loam	moderate	4.6 to 5.0	4.0 to 5.0	.43 .43
2C — 20 to 150	very cobbly sandy loam	moderately rapid	11.7 to 15.6	4.4 to 5.6	.10 .24
3Cr — 150 to 150	bedrock				

Characteristics of Alpine-scrub mosaic gravelly till drains

Soil name: Aquandic Cryaquepts, loamy-skeletal

Landtype: Swales, Wet (M135S_424)

Climax plant community: Short stalked sedge-mixed forb wet meadow/scrub

Landform(s): drainageways on mountains

Slope gradient: 12 to 30 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 13 to 16 cm

Water table (May to September): 0 to 10 cm

Drainage class: somewhat poorly drained

Hydric soil: yes

Hydrologic group: C

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	5.8 to 6.7	
A1 — 4 to 12	silt loam	moderate	3.0 to 3.4	5.8 to 6.7	.37 .37
2A2 — 12 to 39	very cobbly loam	moderately rapid	2.4 to 3.2	5.8 to 6.2	.10 .24
2C — 39 to 150	very cobbly sandy loam	moderately rapid	10.0 to 13.3	5.6 to 6.4	.10 .24

9TM4—Alpine Diorite Cirque Valleys

Soil name: Andic Humicryods, medial over loamy-skeletal-Typic Haplocryods, loamy-skeletal-Andic Dystrocryepts, loamy-skeletal Complex, 10 to 80 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub silty till hummocks: 25 to 50 percent of the unit (RV=40 percent)
- Alpine-dwarf scrub gravelly diorite till slopes, warm: 15 to 50 percent of the unit (RV=30 percent)
- Alpine-scrub-meadow mosaic gravelly diorite colluvial slopes: 10 to 25 percent of the unit (RV=20 percent)
- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 5 to 20 percent of the unit (RV=10 percent)

Setting

Elevation: 637 to 1,373 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-dwarf scrub silty till hummocks

Soil name: Andic Humicryods, medial over loamy-skeletal, hummocks

Landtype: Hummocks (M135S_363)

Climax plant community: Steller cassiope-crowberry-partridge foot alpine dwarf scrub

Landform(s): earth hummocks on mountains

Slope gradient: 10 to 40 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 20 to 42 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	2.9 to 3.4		
A/E — 4 to 11	silt loam	moderate	2.2 to 2.5	3.2 to 3.8	.37	.37
Bhs/Bs — 11 to 36	silt loam	moderate	8.0 to 9.0	3.4 to 4.7	.43	.43
2Bs — 36 to 68	very gravelly sandy loam	moderately rapid	2.9 to 3.8	4.2 to 5.2	.10	.24
2C — 68 to 150	very gravelly sandy loam	moderately rapid	7.4 to 9.8	4.8 to 5.4	.10	.24

Characteristics of Alpine-dwarf scrub gravelly diorite till slopes, warm

Soil name: Typic Haplocryods, loamy-skeletal, diorite

Landtype: Gravelly Mountains (M135S_310)

Climax plant community: Lichen/mixed ericaceous shrub dwarf alpine scrub

Landform(s): mountains

Slope gradient: 20 to 80 percent

Parent material: volcanic ash and/or silty eolian deposits over gravelly till derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 10 to 20 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oi	0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	3.0 to 3.8		
E	2 to 7	silt loam	moderate	1.9 to 2.1	3.2 to 4.7	.43	.43
Bhs	7 to 15	loam	moderate	2.6 to 2.9	3.6 to 5.0	.43	.43
2Bs	15 to 29	very gravelly sandy loam	moderately rapid	1.3 to 1.7	4.4 to 5.4	.10	.24
2C	29 to 150	very cobbly sandy loam	moderately rapid	10.9 to 14.5	4.4 to 5.4	.10	.24

Characteristics of Alpine-scrub-meadow mosaic gravelly diorite colluvial slopes

Soil name: Andic Dystrocryepts, loamy-skeletal, diorite depressions

Landtype: Gravelly Colluvial Slopes (M135S_421)

Climax plant community: Barclay willow/mixed forb scrub mosaic

Landform(s): mountains

Slope gradient: 20 to 60 percent

Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	Depth (cm)	Texture	Available Water				
			Permeability	Capacity (cm)	pH	Kw Kf	
Oe	0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.2 to 5.2		
A	1 to 40	gravelly sandy loam	moderately rapid	3.5 to 4.7	3.8 to 4.8	.24	.55
Bs	40 to 57	very gravelly sandy loam	moderately rapid	1.5 to 2.0	4.0 to 5.2	.24	.55
C	57 to 150	very gravelly sandy loam	moderately rapid	8.4 to 11.2	4.4 to 5.6	.24	.55

9TMF—Boreal and Subalpine Lower Mountain Slopes

Soil name: Andic Humicryods, medial over loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal Complex, 2 to 30 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested silty till slopes, ash influenced, warm: 35 to 60 percent of the unit (RV=55 percent)
- Subalpine-scrub-meadow mosaic silty till slopes: 20 to 40 percent of the unit (RV=30 percent)
- Boreal-forested silty wet till slopes, ash influenced: 5 to 20 percent of the unit (RV=10 percent)
- Boreal-sedge bog organic depressions: 2 to 15 percent of the unit (RV=5 percent)

Setting

Elevation: 63 to 966 m

Precipitation: 408 to 3,051 mm

Air temperature: -6.9 to 0.7 °C

Frost-free period: 60 to 90 days

Ecoregion Classification**Section:** Cook Inlet Lowlands (135A)**Subsection:** Glaciated Lowlands (135A.G1)**Characteristics of Boreal-forested silty till slopes, ash influenced, warm****Soil name:** Andic Humicryods, medial over loamy-skeletal, till, warm**Landtype:** Till Slopes (135A_359)**Climax plant community:** Mixed paper birch-white spruce forest**Landform(s):** mountains**Slope gradient:** 2 to 30 percent**Parent material:** silty volcanic ash and/or loess over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 20 to 37 cm**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9		
A	4 to 10	silt loam	moderate	1.9 to 2.2	3.6 to 5.0	.37	.37
E	10 to 14	silt loam	moderate	1.3 to 1.4	3.6 to 5.0	.37	.43
Bhs	14 to 24	very fine sandy loam	moderate	3.2 to 3.6	3.6 to 5.0	.37	.43
2Bs	24 to 52	very cobbly sandy loam	moderately rapid	2.5 to 3.4	4.5 to 5.5	.10	.24
2C	52 to 150	very cobbly sandy loam	moderately rapid	8.8 to 11.8	4.5 to 5.5	.10	.24

Characteristics of Subalpine-scrub-meadow mosaic silty till slopes**Soil name:** Andic Humicryods, medial over loamy-skeletal, till**Landtype:** Silty Slopes, High Elevation (M135S_405)**Climax plant community:** Sitka alder/shield fern scrub mosaic**Landform(s):** mountains**Slope gradient:** 2 to 30 percent**Parent material:** silty volcanic ash and/or loess over gravelly till**Restrictive feature(s):** strongly contrasting textural stratification at 17 to 88 cm**Water table (May to September):** more than 150 cm**Drainage class:** well drained**Hydric soil:** no**Hydrologic group:** B**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon	Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9		
A	4 to 10	silt loam	moderate	1.9 to 2.2	3.6 to 5.0	.43	.43
E	10 to 14	silt loam	moderate	1.3 to 1.4	3.6 to 5.0	.43	.43
Bhs,Bs	14 to 48	fine sandy loam	moderate	10.9 to 12.2	3.6 to 5.0	.43	.43
2BC	48 to 72	gravelly loam	moderately rapid	2.2 to 2.9	4.5 to 5.5	.10	.24
2C	72 to 150	very cobbly loam	moderately rapid	7.0 to 9.4	4.5 to 5.5	.10	.24

9TP—Alpine Till Plains and Hills

Soil name: Andic Dystricrypts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy-skeletal Association, 0 to 30 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-meadow mosaic silty till slopes: 30 to 50 percent of the unit (RV=35 percent)
- Alpine-dwarf scrub silty till hummocks: 20 to 40 percent of the unit (RV=20 percent)
- Alpine-scrub gravelly wet till swales: 10 to 25 percent of the unit (RV=20 percent)
- Alpine-sedge wet meadow organic depressions: 10 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly till hummocks: 5 to 25 percent of the unit (RV=10 percent)

Setting

Elevation: 425 to 1,116 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Alpine Mountains (M135S.M5)

Characteristics of Alpine-scrub-meadow mosaic silty till slopes

Soil name: Andic Dystricrypts, loamy-skeletal, till

Landtype: Gravelly Colluvial Slopes (M135S_421)

Climax plant community: Barclay willow/mixed forb scrub mosaic

Landform(s): hills; till plains

Slope gradient: 7 to 30 percent

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 13 to 31 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi — 0 to 3	slightly decomposed plant material	moderately rapid	1.0 to 1.0	3.4 to 5.2		
A — 3 to 25	silt loam	moderate	7.0 to 7.9	4.2 to 5.2	.43	.43
2Bw — 25 to 37	very cobbly sandy loam	moderately rapid	1.1 to 1.4	4.2 to 5.4	.10	.24
2C — 37 to 150	very cobbly sandy loam	moderately rapid	10.2 to 13.6	4.5 to 5.5	.10	.24

Characteristics of Alpine-dwarf scrub silty till hummocks

Soil name: Andic Humicryods, medial over loamy-skeletal, hummocks

Landtype: Hummocks (M135S_363)

Climax plant community: Steller cassiope-crowberry-partridge foot alpine dwarf scrub

Landform(s): earth hummocks on hills; earth hummocks on till plains

Slope gradient: 0 to 24 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 20 to 42 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	2.9 to 3.4		
A/E	— 4 to 11	silt loam	moderate	2.2 to 2.5	3.2 to 3.8	.37	.37
Bhs/Bs	— 11 to 36	silt loam	moderate	8.0 to 9.0	3.4 to 4.7	.43	.43
2Bs	— 36 to 68	very gravelly sandy loam	moderately rapid	2.9 to 3.8	4.2 to 5.2	.10	.24
2C	— 68 to 150	very gravelly sandy loam	moderately rapid	7.4 to 9.8	4.8 to 5.4	.10	.24

Characteristics of Alpine-scrub gravelly wet till swales

Soil name: Typic Cryaquands, medial over loamy-skeletal

Landtype: Swales (M135S_422)

Climax plant community: Barclay willow-diamondleaf willow scrub

Landform(s): depressions on hills; depressions on till plains

Slope gradient: 5 to 30 percent

Parent material: silty volcanic ash and/or silty eolian deposits over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 24 to 58 cm

Water table (May to September): 0 to 25 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 9	slightly decomposed plant material	moderately rapid	2.9 to 3.1	4.9 to 5.6		
A	— 9 to 42	silt loam	moderate	12.5 to 13.9	4.6 to 5.8	.37	.37
2Cg	— 42 to 59	very cobbly loam	moderately rapid	1.5 to 2.0	4.5 to 5.0	.10	.24
2C	— 59 to 150	very cobbly loam	moderately rapid	8.2 to 10.9	4.8 to 5.6	.10	.24

9V12—Alpine Fans and Flood Plains, High Elevation

Soil name: Typic Eutrocryepts, sandy-skeletal-Riverwash-Typic Eutrogelepts, sandy-skeletal Complex, 0 to 30 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-dwarf scrub gravelly fan terraces, warm: 20 to 55 percent of the unit (RV=35 percent)
- Nonvegetated alluvium: 10 to 50 percent of the unit (RV=25 percent)
- Alpine-dwarf scrub gravelly fan terraces: 10 to 35 percent of the unit (RV=25 percent)
- Alpine-riparian scrub gravelly flood plains, warm: 5 to 20 percent of the unit (RV=10 percent)
- Alpine-riparian scrub loamy flood plains, warm: 2 to 15 percent of the unit (RV=5 percent)

Setting

Elevation: 604 to 1,222 m

Precipitation: 509 to 3,285 mm

Air temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Alpine-dwarf scrub gravelly fan terraces, warm

Soil name: Typic Eutrocryepts, sandy-skeletal, terraces, warm

Landtype: Gravelly Mountains (M135S_310)

Climax plant community: Lichen/mixed ericaceous shrub dwarf alpine scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 2 to 25 percent

Parent material: silty volcanic ash and/or silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 2 to 8 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oi	0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	4.5 to 5.9		
A	2 to 6	silt loam	moderate	0.7 to 0.8	4.7 to 5.9	.43	.43
2Bw	6 to 21	very gravelly loamy coarse sand	rapid	0.3 to 0.6	5.2 to 7.2	.02	.10
2C	21 to 150	extremely cobbly loamy coarse sand	rapid	2.6 to 5.2	6.0 to 8.2	.02	.10

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated

Landtype: Alluvium, Nonvegetated (Riverwash)

Climax plant community: Sparsely vegetated alluvium

Landform(s): flood plains

Slope gradient: 0 to 5 percent

Parent material: sandy and gravelly alluvium and/or sandy and silty alluvium

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-dwarf scrub gravelly fan terraces

Soil name: Typic Eutrogelepts, sandy-skeletal

Landtype: Gravelly Mountains, High Elevation (M135A_310)

Climax plant community: White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Landform(s): fan terraces on alluvial fans on mountains

Slope gradient: 10 to 30 percent

Parent material: silty eolian deposits over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 3 to 13 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	4.8 to 7.3			
A	2 to 8	silt loam	moderate	1.0 to 1.2	4.9 to 7.4	.43	.43	
2Bw	8 to 29	extremely cobbly loamy coarse sand	moderately rapid	1.9 to 2.5	5.4 to 7.6	.10	.24	
2C	29 to 150	extremely cobbly coarse sand	rapid	2.4 to 4.8	6.0 to 8.0	.02	.10	

10ES—Subalpine and Alpine Plateau Escarpments with Discontinuous Permafrost

Soil name: Typic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Complex, 10 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested gravelly colluvial slopes, dissected: 20 to 35 percent of the unit (RV=30 percent)
- Alpine-scrub-sedge gravelly slopes, frozen: 15 to 30 percent of the unit (RV=25 percent)
- Subalpine-forested hardwood gravelly colluvial slopes: 15 to 40 percent of the unit (RV=20 percent)
- Subalpine-scrub-meadow mosaic gravelly swales, Nenana Gravels: 15 to 20 percent of the unit (RV=15 percent)
- Alpine-scrub gravelly slopes: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 415 to 1,005 m

Precipitation: 426 to 856 mm

Air temperature: -4.8 to -2 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Alpine Mountains & Plateaus (M135A.M6)

Characteristics of Boreal-forested gravelly colluvial slopes, dissected

Soil name: Typic Eutrocryepts, coarse-loamy

Landtype: Escarpments (M135A_800)

Climax plant community: White spruce forest

Landform(s): escarpments on plateaus

Slope gradient: 30 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium

Restrictive feature(s): strongly contrasting textural stratification at 9 to 18 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	5.2 to 6.0		
A — 5 to 11	loam	moderate	1.0 to 1.2	4.8 to 5.6	.43	.43
Bw — 11 to 32	silt loam	moderate	2.1 to 2.9	5.4 to 6.0	.17	.28
2C — 32 to 150	very gravelly loamy sand	rapid	4.7 to 14.2	5.6 to 6.6	.02	.10

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): escarpments on mountains; escarpments on plateaus

Slope gradient: 10 to 20 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9		
A — 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37	.37
2Cg — 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10	.24
2Cgf — 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0		.10	.24

Characteristics of Subalpine-forested hardwood gravelly colluvial slopes

Soil name: Typic Entrogelepts, loamy-skeletal, dissected

Landtype: Escarpments, Cool (M135A_801)

Climax plant community: Dwarf poplar-aspens forest

Landform(s): escarpments on plateaus

Slope gradient: 30 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium

Restrictive feature(s): strongly contrasting textural stratification at 3 to 7 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw	Kf
A — 0 to 4	silt loam	moderate	0.7 to 0.8	4.3 to 5.9	.43	.43
2Bw — 4 to 19	very channery loam	moderate	1.5 to 2.1	5.7 to 6.4	.10	.32
2C — 19 to 150	very cobbly sandy loam	rapid	5.2 to 15.7	5.8 to 6.4	.02	.10

10ES1—Boreal Terrace Escarpments with Discontinuous Permafrost

Soil name: Typic Eutrocryepts, coarse-loamy-Typic Historthels, coarse-silty-Typic Historthels, loamy-skeletal Complex, 5 to 70 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested gravelly colluvial slopes, dissected: 50 to 70 percent of the unit (RV=55 percent)
- Boreal-taiga high elevation silty loess slopes, frozen: 15 to 20 percent of the unit (RV=20 percent)
- Alpine-scrub-sedge gravelly slopes, frozen: 10 to 30 percent of the unit (RV=20 percent)
- Subalpine-riparian scrub loamy drains: 5 to 15 percent of the unit (RV=5 percent)

Setting

Elevation: 333 to 997 m

Precipitation: 405 to 580 mm

Air temperature: -3.2 to -2.2 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Characteristics of Boreal-forested gravelly colluvial slopes, dissected

Soil name: Typic Eutrocryepts, coarse-loamy

Landtype: Escarpments (M135A_800)

Climax plant community: White spruce forest

Landform(s): escarpments on plateaus

Slope gradient: 30 to 70 percent

Parent material: silty eolian deposits over gravelly colluvium

Restrictive feature(s): strongly contrasting textural stratification at 9 to 18 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 5	slightly decomposed plant material	moderately rapid	1.6 to 1.8	5.2 to 6.0			
A — 5 to 11	loam	moderate	1.0 to 1.2	4.8 to 5.6	.43	.43	
Bw — 11 to 32	silt loam	moderate	2.1 to 2.9	5.4 to 6.0	.17	.28	
2C — 32 to 150	very gravelly loamy sand	rapid	4.7 to 14.2	5.6 to 6.6	.02	.10	

Characteristics of Boreal-taiga high elevation silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty, cool

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): escarpments on plateaus

Slope gradient: 5 to 17 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 44 to 83 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 21	peat	moderately rapid	6.7 to 7.3	4.4 to 5.4	
A — 21 to 27	mucky silt loam	moderate	2.3 to 2.5	5.4 to 6.0	.37 .37
Cg — 27 to 49	silt loam	moderate	3.7 to 4.4	5.6 to 6.4	.43 .43
Cgf — 49 to 150	permanently frozen silt loam	impermeable	5.8 to 6.9	.43	.43

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): escarpments on plateaus; mountains

Slope gradient: 10 to 20 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9	
A — 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37 .37
2Cg — 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10 .24
2Cgf — 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0	.10	.24

10LM—Alpine Low Mountains with Discontinuous Permafrost, Nenana Gravels

Soil name: Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 2 to 30 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub-sedge gravelly slopes, frozen: 45 to 70 percent of the unit (RV=50 percent)
- Alpine-scrub mosaic gravelly slopes: 10 to 25 percent of the unit (RV=25 percent)
- Subalpine-riparian scrub loamy drains: 5 to 10 percent of the unit (RV=10 percent)
- Subalpine-scrub-meadow mosaic gravelly swales, Nenana Gravels: 5 to 10 percent of the unit (RV=10 percent)
- Alpine-scrub gravelly slopes: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 446 to 1,222 m

Precipitation: 426 to 856 mm

Air temperature: -4.8 to -2 °C
Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Alpine Mountains & Plateaus (M135A.M6)

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): mountains

Slope gradient: 5 to 25 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water		pH	Kw	Kf
		Permeability	Capacity (cm)			
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9		
A — 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37	.37
2Cg — 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10	.24
2Cgf — 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0		.10	.24

Characteristics of Alpine-scrub mosaic gravelly slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, Nenana Gravels

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): mountains

Slope gradient: 2 to 10 percent

Parent material: silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 5 to 13 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water		pH	Kw	Kf
		Permeability	Capacity (cm)			
Oe — 0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	4.0 to 4.8		
A — 2 to 8	silt loam	moderate	1.0 to 1.2	4.4 to 5.5	.43	.43
2Bw — 8 to 48	very gravelly sandy loam	moderately rapid	3.6 to 4.8	5.3 to 6.0	.17	.24
2C — 48 to 150	extremely gravelly loamy coarse sand	rapid	2.0 to 4.1	5.6 to 6.2	.02	.10

10P1—Alpine Plateaus and Mountain Summits with Discontinuous Permafrost, Nenana Gravels

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 15 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly circles, frozen: 35 to 60 percent of the unit (RV=50 percent)
- Alpine-scrub-sedge gravelly slopes, frozen: 25 to 50 percent of the unit (RV=45 percent)
- Subalpine-scrub-meadow mosaic gravelly swales, Nenana Gravels: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 481 to 1,112 m

Precipitation: 426 to 856 mm

Air temperature: -4.8 to -2 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Alpine Mountains & Plateaus (M135A.M6)

Characteristics of Alpine-scrub gravelly circles, frozen

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy, Nenana Gravels

Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)

Climax plant community: Shrub birch/sedge scrub mosaic

Landform(s): nonsorted circles on hills; nonsorted circles on till plains

Slope gradient: 0 to 10 percent

Parent material: silty eolian deposits over gravelly cryoturbate

Restrictive feature(s): strongly contrasting textural stratification at 2 to 32 cm; permafrost at 90 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water				
		Permeability	Capacity (cm)	pH	Kw Kf	
Oe — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.4 to 5.0		
A — 1 to 5	silt loam	moderate	1.5 to 1.7	4.4 to 5.6	.43	.43
2Bw/Cjj — 5 to 23	cobbly sandy loam	moderately rapid	1.6 to 2.2	4.8 to 5.8	.28	.37
2C/Bwjj — 23 to 120	cobbly sandy loam	moderately rapid	8.7 to 11.6	4.5 to 6.4	.28	.37
2Cf — 120 to 150	permanently frozen gravelly sandy loam	impermeable	4.5 to 6.4		.28	.37

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): mountains

Slope gradient: 5 to 15 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9	
A — 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37 .37
2Cg — 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10 .24
2Cgf — 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0		.10 .24

10P3—Boreal Dissected Plateaus with Discontinuous Permafrost

Soil name: Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 0 to 22 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga high elevation silty loess slopes, frozen: 30 to 55 percent of the unit (RV=40 percent)
- Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains: 20 to 45 percent of the unit (RV=30 percent)
- Boreal-taiga high elevation silty mica-rich loess hills, frozen: 10 to 30 percent of the unit (RV=20 percent)
- Boreal-forested gravelly colluvial slopes, dissected: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 333 to 648 m

Precipitation: 405 to 580 mm

Air temperature: -3.2 to -2.2 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Characteristics of Boreal-taiga high elevation silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty, cool

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): mountains; plateaus

Slope gradient: 4 to 16 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 44 to 83 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 21	peat	moderately rapid	6.7 to 7.3	4.4 to 5.4	
A — 21 to 27	mucky silt loam	moderate	2.3 to 2.5	5.4 to 6.0	.37 .37
Cg — 27 to 49	silt loam	moderate	3.7 to 4.4	5.6 to 6.4	.43 .43
Cgf — 49 to 150	permanently frozen silt loam	impermeable	5.8 to 6.9		.43 .43

Characteristics of Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains

Soil name: Typic Histoturbels, coarse-silty, high elevation, Alaska Mountains

Landtype: Loamy Frozen Terraces, Wet (M135A_105)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on plateaus

Slope gradient: 0 to 10 percent

Parent material: grassy organic material over silty cryoturbate over silty eolian deposits

Restrictive feature(s): permafrost at 51 to 70 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	4.4 to 6.0	
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	5.5 to 6.0	.37 .37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	5.8 to 6.6	.37 .37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	5.8 to 6.6		.43 .43

Characteristics of Boreal-taiga high elevation silty mica-rich loess hills, frozen

Soil name: Typic Umbrorthels, coarse-silty, mica-rich

Landtype: Loamy Frozen Slopes, Ice Cored (M135A_113)

Climax plant community: Black spruce/green alder woodland

Landform(s): mountains

Slope gradient: 12 to 22 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits derived from schist

Restrictive feature(s): permafrost at 33 to 75 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 23	moderately decomposed plant	moderately rapid	7.4 to 8.1	3.5 to 4.8	
A — 23 to 46	silt loam	moderate	5.5 to 6.4	4.9 to 5.7	.32 .32
Af — 46 to 58	permanently frozen silt loam	impermeable	2.4 to 2.9	5.0 to 6.6	.43 .43
Cf — 58 to 150	permanently frozen silt loam	impermeable	5.0 to 6.6		.43 .43

10P4—Alpine and Subalpine Plateau Summits

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy-Typic Eutrogelepts, loamy skeletal-Typic Historthels, loamy-skeletal Association, 0 to 16 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-scrub gravelly circles, frozen: 30 to 45 percent of the unit (RV=35 percent)
- Alpine-scrub mosaic gravelly slopes: 30 to 45 percent of the unit (RV=35 percent)
- Alpine-scrub-sedge gravelly slopes, frozen: 20 to 40 percent of the unit (RV=30 percent)

Setting

Elevation: 663 to 1,006 m

Precipitation: 426 to 856 mm

Air temperature: -4.8 to -2 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Alpine Mountains & Plateaus (M135A.M6)

Characteristics of Alpine-scrub gravelly circles, frozen

Soil name: Ruptic-Histic Aquiturbels, coarse-loamy, Nenana Gravels

Landtype: Gravelly Frozen Slopes, Ruptic (M135A_182)

Climax plant community: Shrub birch/sedge scrub mosaic

Landform(s): nonsorted circles on hills; nonsorted circles on plateaus

Slope gradient: 0 to 10 percent

Parent material: silty eolian deposits over gravelly cryoturbate

Restrictive feature(s): strongly contrasting textural stratification at 2 to 32 cm; permafrost at 90 to 150 cm

Water table (May to September): 80 to 120 cm

Drainage class: moderately well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oe — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	4.4 to 5.0	
A — 1 to 5	silt loam	moderate	1.5 to 1.7	4.4 to 5.6	.43 .43
2Bw/Cjj — 5 to 23	cobbly sandy loam	moderately rapid	1.6 to 2.2	4.8 to 5.8	.28 .37
2C/Bwjj — 23 to 120	cobbly sandy loam	moderately rapid	8.7 to 11.6	4.5 to 6.4	.28 .37
2Cf — 120 to 150	permanently frozen gravelly sandy loam	impermeable	4.5 to 6.4		.28 .37

Characteristics of Alpine-scrub mosaic gravelly slopes

Soil name: Typic Eutrogelepts, loamy-skeletal, Nenana Gravels

Landtype: Gravelly Slopes, High Elevation (M135A_356)

Climax plant community: Shrub birch-dwarf ericaceous scrub mosaic

Landform(s): hills on plateaus

Slope gradient: 2 to 10 percent

Parent material: silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 5 to 13 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oe	— 0 to 2	moderately decomposed plant	moderately rapid	0.6 to 0.7	4.0 to 4.8		
A	— 2 to 8	silt loam	moderate	1.0 to 1.2	4.4 to 5.5	.43	.43
2Bw	— 8 to 48	very gravelly sandy loam	moderately rapid	3.6 to 4.8	5.3 to 6.0	.17	.24
2C	— 48 to 150	extremely gravelly loamy coarse sand	rapid	2.0 to 4.1	5.6 to 6.2	.02	.10

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels, cool

Landtype: Gravelly Frozen Slopes (M135A_180)

Climax plant community: Shrub birch-mixed ericaceous shrub/sedge scrub

Landform(s): mountains

Slope gradient: 2 to 16 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi and Oe	— 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9		
A	— 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37	.37
2Cg	— 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10	.24
2Cgf	— 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0		.10	.24

10SU—Boreal Plateaus with Continuous Permafrost, Wet

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, loamy-skeletal Association, 0 to 25 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-tussock-scrub silty loess slopes, frozen: 65 to 90 percent of the unit (RV=75 percent)
- Alpine-scrub-sedge gravelly slopes, frozen: 10 to 30 percent of the unit (RV=20 percent)
- Boreal-taiga gravelly slopes, frozen: 0 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 547 to 1,009 m

Precipitation: 426 to 856 mm

Air temperature: -4.8 to -2 °C

Frost-free period: 50 to 70 days

Ecoregion Classification**Section:** Alaska Mountains (M135A)**Subsection:** Teklanika Alpine Mountains & Plateaus (M135A.M6)**Characteristics of Alpine-tussock-scrub silty loess slopes, frozen****Soil name:** Typic Histoturbels, coarse-silty, cool**Landtype:** Loamy Frozen Wet Terraces, High Elevation (M135A_175)**Climax plant community:** Tussock cottongrass/mixed ericaceous shrub meadow**Landform(s):** turf hummocks on mountains; turf hummocks on plateaus**Slope gradient:** 0 to 4 percent**Parent material:** woody organic material and/or grassy organic material over silty cryoturbate over silty eolian deposits**Restrictive feature(s):** permafrost at 51 to 70 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	3.3 to 4.8	
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	3.9 to 5.4	.37 .37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	4.8 to 5.9	.37 .37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.9		.43 .43

Characteristics of Alpine-scrub-sedge gravelly slopes, frozen**Soil name:** Typic Historthels, loamy-skeletal, Nenana Gravels, cool**Landtype:** Gravelly Frozen Slopes (M135A_180)**Climax plant community:** Shrub birch-mixed ericaceous shrub/sedge scrub**Landform(s):** mountains; plateaus**Slope gradient:** 5 to 25 percent**Parent material:** mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum**Restrictive feature(s):** strongly contrasting textural stratification at 19 to 39 cm; permafrost at 28 to 96 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 20	peat	moderately rapid	6.4 to 7.0	4.0 to 4.9	
A — 20 to 30	mucky silt loam	moderate	3.8 to 4.2	4.9 to 5.7	.37 .37
2Cg — 30 to 54	very gravelly sandy loam	moderately rapid	2.2 to 2.9	5.2 to 6.0	.10 .24
2Cgf — 54 to 150	permanently frozen very gravelly sandy loam	impermeable	5.2 to 6.0		.10 .24

10TS—Boreal Plateaus with Continuous Permafrost

Soil name: Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga high elevation silty loess slopes, frozen: 45 to 65 percent of the unit (RV=55 percent)
- Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains: 25 to 50 percent of the unit (RV=35 percent)
- Alpine-scrub organic mounds, frozen: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 360 to 719 m

Precipitation: 405 to 580 mm

Air temperature: -3.2 to -2.2 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Characteristics of Boreal-taiga high elevation silty loess slopes, frozen

Soil name: Typic Historthels, coarse-silty, cool

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): plateaus

Slope gradient: 2 to 20 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Restrictive feature(s): permafrost at 44 to 83 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 21	peat	moderately rapid	6.7 to 7.3	4.4 to 5.4			
A — 21 to 27	mucky silt loam	moderate	2.3 to 2.5	5.4 to 6.0	.37	.37	
Cg — 27 to 49	silt loam	moderate	3.7 to 4.4	5.6 to 6.4	.43	.43	
Cgf — 49 to 150	permanently frozen silt loam	impermeable	5.8 to 6.9		.43	.43	

Characteristics of Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains

Soil name: Typic Histoturbels, coarse-silty, high elevation, Alaska Mountains

Landtype: Loamy Frozen Terraces, Wet (M135A_105)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on plateaus

Slope gradient: 0 to 10 percent

Parent material: grassy organic material over silty cryoturbate over silty eolian deposits

Restrictive feature(s): permafrost at 51 to 70 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	4.4 to 6.0	
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	5.5 to 6.0	.37 .37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	5.8 to 6.6	.37 .37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	5.8 to 6.6		.43 .43

10TS1—Boreal Mountain Toeslopes with Discontinuous Permafrost, Nenana Gravels

Soil name: Typic Historthels, loamy-skeletal-Typic Histoturbels, coarse-silty Association, 0 to 16 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga gravelly slopes, frozen: 40 to 70 percent of the unit (RV=55 percent)
- Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains: 15 to 30 percent of the unit (RV=25 percent)
- Subalpine-riparian scrub loamy drains: 5 to 15 percent of the unit (RV=10 percent)
- Boreal-taiga loamy drift slopes, frozen: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 406 to 808 m

Precipitation: 405 to 580 mm

Air temperature: -3.2 to -2.2 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Characteristics of Boreal-taiga gravelly slopes, frozen

Soil name: Typic Historthels, loamy-skeletal, Nenana Gravels

Landtype: Loamy Frozen Slopes (M135A_400)

Climax plant community: Black spruce/bog blueberry-Labrador tea woodland

Landform(s): mountains

Slope gradient: 2 to 16 percent

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum

Restrictive feature(s): strongly contrasting textural stratification at 33 to 45 cm; permafrost at 40 to 64 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 29	peat	moderately rapid	9.3 to 10.1	4.5 to 6.0			
A — 29 to 33	mucky silt loam	moderate	1.5 to 1.7	4.6 to 6.0	.37	.37	
2Cg — 33 to 51	very gravelly loam	moderately rapid	1.6 to 2.2	5.0 to 6.8	.17	.37	
2Cgf — 51 to 150	permanently frozen very gravelly loam	impermeable	5.6 to 6.8		.17	.37	

Characteristics of Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains

Soil name: Typic Histoturbels, coarse-silty, high elevation, Alaska Mountains

Landtype: Loamy Frozen Terraces, Wet (M135A_105)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on plateaus

Slope gradient: 0 to 10 percent

Parent material: grassy organic material over silty cryoturbate over silty eolian deposits

Restrictive feature(s): permafrost at 51 to 70 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	4.4 to 6.0			
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	5.5 to 6.0	.37	.37	
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	5.8 to 6.6	.37	.37	
Cgf — 61 to 150	permanently frozen silt loam	impermeable	5.8 to 6.6		.43	.43	

10V2—Boreal Terraces and Plateau Toeslopes with Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association, 0 to 2 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-taiga/tussock silty frozen terraces, Alaska Mountains: 65 to 85 percent of the unit (RV=70 percent)
- Boreal-taiga high elevation loamy terraces, frozen: 20 to 40 percent of the unit (RV=25 percent)
- Boreal-riparian scrub gravelly flood plains: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 350 to 527 m

Precipitation: 344 to 923 mm

Air temperature: -6 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Boreal-taiga/tussock silty frozen terraces, Alaska Mountains**Soil name:** Typic Histoturbels, coarse-silty, Alaska Mountains**Landtype:** Loamy Frozen Terraces, Wet (M135A_105)**Climax plant community:** Black spruce/tussock cottongrass woodland**Landform(s):** turf hummocks on stream terraces**Slope gradient:** 0 to 2 percent**Parent material:** grassy organic material over silty cryoturbate over silty alluvium**Restrictive feature(s):** permafrost at 43 to 54 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	4.4 to 6.0	
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	5.5 to 6.0	.37 .37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	5.8 to 6.6	.37 .37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	5.8 to 6.6		.43 .43

Characteristics of Boreal-taiga high elevation loamy terraces, frozen**Soil name:** Typic Historthels, coarse-loamy, terraces**Landtype:** Loamy Frozen Terraces (M135A_104)**Climax plant community:** Spruce/shrub birch-bog blueberry woodland**Landform(s):** stream terraces**Slope gradient:** 0 to 2 percent**Parent material:** mossy organic material and/or woody organic material over sandy and silty alluvium over sandy and gravelly alluvium**Restrictive feature(s):** permafrost at 63 to 91 cm**Water table (May to September):** 0 to 50 cm**Drainage class:** poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** none**Ponding hazard:** none**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oi — 0 to 27	peat	moderately rapid	8.6 to 9.4	4.2 to 6.6	
Cg — 27 to 72	stratified gravelly sand to silt	moderately rapid	5.4 to 7.2	5.2 to 7.0	.17 .24
Cgf — 72 to 150	permanently frozen stratified gravelly sand to silt	impermeable	5.6 to 7.0		.28 .28

11FP—Boreal Flood Plains, High Elevation

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested loamy high flood plains: 20 to 45 percent of the unit (RV=30 percent)
- Boreal-riparian scrub gravelly flood plains, moderately wet: 15 to 30 percent of the unit (RV=20 percent)
- Boreal-riparian scrub gravelly flood plains: 15 to 30 percent of the unit (RV=20 percent)
- Boreal-riparian scrub loamy wet flood plains: 5 to 20 percent of the unit (RV=15 percent)
- Nonvegetated alluvium: 5 to 15 percent of the unit (RV=10 percent)
- Boreal-riparian scrub gravelly flood plains, wet: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 333 to 812 m

Precipitation: 344 to 923 mm

Air temperature: -6 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Boreal-riparian forested loamy high flood plains

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, high flood plains

Landtype: Loamy High Flood Plains (M135A_151)

Climax plant community: White spruce/bog blueberry/feathermoss forest

Landform(s): flood plains

Slope gradient: 0 to 3 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 32 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)		Texture	Permeability	Available Water		pH	Kw	Kf
				Capacity (cm)				
Oi	0 to 7	slightly decomposed plant material	moderately rapid	2.2 to 2.5	5.1 to 6.5			
AC	7 to 17	stratified fine sand to silt	moderate	1.3 to 1.6	5.2 to 6.6		.28	.28
C	17 to 43	stratified fine sand to silt	moderate	3.4 to 4.2	5.9 to 7.6		.28	.28
2C	43 to 150	very cobbly sand	rapid	3.2 to 6.4	6.0 to 7.4		.02	.10

Characteristics of Boreal-riparian scrub gravelly flood plains, moderately wet

Soil name: Oxyaquic Cryorthents, sandy-skeletal

Landtype: Gravelly Flood Plains (M135A_204)

Climax plant community: White spruce-poplar/soapberry forest

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 8 to 17 cm

Water table (May to September): approximately 70 cm

Drainage class: somewhat poorly drained

Hydric soil: yes

Hydrologic group: C

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
AC	— 0 to 12	stratified sand to silt	moderate	1.9 to 2.2	7.2 to 8.4	.28	.28
2C	— 12 to 150	extremely cobbly coarse sand	rapid	5.5 to 11.0	7.2 to 8.4	.02	.10

Characteristics of Boreal-riparian scrub gravelly flood plains

Soil name: Typic Cryorthents, sandy-skeletal

Landtype: Gravelly Flood Plains (M135A_204)

Climax plant community: White spruce-poplar/soapberry forest

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 0 to 17 cm

Water table (May to September): more than 150 cm

Drainage class: excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oi	— 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7	6.0 to 7.7		
AC	— 2 to 10	stratified fine sand to silt	moderate	1.0 to 1.3	6.0 to 7.8	.28	.28
2C	— 10 to 150	extremely cobbly coarse sand	rapid	5.6 to 11.2	6.2 to 8.4	.02	.10

11P—Alpine Plains with Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty, 0 to 5 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-tussock-scrub silty loess slopes, frozen: 70 to 90 percent of the unit (RV=85 percent)
- Subalpine-riparian scrub loamy drains: 2 to 5 percent of the unit (RV=5 percent)
- Alpine-scrub organic mounds, frozen: 5 to 10 percent of the unit (RV=5 percent)
- Alpine-sedge bog organic depressions, frozen: 2 to 5 percent of the unit (RV=5 percent)

Setting

Elevation: 441 to 825 m

Precipitation: 452 to 577 mm

Air temperature: -2.8 to -2.2 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Toklat Basin Lowlands (M135A.M7)

Characteristics of Alpine-tussock-scrub silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty, cool

Landtype: Loamy Frozen Wet Terraces, High Elevation (M135A_175)

Climax plant community: Tussock cottongrass/mixed ericaceous shrub meadow

Landform(s): turf hummocks on alluvial flats on basin floors

Slope gradient: 0 to 5 percent

Parent material: woody organic material and/or grassy organic material over silty cryoturbate over silty eolian deposits

Restrictive feature(s): permafrost at 51 to 70 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			
			Capacity (cm)	pH	Kw	Kf
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	3.3 to 4.8		
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	3.9 to 5.4	.37	.37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	4.8 to 5.9	.37	.37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.9		.43	.43

11P1—Alpine Plains and Drainages with Continuous Permafrost

Soil name: Typic Histoturbels, coarse-silty-Glacic Folistels, dysic-Terric Fibristels, loamy Association, 0 to 5 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-tussock-scrub silty loess slopes, frozen: 45 to 70 percent of the unit (RV=60 percent)
- Alpine-scrub organic mounds, frozen: 15 to 35 percent of the unit (RV=25 percent)
- Alpine-sedge bog organic depressions, frozen: 10 to 20 percent of the unit (RV=15 percent)

Setting

Elevation: 448 to 788 m

Precipitation: 452 to 577 mm

Air temperature: -2.8 to -2.2 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Toklat Basin Lowlands (M135A.M7)

Characteristics of Alpine-tussock-scrub silty loess slopes, frozen

Soil name: Typic Histoturbels, coarse-silty, cool

Landtype: Loamy Frozen Wet Terraces, High Elevation (M135A_175)

Climax plant community: Tussock cottongrass/mixed ericaceous shrub meadow

Landform(s): turf hummocks on alluvial flats on basin floors

Slope gradient: 0 to 5 percent

Parent material: woody organic material and/or grassy organic material over silty cryoturbate over silty eolian deposits

Restrictive feature(s): permafrost at 51 to 70 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	3.3 to 4.8			
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	3.9 to 5.4	.37	.37	
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	4.8 to 5.9	.37	.37	
Cgf — 61 to 150	permanently frozen silt loam	impermeable	4.8 to 5.9		.43	.43	

Characteristics of Alpine-scrub organic mounds, frozen

Soil name: Glacic Folistels, dysic

Landtype: Peat Mounds (M135A_112)

Climax plant community: Cloudberry/sphagnum moss wet meadow

Landform(s): mounds on basin floors

Slope gradient: 0 to 3 percent

Parent material: mossy organic material and/or woody organic material over silty alluvium

Restrictive feature(s): permafrost at 38 to 61 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi and Oe — 0 to 45	peat	moderately rapid	14.4 to 15.8	3.2 to 4.9			
Oef — 45 to 150	permanently frozen mucky peat	impermeable	33.6 to 36.8	4.2 to 5.2			

Characteristics of Alpine-sedge bog organic depressions, frozen

Soil name: Terric Fibristels, loamy, bog

Landtype: Organic Depressions, Bogs (M135A_530)

Climax plant community: Sedge/sphagnum bog

Landform(s): drainageways on plains on basins

Slope gradient: 0 to 2 percent

Parent material: grassy organic material over silty eolian deposits

Restrictive feature(s): permafrost at 54 to 63 cm; strongly contrasting textural stratification at 54 to 63 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 63	peat	moderately rapid	20.2 to 22.0	4.9 to 6.6	
A/Cgf — 63 to 150	permanently frozen mucky silt loam, silt loam	impermeable	5.2 to 6.5		.32 .32

11ST—Boreal Terraces and High Flood Plains with Discontinuous Permafrost

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Association

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested loamy high flood plains: 25 to 55 percent of the unit (RV=40 percent)
- Boreal-taiga high elevation loamy terraces, frozen: 25 to 50 percent of the unit (RV=35 percent)
- Boreal-taiga/tussock silty frozen terraces, Alaska Mountains: 20 to 35 percent of the unit (RV=25 percent)

Setting

Elevation: 333 to 919 m

Precipitation: 452 to 577 mm

Air temperature: -2.8 to -2.2 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Toklat Basin Lowlands (M135A.M7)

Characteristics of Boreal-riparian forested loamy high flood plains

Soil name: Typic Cryofluvents, coarse-loamy over sandy-skeletal, high flood plains

Landtype: Loamy High Flood Plains (M135A_151)

Climax plant community: White spruce/bog blueberry/feathermoss forest

Landform(s): flood plains

Slope gradient: 0 to 3 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 32 to 88 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: rare

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			
		Permeability	Capacity (cm)	pH	Kw Kf
Oi — 0 to 7	slightly decomposed plant material	moderately rapid	2.2 to 2.5	5.1 to 6.5	
AC — 7 to 17	stratified fine sand to silt	moderate	1.3 to 1.6	5.2 to 6.6	.28 .28
C — 17 to 43	stratified fine sand to silt	moderate	3.4 to 4.2	5.9 to 7.6	.28 .28
2C — 43 to 150	very cobbly sand	rapid	3.2 to 6.4	6.0 to 7.4	.02 .10

Characteristics of Boreal-taiga high elevation loamy terraces, frozen

Soil name: Typic Historthels, coarse-loamy, terraces

Landtype: Loamy Frozen Terraces (M135A_104)

Climax plant community: Spruce/shrub birch-bog blueberry woodland

Landform(s): stream terraces

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): permafrost at 63 to 91 cm

Water table (May to September): 0 to 50 cm

Drainage class: poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		Kw	Kf
			Capacity (cm)	pH		
Oi — 0 to 27	peat	moderately rapid	8.6 to 9.4	4.2 to 6.6		
Cg — 27 to 72	stratified gravelly sand to silt	moderately rapid	5.4 to 7.2	5.2 to 7.0	.17	.24
Cgf — 72 to 150	permanently frozen stratified gravelly sand to silt	impermeable	5.6 to 7.0		.28	.28

Characteristics of Boreal-taiga/tussock silty frozen terraces, Alaska Mountains

Soil name: Typic Histoturbels, coarse-silty, Alaska Mountains

Landtype: Loamy Frozen Terraces, Wet (M135A_105)

Climax plant community: Black spruce/tussock cottongrass woodland

Landform(s): turf hummocks on stream terraces

Slope gradient: 0 to 2 percent

Parent material: grassy organic material over silty cryoturbate over silty alluvium

Restrictive feature(s): permafrost at 43 to 54 cm

Water table (May to September): 0 to 50 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		Kw	Kf
			Capacity (cm)	pH		
Oi and Oe — 0 to 22	peat	moderately rapid	7.0 to 7.7	4.4 to 6.0		
A — 22 to 30	mucky silt loam	moderate	3.0 to 3.4	5.5 to 6.0	.37	.37
Cg/Oajj — 30 to 61	silt loam, muck	moderate	5.3 to 6.2	5.8 to 6.6	.37	.37
Cgf — 61 to 150	permanently frozen silt loam	impermeable	5.8 to 6.6		.43	.43

12B—Boreal Bogs

Soil name: Typic Cryofibrists, dysic-Fluvaquentic Cryohemists, dysic Complex, 0 to 2 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-sedge bog organic depressions: 55 to 75 percent of the unit (RV=55 percent)
- Boreal-woodland bog organic depressions: 25 to 55 percent of the unit (RV=40 percent)
- Boreal-forested silty wet till slopes, ash influenced: 5 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 187 to 361 m

Precipitation: 536 to 2,174 mm

Air temperature: -1 to 1 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Glaciated Lowlands (135A.G1)

Characteristics of Boreal-sedge bog organic depressions

Soil name: Typic Cryofibrists, dysic

Landtype: Organic Depressions, Very Wet (135A_534)

Climax plant community: Tufted bulrush-few-flowered sedge wet meadow

Landform(s): bogs on till plains

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or grassy organic material

Restrictive feature(s): none

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
Oi1 — 0 to 42	peat	moderately rapid	13.4 to 14.7	2.9 to 3.6		
Oi2 — 42 to 150	peat	moderately rapid	34.6 to 37.8	2.9 to 4.7		

Characteristics of Boreal-woodland bog organic depressions

Soil name: Fluvaquentic Cryohemists, dysic

Landtype: Organic Depressions (135A_535)

Climax plant community: Black spruce/few-flowered sedge woodland

Landform(s): bogs on till plains

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or grassy organic material

Restrictive feature(s): strongly contrasting textural stratification at 110 to 132 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: A

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 28	peat	moderately rapid	9.0 to 9.8	2.9 to 3.6			
Oe — 28 to 132	mucky peat	moderately rapid	33.3 to 36.4	2.9 to 3.6			
Oa/C — 132 to 150	muck, fine sandy loam	moderate	5.8 to 6.5	3.3 to 4.7	.43	.43	

12HS2—Boreal Glaciated Hills and Plains

Soil name: Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal-Typic Cryofibrists, dysic Association, 0 to 20 percent slopes

Composition

(All components are listed but only major components are described)

- Boreal-forested silty till slopes, ash influenced, warm: 45 to 65 percent of the unit (RV=55 percent)
- Boreal-forested silty wet till slopes, ash influenced: 20 to 40 percent of the unit (RV=30 percent)
- Boreal-sedge bog organic depressions: 10 to 20 percent of the unit (RV=15 percent)

Setting

Elevation: 76 to 757 m

Precipitation: 536 to 2,174 mm

Air temperature: -1 to 1 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Glaciated Lowlands (135A.G1)

Characteristics of Boreal-forested silty till slopes, ash influenced, warm

Soil name: Andic Humicryods, medial over loamy-skeletal, till, warm

Landtype: Till Slopes (135A_359)

Climax plant community: Mixed paper birch-white spruce forest

Landform(s): hills; till plains

Slope gradient: 2 to 14 percent

Parent material: silty volcanic ash and/or loess over gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 20 to 37 cm

Water table (May to September): more than 150 cm

Drainage class: well drained

Hydric soil: no

Hydrologic group: B

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 4.9			
A — 4 to 10	silt loam	moderate	1.9 to 2.2	3.6 to 5.0	.37	.37	
E — 10 to 14	silt loam	moderate	1.3 to 1.4	3.6 to 5.0	.37	.43	
Bhs — 14 to 24	very fine sandy loam	moderate	3.2 to 3.6	3.6 to 5.0	.37	.43	
2Bs — 24 to 52	very cobbly sandy loam	moderately rapid	2.5 to 3.4	4.5 to 5.5	.10	.24	
2C — 52 to 150	very cobbly sandy loam	moderately rapid	8.8 to 11.8	4.5 to 5.5	.10	.24	

Characteristics of Boreal-forested silty wet till slopes, ash influenced

Soil name: Thaptic Cryaquands, medial over loamy

Landtype: Till Slopes, Wet (135A_362)

Climax plant community: Mixed white spruce-paper birch/Sitka alder forest

Landform(s): depressions on hills; depressions on till plains

Slope gradient: 5 to 20 percent

Parent material: volcanic ash and/or silty loess over loamy drift and/or gravelly till

Restrictive feature(s): strongly contrasting textural stratification at 78 to 120 cm

Water table (May to September): 0 to 25 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 4	slightly decomposed plant material	moderately rapid	1.3 to 1.4	3.7 to 5.5			
A	— 4 to 40	silt loam	moderate	12.2 to 13.0	4.5 to 6.0	.37		
A/Cg	— 40 to 78	silt loam	moderate	12.2 to 12.9	4.5 to 6.0	.43	.43	
2C	— 78 to 150	cobbly loam	moderately slow	4.3 to 5.8	5.1 to 6.5	.17	.24	

Characteristics of Boreal-sedge bog organic depressions

Soil name: Typic Cryofibrists, dysic

Landtype: Organic Depressions, Very Wet (135A_534)

Climax plant community: Tufted bulrush-few-flowered sedge wet meadow

Landform(s): bogs on hills; bogs on till plains

Slope gradient: 0 to 2 percent

Parent material: mossy organic material and/or grassy organic material

Restrictive feature(s): none

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: none

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi1	— 0 to 42	peat	moderately rapid	13.4 to 14.7	2.9 to 3.6			
Oi2	— 42 to 150	peat	moderately rapid	34.6 to 37.8	2.9 to 4.7			

13F21—Subalpine and Alpine Diorite Flood Plains

Soil name: Oxyaquic Cryorthents, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Terric Cryofibrists, euic Complex

Composition

(All components are listed but only major components are described)

- Subalpine-riparian scrub gravelly diorite flood plains, moderately wet: 30 to 55 percent of the unit (RV=50 percent)
- Alpine-riparian scrub loamy diorite low flood plains, wet: 15 to 30 percent of the unit (RV=25 percent)
- Subalpine-riparian wet meadow organic depressions: 10 to 20 percent of the unit (RV=15 percent)
- Nonvegetated alluvium: 5 to 15 percent of the unit (RV=10 percent)

Setting**Elevation:** 329 to 849 m**Precipitation:** 678 to 989 mm**Air temperature:** -1.5 to 1 °C**Frost-free period:** 70 to 100 days**Ecoregion Classification****Section:** Cook Inlet Lowlands (135A)**Subsection:** Lowland Flood Plains & Terraces & Fans (135A.V1)**Characteristics of Subalpine-riparian scrub gravelly diorite flood plains, moderately wet****Soil name:** Oxyaquic Cryorthents, sandy-skeletal, diorite, South Central**Landtype:** Gravelly Low Flood Plains (135A_200)**Climax plant community:** Sitka alder-Barclay willow-Sitka willow scrub**Landform(s):** channels on flood plains**Slope gradient:** 0 to 2 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium derived from diorite**Restrictive feature(s):** none**Water table (May to September):** approximately 50 cm**Drainage class:** somewhat poorly drained**Hydric soil:** yes**Hydrologic group:** C**Flooding hazard:** frequent**Ponding hazard:** none**Potential frost action:** moderate**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
AC — 0 to 15	extremely cobbly coarse sand	rapid	0.6 to 1.2	4.7 to 5.2	.02 .10
C — 15 to 150	extremely cobbly coarse sand	rapid	5.4 to 10.8	5.2 to 5.9	.02 .10

Characteristics of Alpine-riparian scrub loamy diorite low flood plains, wet**Soil name:** Typic Cryaquents, coarse-loamy over sandy-skeletal, diorite**Landtype:** Loamy Wet Flood Plains, High Elevation (135A_152)**Climax plant community:** Barclay willow-diamondleaf willow wet scrub**Landform(s):** channels on flood plains**Slope gradient:** 0 to 2 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium derived from diorite**Restrictive feature(s):** strongly contrasting textural stratification at 33 to 78 cm**Water table (May to September):** 0 to 10 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** occasional**Ponding hazard:** occasional**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Permeability	Available Water		
			Capacity (cm)	pH	Kw Kf
Oe — 0 to 9	moderately decomposed plant	moderately rapid	2.9 to 3.1	6.2 to 6.8	
A — 9 to 12	stratified fine sand to silt	moderate	0.4 to 0.5	6.2 to 6.8	.28 .28
Cg — 12 to 33	stratified sand to silt	moderate	2.7 to 3.4	6.3 to 6.9	.28 .28
2C — 33 to 150	extremely gravelly coarse sand	rapid	3.5 to 7.0	6.3 to 6.9	.02 .10

Characteristics of Subalpine-riparian wet meadow organic depressions

Soil name: Terric Cryofibrists, euic, high elevation

Landtype: Loamy Wet Flood Plains (135A_500)

Climax plant community: Thinleaf alder-mixed willow scrub

Landform(s): cutoffs on flood plains; meander scrolls on flood plains

Slope gradient: 0 percent

Parent material: grassy organic material over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 24 to 86 cm; strongly contrasting textural stratification at 42 to 150 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 68	peat	moderately rapid	21.8 to 23.8	4.4 to 6.5			
Cg — 68 to 100	silt loam	moderate	5.4 to 6.4	5.2 to 6.1	.32	.32	
2C — 100 to 150	extremely cobbly sand	rapid	2.0 to 4.0	5.2 to 6.8	.10	.64	

13F22—Alpine Diorite Flood Plains and Wet Mountain Toeslopes

Soil name: Typic Cryorthents, sandy-skeletal-Riverwash-Typic Cryaquents, coarse-loamy over sandy-skeletal Complex, 0 to 6 percent slopes

Composition

(All components are listed but only major components are described)

- Alpine-riparian scrub gravelly diorite flood plains: 25 to 45 percent of the unit (RV=35 percent)
- Nonvegetated alluvium: 15 to 35 percent of the unit (RV=25 percent)
- Alpine-riparian scrub loamy diorite low flood plains, wet: 20 to 35 percent of the unit (RV=25 percent)
- Subalpine-riparian scrub loamy diorite flood plains: 10 to 20 percent of the unit (RV=15 percent)

Setting

Elevation: 385 to 782 m

Precipitation: 678 to 989 mm

Air temperature: -1.5 to 1 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Alpine-riparian scrub gravelly diorite flood plains

Soil name: Typic Cryorthents, sandy-skeletal, diorite, South Central

Landtype: Gravelly Flood Plains, Cool (135A_257)

Climax plant community: Feltleaf willow-Barclay willow-Sitka willow scrub

Landform(s): channels on flood plains

Slope gradient: 2 to 6 percent

Parent material: sandy and gravelly alluvium derived from diorite

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
AC	— 0 to 8	extremely cobbly coarse sand	rapid	0.3 to 0.6	5.0 to 6.2	.02	.10
C	— 8 to 150	extremely cobbly coarse sand	rapid	5.7 to 11.4	5.5 to 6.3	.02	.10

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated

Landtype: Alluvium, Nonvegetated (Riverwash)

Climax plant community: Sparsely vegetated alluvium

Landform(s): flood plains

Slope gradient: 0 to 5 percent

Parent material: sandy and silty alluvium and/or sandy and gravelly alluvium

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: not determined

Characteristics of Alpine-riparian scrub loamy diorite low flood plains, wet

Soil name: Typic Cryaquents, coarse-loamy over sandy-skeletal, diorite

Landtype: Loamy Wet Flood Plains, High Elevation (135A_152)

Climax plant community: Barclay willow-diamondleaf willow wet scrub

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium derived from diorite

Restrictive feature(s): strongly contrasting textural stratification at 33 to 78 cm

Water table (May to September): 0 to 10 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: occasional

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
Oe	— 0 to 9	moderately decomposed plant	moderately rapid	2.9 to 3.1	6.2 to 6.8		
A	— 9 to 12	stratified fine sand to silt	moderate	0.4 to 0.5	6.2 to 6.8	.28	.28
Cg	— 12 to 33	stratified sand to silt	moderate	2.7 to 3.4	6.3 to 6.9	.28	.28
2C	— 33 to 150	extremely gravelly coarse sand	rapid	3.5 to 7.0	6.3 to 6.9	.02	.10

13FP—Boreal Flood Plains

Soil name: Typic Cryorthents-Oxyaquic Cryorthents, sandy-skeletal-Riverwash Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested gravelly high flood plains, Cook Inlet: 15 to 60 percent of the unit (RV=40 percent)
- Boreal-riparian scrub gravelly flood plains, moderately wet and warm: 15 to 60 percent of the unit (RV=25 percent)
- Nonvegetated alluvium: 5 to 20 percent of the unit (RV=15 percent)
- Boreal-riparian scrub loamy wet flood plains, Cook Inlet: 5 to 20 percent of the unit (RV=15 percent)
- Subalpine-riparian wet meadow organic depressions: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 183 to 511 m

Precipitation: 678 to 989 mm

Air temperature: -1.5 to 1 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Boreal-riparian forested gravelly high flood plains, Cook Inlet

Soil name: Typic Cryorthents, sandy-skeletal, Cook Inlet

Landtype: Loamy Flood Plains (135A_100)

Climax plant community: Poplar/alder forest

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 12 to 32 cm

Water table (May to September): more than 150 cm

Drainage class: somewhat excessively drained

Hydric soil: no

Hydrologic group: A

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: low

Representative soil profile:

Horizon	Depth (cm)	Texture	Permeability	Available Water Capacity (cm)	pH	Kw	Kf
Oe	0 to 3	moderately decomposed plant	moderately rapid	1.0 to 1.0	4.5 to 6.6		
AC	3 to 16	stratified sand to silt	moderate	1.7 to 2.1	4.8 to 6.6	.28	.28
2C	16 to 150	extremely cobbly coarse sand	rapid	5.4 to 10.7	5.0 to 7.6	.02	.10

Characteristics of Boreal-riparian scrub gravelly flood plains, moderately wet and warm

Soil name: Oxyaquic Cryorthents, sandy-skeletal, South Central

Landtype: Gravelly Low Flood Plains (135A_200)

Climax plant community: Sitka alder-Barclay willow-Sitka willow scrub

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): none

Water table (May to September): approximately 50 cm

Drainage class: somewhat poorly drained

Hydric soil: yes

Hydrologic group: C

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: moderate

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			
				Capacity (cm)	pH	Kw	Kf
AC	— 0 to 15	extremely cobbly coarse sand	rapid	0.6 to 1.2	5.0 to 6.3	.02	.10
C	— 15 to 150	extremely cobbly coarse sand	rapid	5.4 to 10.8	5.5 to 6.8	.02	.10

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated

Landtype: Alluvium, Nonvegetated (Riverwash)

Climax plant community: Sparsely vegetated alluvium

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium and/or sandy and gravelly alluvium

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: not determined

13FP2—Boreal Flood Plains, Dry

Soil name: Typic Cryorthents, sandy-skeletal-Riverwash-Oxyaquic Cryorthents, sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian forested hardwood gravelly flood plains: 20 to 60 percent of the unit (RV=40 percent)
- Nonvegetated alluvium: 10 to 30 percent of the unit (RV=20 percent)
- Boreal-riparian scrub gravelly flood plains, moderately wet and warm: 15 to 40 percent of the unit (RV=15 percent)
- Boreal-riparian forested gravelly high flood plains, Cook Inlet: 10 to 30 percent of the unit (RV=15 percent)
- Subalpine-riparian wet meadow organic depressions: 0 to 10 percent of the unit (RV=5 percent)
- Alpine-riparian scrub loamy wet flood plains, warm: 5 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 91 to 882 m

Precipitation: 678 to 989 mm

Air temperature: -1.5 to 1 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Boreal-riparian forested hardwood gravelly flood plains

Soil name: Typic Cryorthents, sandy-skeletal, dry, Cook Inlet

Landtype: Gravelly Flood Plains (135A_201)

Climax plant community: Poplar/soapberry forest

Landform(s): channels on flood plains
Slope gradient: 0 to 2 percent
Parent material: sandy and gravelly alluvium
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: excessively drained
Hydric soil: no
Hydrologic group: A
Flooding hazard: occasional
Ponding hazard: none
Potential frost action: low

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oi — 0 to 1	moderately decomposed plant	moderately rapid	0.3 to 0.3	5.4 to 6.9			
AC — 1 to 7	extremely cobbly coarse sand	rapid	0.2 to 0.5	7.4 to 7.9	.02	.10	
C — 7 to 150	extremely cobbly coarse sand	rapid	5.7 to 11.4	7.6 to 8.2	.02	.10	

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated
Landtype: Alluvium, Nonvegetated (Riverwash)
Climax plant community: Sparsely vegetated alluvium
Landform(s): flood plains
Slope gradient: 0 to 5 percent
Parent material: sandy and gravelly alluvium and/or sandy and silty alluvium
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: not determined
Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: frequent
Ponding hazard: none
Potential frost action: not determined

Characteristics of Boreal-riparian scrub gravelly flood plains, moderately wet and warm

Soil name: Oxyaquic Cryorthents, sandy-skeletal, South Central
Landtype: Gravelly Low Flood Plains (135A_200)
Climax plant community: Sitka alder-Barclay willow-Sitka willow scrub
Landform(s): channels on flood plains
Slope gradient: 0 to 2 percent
Parent material: sandy and silty alluvium over sandy and gravelly alluvium
Restrictive feature(s): none
Water table (May to September): approximately 50 cm
Drainage class: somewhat poorly drained
Hydric soil: yes
Hydrologic group: C
Flooding hazard: frequent
Ponding hazard: none
Potential frost action: moderate

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
AC — 0 to 15	extremely cobbly coarse sand	rapid	0.6 to 1.2	5.0 to 6.3	.02	.10	
C — 15 to 150	extremely cobbly coarse sand	rapid	5.4 to 10.8	5.5 to 6.8	.02	.10	

13FPW—Boreal Flood Plains and Terraces, Wet

Soil name: Typic Cryaquents, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Terric Cryofibrists, euic Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian scrub loamy wet flood plains, Cook Inlet: 40 to 50 percent of the unit (RV=45 percent)
- Boreal-riparian forested loamy wet flood plains, Cook Inlet: 20 to 35 percent of the unit (RV=25 percent)
- Subalpine-riparian wet meadow organic depressions: 15 to 25 percent of the unit (RV=20 percent)
- Nonvegetated alluvium: 5 to 15 percent of the unit (RV=10 percent)

Setting

Elevation: 61 to 487 m

Precipitation: 678 to 989 mm

Air temperature: -1.5 to 1 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Boreal-riparian scrub loamy wet flood plains, Cook Inlet

Soil name: Typic Cryaquents, coarse-loamy over sandy-skeletal, Cook Inlet

Landtype: Loamy Wet Flood Plains (135A_500)

Climax plant community: Thinleaf alder-mixed willow scrub

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 33 to 78 cm

Water table (May to September): 0 to 10 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
			Capacity (cm)	pH			
Oe — 0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	6.2 to 6.8			
A — 4 to 16	stratified fine sand to silt	moderate	1.6 to 1.9	6.2 to 6.8	.28	.28	
Cg — 16 to 56	stratified sand to silt	moderate	5.2 to 6.4	6.3 to 6.9	.28	.28	
2C — 56 to 150	extremely gravelly coarse sand	rapid	2.8 to 5.6	6.3 to 6.9	.02	.10	

Characteristics of Boreal-riparian forested loamy wet flood plains, Cook Inlet

Soil name: Aquic Cryofluvents, coarse-loamy over sandy-skeletal, Cook Inlet

Landtype: Loamy Wet High Flood Plains (135A_156)

Climax plant community: Mixed white spruce-poplar/thinleaf alder forest

Landform(s): channels on flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 60 to 98 cm

Water table (May to September): approximately 60 cm

Drainage class: somewhat poorly drained

Hydric soil: no

Hydrologic group: C

Flooding hazard: occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oe	— 0 to 4	moderately decomposed plant	moderately rapid	1.3 to 1.4	6.2 to 6.8			
A	— 4 to 22	stratified fine sand to silt	moderate	2.3 to 2.9	6.2 to 6.8	.28	.28	
Cg	— 22 to 86	stratified sand to silt	moderate	8.3 to 10.2	5.6 to 6.9	.28	.28	
2C	— 86 to 150	extremely gravelly coarse sand	rapid	1.9 to 3.8	5.6 to 7.2	.02	.10	

Characteristics of Subalpine-riparian wet meadow organic depressions

Soil name: Terric Cryofibrists, euic, high elevation

Landtype: Loamy Wet Flood Plains (135A_500)

Climax plant community: Thinleaf alder-mixed willow scrub

Landform(s): cutoffs on flood plains; meander scrolls on flood plains

Slope gradient: 0 percent

Parent material: grassy organic material over sandy and silty alluvium over sandy and gravelly alluvium

Restrictive feature(s): strongly contrasting textural stratification at 24 to 86 cm; strongly contrasting textural stratification at 42 to 150 cm

Water table (May to September): approximately 0 cm

Drainage class: very poorly drained

Hydric soil: yes

Hydrologic group: D

Flooding hazard: occasional

Ponding hazard: frequent

Potential frost action: high

Representative soil profile:

Horizon	— Depth (cm)	Texture	Permeability	Available Water			Kw	Kf
				Capacity (cm)	pH			
Oi	— 0 to 68	peat	moderately rapid	21.8 to 23.8	4.4 to 6.5			
Cg	— 68 to 100	silt loam	moderate	5.4 to 6.4	5.2 to 6.1	.32	.32	
2C	—100 to 150	extremely cobbly sand	rapid	2.0 to 4.0	5.2 to 6.8	.10	.64	

13FWW—Boreal Flood Plains, Very Wet

Soil name: Terric Cryofibrists, euic-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex

Composition

(All components are listed but only major components are described)

- Boreal-riparian scrub organic flood plains, wet: 25 to 60 percent of the unit (RV=45 percent)
- Boreal-riparian wet meadow organic flood plains, Cook Inlet: 20 to 55 percent of the unit (RV=35 percent)
- Boreal-riparian forested loamy wet flood plains, Cook Inlet: 15 to 35 percent of the unit (RV=20 percent)

Setting

Elevation: 61 to 380 m

Precipitation: 678 to 989 mm

Air temperature: -1.5 to 1 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Boreal-riparian scrub organic flood plains, wet**Soil name:** Terric Cryofibrists, euic**Landtype:** Organic High Flood Plains (135A_502)**Climax plant community:** Thinleaf alder/sweetgale/water horsetail scrub**Landform(s):** cutoffs on flood plains; meander scrolls on flood plains**Slope gradient:** 0 percent**Parent material:** grassy organic material over sandy and silty alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 59 to 96 cm**Water table (May to September):** approximately 0 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** occasional**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
OiCg — 0 to 63	peat	moderately rapid	20.2 to 22.0	4.6 to 7.0		
Cg — 63 to 150	silt loam	moderate	14.8 to 17.4	5.0 to 6.6	.43	.43

Characteristics of Boreal-riparian wet meadow organic flood plains, Cook Inlet**Soil name:** Terric Cryofibrists, euic, wet**Landtype:** Organic High Flood Plains, Very Wet (135A_501)**Climax plant community:** Water horsetail-marsh five finger-buckbean wet meadow**Landform(s):** cutoffs on flood plains; meander scrolls on flood plains**Slope gradient:** 0 percent**Parent material:** grassy organic material over sandy and silty alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 59 to 96 cm**Water table (May to September):** approximately 0 cm**Drainage class:** very poorly drained**Hydric soil:** yes**Hydrologic group:** D**Flooding hazard:** occasional**Ponding hazard:** frequent**Potential frost action:** high**Representative soil profile:**

Horizon — Depth (cm)	Texture	Available Water			Kw	Kf
		Permeability	Capacity (cm)	pH		
OiCg — 0 to 63	peat	moderately rapid	20.2 to 22.0	4.6 to 7.0		
Cg — 63 to 150	stratified fine sand to silt	moderate	14.8 to 17.4	5.0 to 6.6	.43	.43

Characteristics of Boreal-riparian forested loamy wet flood plains, Cook Inlet**Soil name:** Aquic Cryofluvents, coarse-loamy over sandy-skeletal, Cook Inlet**Landtype:** Loamy Wet High Flood Plains (135A_156)**Climax plant community:** Mixed white spruce-poplar/thinleaf alder forest**Landform(s):** channels on flood plains**Slope gradient:** 0 to 2 percent**Parent material:** sandy and silty alluvium over sandy and gravelly alluvium**Restrictive feature(s):** strongly contrasting textural stratification at 60 to 98 cm**Water table (May to September):** approximately 60 cm**Drainage class:** somewhat poorly drained**Hydric soil:** no**Hydrologic group:** C**Flooding hazard:** occasional

Ponding hazard: none

Potential frost action: high

Representative soil profile:

Horizon — Depth (cm)	Texture	Permeability	Available Water		pH	Kw	Kf
			Capacity (cm)				
Oi — 0 to 2	slightly decomposed plant material	moderately rapid	0.6 to 0.7		6.2 to 7.8		
AC — 2 to 33	stratified fine sand to silt	moderate	4.0 to 5.0		6.6 to 8.2	.28	.28
Cg — 33 to 54	stratified fine sand to silt	moderate	2.7 to 3.4		6.8 to 8.4	.28	.28
2C — 54 to 150	extremely gravelly coarse sand	rapid	2.9 to 5.8		6.8 to 8.2	.02	.10

G—Nonvegetated Alluvium, Alaska Mountains, Boreal

Soil name: Riverwash, Alaska Mountains

Composition

(All components are listed but only major components are described)

- Nonvegetated alluvium: 85 to 100 percent of the unit (RV=90 percent)
- Boreal-riparian scrub gravelly diorite flood plains, moderately wet: 0 to 5 percent of the unit (RV=3 percent)
- Boreal-riparian forested gravelly high flood plains: 0 to 5 percent of the unit (RV=3 percent)
- Alpine-riparian scrub gravelly flood plains, moderately wet: 0 to 5 percent of the unit (RV=2 percent)
- Boreal-riparian scrub loamy wet flood plains: 0 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 333 to 975 m

Precipitation: 344 to 923 mm

Air temperature: -6.0 to -2.1 °C

Frost-free period: 60 to 80 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated

Landtype: Alluvium, Nonvegetated (Riverwash)

Climax plant community: Sparsely vegetated alluvium

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium and/or sandy and gravelly alluvium

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: not determined

G1—Nonvegetated Alluvium, Yukon-Kuskokwim Bottomlands

Soil name: Riverwash, Yukon-Kuskokwim Bottomlands

Composition

(All components are listed but only major components are described)

- Nonvegetated alluvium: 80 to 95 percent of the unit (RV=90 percent)
- Boreal-riparian forested loamy flood plains, moderately wet: 2 to 10 percent of the unit (RV=5 percent)
- Boreal-riparian forested gravelly flood plains: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 160 to 641 m

Precipitation: 336 to 651 mm

Air temperature: -3.0 to -2.5 °C

Frost-free period: 80 to 110 days

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection: Minchumina Basin Lowlands (131B.V2)

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated

Landtype: Alluvium, Nonvegetated (Riverwash)

Climax plant community: Sparsely vegetated alluvium

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and gravelly alluvium and/or sandy and silty alluvium

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: not determined

G2—Nonvegetated Alluvium-Cook Inlet Lowlands

Soil name: Riverwash, Cook Inlet Lowlands

Composition

(All components are listed but only major components are described)

- Nonvegetated alluvium: 75 to 95 percent of the unit (RV=90 percent)
- Boreal-riparian scrub gravelly flood plains, moderately wet and warm: 2 to 10 percent of the unit (RV=5 percent)
- Boreal-riparian forested hardwood gravelly flood plains: 2 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 61 to 912 m

Precipitation: 678 to 989 mm

Air temperature: -1.5 to 1.0 °C

Frost-free period: 70 to 100 days

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection: Lowland Flood Plains & Terraces & Fans (135A.V1)

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated

Landtype: Alluvium, Nonvegetated (Riverwash)

Climax plant community: Sparsely vegetated alluvium

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and gravelly alluvium and/or sandy and silty alluvium

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: frequent

Ponding hazard: none

Potential frost action: not determined

GA—Nonvegetated Alluvium, Alaska Mountains, Alpine

Soil name: Riverwash, Alaska Mountains, High Elevation

Composition

(All components are listed but only major components are described)

- Nonvegetated alluvium: 90 to 100 percent of the unit (RV=95 percent)
- Alpine-riparian scrub gravelly flood plains: 0 to 5 percent of the unit (RV=3 percent)
- Alpine-riparian scrub gravelly flood plains, moderately wet: 0 to 5 percent of the unit (RV=2 percent)

Setting

Elevation: 730 to 1,516 m

Precipitation: 497 to 1,229 mm

Air temperature: -8.3 to -2.5 °C

Frost-free period: 50 to 70 days

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection: Alpine Flood Plains & Terraces & Fans (M135A.V1)

Characteristics of Nonvegetated alluvium

Soil name: Riverwash, nonvegetated

Landtype: Alluvium, Nonvegetated (Riverwash)

Climax plant community: Sparsely vegetated alluvium

Landform(s): flood plains

Slope gradient: 0 to 2 percent

Parent material: sandy and silty alluvium and/or sandy and gravelly alluvium

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined
Flooding hazard: frequent
Ponding hazard: none
Potential frost action: not determined

NV1—Nonvegetated Mountains, Alaska Mountains

Soil name: Nonvegetated Mountains, Alaska Mountains

Composition

(All components are listed but only major components are described)

- Interior-nonvegetated rock outcrop, ice, talus, and/or drift: 80 to 95 percent of the unit (RV=90 percent)
- Alpine-dwarf scrub gravelly colluvial slopes: 0 to 10 percent of the unit (RV=5 percent)
- Alpine-dwarf scrub gravelly schist colluvial slopes: 0 to 10 percent of the unit (RV=3 percent)
- Alpine-dwarf scrub dark gravelly colluvial slopes: 0 to 10 percent of the unit (RV=2 percent)

Setting

Elevation: 785 to 6,125 m
Precipitation: 742 to 2,939 mm
Air temperature: -21.6 to -5.6 °C
Frost-free period: 20 to 60 days

Ecoregion Classification

Section: Alaska Mountains (M135A)
Subsection: Nonvegetated Alpine Mountains (M135A.B1)

Characteristics of Interior-nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift, Interior
Landtype: Rock and Ice, Nonvegetated (M135A_ROC)
Climax plant community: Sparsely vegetated mountain slopes, Interior
Landform(s): mountains, ice, and moraines
Slope gradient: 20 to 150 percent
Parent material: rockfall deposits and/or scree and/or talus
Restrictive feature(s): none
Water table (May to September): more than 150 cm
Drainage class: not determined
Hydric soil: unranked
Hydrologic group: not determined
Flooding hazard: none
Ponding hazard: none
Potential frost action: not determined

NV2—Nonvegetated Mountains, South Central Mountains

Soil name: Nonvegetated Mountains, South Central Mountains

Composition

(All components are listed but only major components are described)

- South Central nonvegetated rock outcrop, ice, talus, and/or drift: 85 to 95 percent of the unit (RV=90 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, cool: 0 to 10 percent of the unit (RV=5 percent)
- Alpine-dwarf scrub gravelly colluvial slopes, warm: 0 to 10 percent of the unit (RV=5 percent)

Setting

Elevation: 210 to 6,188 m

Precipitation: 768 to 3,450 mm

Air temperature: -23.9 to -3.5 °C

Frost-free period: 20 to 60 days

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection: Nonvegetated Alpine Mountains (M135S.B2)

Characteristics of South Central nonvegetated rock outcrop, ice, talus, and/or drift

Soil name: Nonvegetated rock outcrop, ice, talus, and/or drift

Landtype: South Central Rock and Ice, Nonvegetated (M135S_ROC)

Climax plant community: Sparsely vegetated mountain slopes, South Central

Landform(s): mountains, ice, and moraines

Slope gradient: 20 to 150 percent

Parent material: rockfall deposits and/or scree and/or talus

Restrictive feature(s): none

Water table (May to September): more than 150 cm

Drainage class: not determined

Hydric soil: unranked

Hydrologic group: not determined

Flooding hazard: none

Ponding hazard: none

Potential frost action: not determined

W—Water

Soil name: Water

Composition

(All components are listed but only major components are described)

- Water: 100 percent of the unit (RV=100 percent)

Setting

Elevation: 103 to 839 m

Landform(s): lakes larger than about 8 hectares

ECOMAP Landtypes and Landtype Phases

A Landtype is a basic unit of ecological land classification and represents a type of land with a distinctive combination of potential natural plant communities, soils, landforms, hydrology, climate, and ecological properties and processes. There are 101 Landtypes described for Denali Park. Examples of ecological properties and processes include vegetation succession, nutrient cycling, and productivity. Landtype classification is not oriented to any type of land or land use and is applicable to forest and rangeland, wetlands, and uplands. The relationship between climate, landforms, soils, and vegetation, and the ability to discern differences in the cumulative effect of these factors from one site to another, is the basis for Landtype classification. The Landtypes are listed below.

The primary emphasis of Landtype or ecological site classification is usually the vegetation on a site. Vegetation is considered to be an indicator of the integrated factors of the environment. Productivity, the response of the vegetation to various types of disturbances, and use and management of the vegetation are principal concerns to landowners and managers.

A secondary but equally important emphasis of site classification is landform and soil relationships. In general, the relationships between landforms and soils across the landscape are fairly predictable. Natural disturbances, such as wildfire, wind, and flooding result in considerable variation in vegetation. Landforms and soils provide a stable resource base by which Landtypes can be determined regardless of existing vegetative conditions. In addition, inferences can be made regarding site dynamics and stability, soil processes, and appropriate management systems based on landform and soil types.

While abrupt or distinct breaks between landforms, soils, and vegetation occasionally occur, more often than not the transition is gradual and indistinct. In addition, precipitation, temperature, and other climatic patterns, as well as microclimatic variables such as elevation, change gradually across the landscape. A Landtype classification, therefore, should be viewed as a landscape model. The boundaries between Landtypes are sometimes arbitrary and approximate. On the ground, the characteristics and properties within and between Landtypes are complex and variable, and usually overlap to some degree.

Landtype classification provides a useful framework for correlating and compiling data and interpretations on multiple resources and landscape processes. Site classification is also a valuable framework for organizing, applying, and monitoring resource conservation systems for various land uses.

Potential Natural Plant Community

By definition, a Landtype is characterized by a single potential natural plant community (PNC). The PNC is the assemblage of plant species that most nearly achieves a long-term steady state of productivity, structure, and composition on a site (Tueller 1973, cited by National Research Council 1994). The occurrence of a single potential plant community is based on the notion that over time, and in the absence of disturbances to the vegetation and changes in the site, succession (the gradual and successive replacement of one plant community by another) eventually leads to a single plant community which best reflects the integrated factors of the environment. While this theory has been questioned on both theoretical and practical grounds (National Research Council 1994), the PNC provides a benchmark from which long and short term responses of the vegetation to disturbances, and pathways and processes of succession, can be related.

Landtype Progression

Landtype progression refers to gradual and progressive changes over time to the physical and environmental conditions of the site that result in a different PNC. In riparian systems and permafrost environments, there is a high potential for progressive changes because of geomorphic and soil forming processes and climatic influences and potentials. Vegetation succession on sites undergoing gradual site progression generally does not lead to a true PNC. Changes in the site are occurring concurrently with succession such that a "long-term steady state of productivity, structure, and composition" is never achieved.

Along rivers, a low flood plain is gradually elevated to the height of a stream terrace in response to flooding, channel migration, and down-cutting, and the deposition of alluvium by flood waters. As the height of the land surface above the channel increases, flooding frequency and duration decrease and the depth to

water table increases. Site changes of this nature usually occur gradually over the life cycle of valley formation.

Primary vegetation succession may occur concurrently with flood plain-stream terrace site progression. In Alaska, the sequence is typically from low stature herb and shrub communities on recently exposed alluvium to tall forest communities on stream terraces. The latest successional stage attainable on a specific hydrologically influenced surface is referred to as a riparian association (Hansen 1989 cited by Gebhardt et al. 1990). For ecological sites in a riparian zone, the PNC is frequently a riparian association.

In permafrost environments, post-fire vegetation succession on most boreal forest sites is accompanied by a gradual increase in the abundance and thickness of the moss-organic layer on the soil surface. As the insulating capacity of the moss-organic layer increases, soil warming during summer is reduced and overall soil temperature decreases. Eventually, the permafrost table forms or rises within the soil profile and the soil drainage is restricted, often to the degree that a shallow water table is perched on the permafrost surface. Nutrient cycling and availability decreases markedly, as does site productivity, along with the changes in the soil environment. Productive hardwood and spruce forests gradually are replaced by unproductive mixed spruce woodland and scrub bogs.

The time frame and transition dynamics for site progression from a relatively warm, well drained, permafrost free condition to a cold, poorly drained, shallow permafrost condition are not well understood. For purposes of site classification, a reasonable hypothesis is that the duration of the well drained, permafrost free, productive condition persists for at least the life cycle of the initial spruce stand. Separate ecological sites are described for productive, well drained, permafrost free sites and poorly drained, shallow permafrost ones. The PNC is then defined as the latest successional stage observed on the site. On the permafrost free sites the PNC often is not a "long-term steady state of productivity, structure, and composition."

Landtype Retrogression

Wildfire, a common recurring disturbance factor in the boreal forest, can interrupt or retard site progression or, as is often the case, cause a retrogression from a shallow permafrost, poorly drained condition to a well drained, permafrost free condition. In addition to destroying the existing dominant vegetation, wildfire consumes the insulating moss-organic mat to varying degrees and blackens the soil surface, which leads to significant soil warming during summer. On sites with shallow permafrost, this results in thawing and an increase in the depth to permafrost, improved soil drainage, enhanced nutrient cycling and availability, and a dramatic increase in site productivity. Depending on initial site and vegetative conditions and the severity of the fire, site retrogression of this degree can occur within a few years following burning.

Not all wildfire, however, leads to site retrogression. Vegetation on permafrost free sites is equally susceptible to wildfire. Often, fire destroys the existing vegetation before the later point of site progression is reached. In this situation, wildfire results in renewed secondary succession of the vegetation and nutrient release to the ground surface, but has little effect on other soil and site properties.

In addition to identifying the latest successional stage as the PNC, Landtype classification provides a framework for recognizing and describing progression-retrogression dynamics and relationships.

Landtype Phases

Landtype Phases are not identified for all Landtypes and have not been specifically designated in this document. The Landtype phase is the smallest ecological unit recognized in the hierarchy. These are subdivisions of Landtypes based on topographic criteria such as slope shape or position, hydrologic characteristics and plant associations and phases that influence or reflect microclimate and productivity of the site. Landtype Phases are used in this project to describe subordinate areas of micro-relief or micro-climate within a Landtype. These areas have a significantly different plant community than the dominant condition observed within the Landtype. Examples of micro-relief include areas of micro-highs or micro-lows on periglacial landforms such as circles, gelifluction lobes, steps, and stripes where micro-climate differences produces one or more significantly different subordinate plant communities. Another example of a soil micro-climate difference that warrants the use of a Landscape Phase are stream terraces where two or more potential plant communities occur together in a mosaic. A slight variation in the thickness of the loamy surface

layer over sand and gravel affects rooting depth and plant available water resulting in two significantly different potential plant communities. The subordinate community is assigned a Landtype Phase. Landtype Phases are also used where two or more significantly different potential plant communities occur on the same soil component and the differences between the communities can not be distinguished based on obvious disturbance or site properties. Again, the subordinate community is assigned a Landtype Phase. Within the Landtype descriptions, an Ecological Status assignment of “wetter microsite,” “drier microsite,” “beaver impacted site and vegetation” or various pond succession designations are used to designate Landtype Phases.

Landtype-Soil Correlation

A Landtype consists of a group of one or more soils that have similar vegetative and ecological potentials and processes. While a number of different soils may be grouped together into a Landtype, any individual soil may be included in only a single Landtype. To establish soil-site relationships and maintain the one-to-one correlation, vegetative characteristics and ecological patterns and processes are used in conjunction with soil characteristics and other criteria specified in *Soil Taxonomy* and *Keys to Soil Taxonomy* ([Soil Survey Staff 1975; 1998](#)) to develop the soil classification.

Because of the one-to-one correlation between a soil and a Landtype, the Landtype can be determined by knowing the soil. This is particularly useful when the vegetation is not a definitive indicator of the site—for example, when vegetation has been altered by disturbance or management or when vegetation on two Landtypes is similar in composition and structure one must rely on soil properties to make the correct Landtype assignment. The one-to-one correlation means that a Landtype map can be derived from the soils map. The Landtypes correlated to common components are listed in Table 7.

Loamy Flood Plains (131B_100)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	281	160 to 624
Slope Gradient (percent):	1	0 to 2

Aspect (clockwise direction): non-influencing
Landform: channels on flood plains; flood plains

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Occasional	Brief	May	Sep
Ponding:	None			

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	459	336 to 651
Annual Air Temperature (°C):	-2.6	-3.0 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 30 Range: 2 to 74

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 9	slightly decomposed plant material	moderately rapid	.34	5.3 to 6.8	30	80
5 to 28	stratified fine sand to silt	moderate	.15 to .20	5.7 to 7.9	1	20

Restrictive Features: strongly contrasting textural stratification at 56 to 78 cm

Water Table (May to September): 50 to over 150 cm

Drainage Class: well drained to somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

White spruce-poplar/alder forest
Thinleaf alder-feltleaf willow scrub
Poplar/alder forest

Ecological Status

Climax plant community
Early stage of primary succession on flood plains
Mid stage of primary succession on flood plains

Ecological Status-Transition Description:

Three plant communities are identified on this flood prone site including a potential community with white spruce-poplar/alder forest, a mid- and early-seral community on successively lower and slightly more flood prone positions with poplar/alder forest and thinleaf alder-willow scrub, respectively. Flooding is considered a transitional pathway between seral communities within this site as well as between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce-poplar/alder forest	61	10	25	41	5
Thinleaf alder-feltleaf willow scrub	108	7	20	35	19
Poplar/alder forest	82	10	24	43	10

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
White spruce-poplar/alder forest	GOREO2	Goodyera repens var. ophioides
Thinleaf alder-feltleaf willow scrub	EPLE	Epilobium leptocarpum
	POPEO	Polygonum pensylvanicum ssp. oneillii
Poplar/alder forest	GOREO2	Goodyera repens var. ophioides
	SAEXI	Salix exigua ssp. interior

Characteristics of White spruce-poplar/alder forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	7.0	21	50	100	46
TT	POBA2	Populus balsamifera	5.0	20	50	100	45
ST	ALVIC	Alnus viridis ssp. crispa	45.0	52	60	60	56
ST	ALTE2	Alnus tenuifolia	20.0	32	40	60	44
ST	SAAL	Salix alaxensis	5.0	8	10	40	18
ST	SAAR3	Salix arbusculoides	10.0	10	10	20	14
SL-SM	ROAC	Rosa acicularis	4.0	6	10	60	19
SL-SM	SHCA	Shepherdia canadensis	0.1	8	15	40	18
SM	SAGL	Salix glauca	10.0	10	10	20	14
SD	DRIN4	Dryas integrifolia	5.0	5	5	20	10
FD-FM	EQPR	Equisetum pratense	0.1	30	50	60	42
FD-FM	PYAS	Pyrola asarifolia	1.0	5	10	60	17
FD	COCA13	Cornus canadensis	0.1	9	25	60	23
L	LICHEN	total lichens	0.1	1	4	100	10
M	MOSS	total bryophytes-mosses and liverworts	10.0	29	60	100	54
M1	HYSP70	Hylocomium splendens	10.0	22	40	80	42
M1	ZZMOSS	unknown-mosses	5.0	10	20	80	28
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	55.0	77	95	100	88
B	LITTER2	litter-woody debris >2.5 cm	4.0	5	7	100	22
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	13.0	19.6	28.0	m	7
Tree regeneration	TR	4.0	4.0	4.0	m	1
Tall shrubs	ST	4.5	6.0	7.5	m	4
Medium shrubs	SM	1.1	1.6	2.0	m	4
Dwarf shrubs	SD	2.0	2.5	3.0	cm	2
Tall and medium forbs	FT, FM	20.0	20.0	20.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.6	11.0	cm	7

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	96	26.4	20.4	Min.	4	B
	124	32.8	23.9	Avg.		
	153	36.3	25.6	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
m ² / ha			of Stands
27.6	32.2	36.8	2

Characteristics of Thinleaf alder-feltleaf willow scrub

Ecological Status: Early stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 19. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Importance	
			Min.	Avg.	Max.	Constancy	Value
ST	ALTE2	Alnus tenuifolia	10.0	44	90	89	63
ST	SAAL	Salix alaxensis	0.1	28	70	95	52
ST	ALVIC	Alnus viridis ssp. crispa	0.1	40	85	32	36
SM-ST	SAAR3	Salix arbusculoides	0.1	5	10	47	15
SL-SM	ROAC	Rosa acicularis	0.1	5	15	58	17
GM-GT	CACA4	Calamagrostis canadensis	0.1	14	45	100	37
FD-FM	EQAR	Equisetum arvense	0.1	20	75	89	42
FD-FM	EQPR	Equisetum pratense	0.1	10	20	16	13
FD	RUAR	Rubus arcticus	0.1	13	45	58	27
FD	VIEPR	Viola epipsila ssp. repens	0.1	5	15	21	10
L	LICHEN	total lichens	0.1	0	0	95	0
M	MOSS	total bryophytes-mosses and liverworts	2.0	20	55	95	44
M1	ZZMOSS	unknown-mosses	5.0	19	50	47	30
M1	PLAGI7	Plagiomnium	0.1	5	20	32	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	2.0	72	95	95	83
B	SOIL	mineral-bare soil	0.0	13	90	95	35
B	LITTER2	litter-woody debris >2.5 cm	0.0	8	15	95	28
B	ROCK	mineral-surface rock fragments	0.0	2	30	95	14
B	WATER	water	0.0	0	0	95	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	10.2	21.0	m	9
Tree regeneration	TR	0.5	2.0	4.0	m	9
Tall shrubs	ST	5.0	6.5	10.0	m	22
Medium shrubs	SM	1.1	1.6	2.5	m	9
Low shrubs	SL	70.0	90.0	100.0	cm	3
Dwarf shrubs	SD	3.0	3.0	3.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	30.0	118.0	180.0	cm	15
Tall and medium forbs	FT, FM	10.0	50.0	120.0	cm	15
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.4	6.9	70.0	cm	24

Characteristics of Poplar/alder forest

Ecological Status: Mid stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 12. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	15.0	36	50	58	46
TM	POBA2	Populus balsamifera	10.0	29	45	42	35
ST	ALTE2	Alnus tenuifolia	10.0	39	65	75	54
ST	ALVIC	Alnus viridis ssp. crispa	40.0	56	65	33	43
SM-ST	SAAL	Salix alaxensis	1.0	10	20	58	24
SL-SM	ROAC	Rosa acicularis	0.1	14	40	75	32
SL	VAUL	Vaccinium uliginosum	0.1	6	15	33	14
GM-GT	CACA4	Calamagrostis canadensis	0.1	13	45	83	33
FD-FM	EQAR	Equisetum arvense	0.1	12	75	75	30
FD	COCA13	Cornus canadensis	0.1	15	60	83	35
FD	RUAR	Rubus arcticus	0.1	5	10	50	16
L	LICHEN	total lichens	0.0	0	4	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	18	85	100	42
M1	ZZMOSS	unknown-mosses	5.0	12	25	58	26
M1	HYSP70	Hylocomium splendens	1.0	15	55	42	25
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	72	95	100	85
B	LITTER2	litter-woody debris >2.5 cm	0.0	8	25	100	28
B	SOIL	mineral-bare soil	0.0	0	3	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	12.2	18.0	m	13
Tree regeneration	TR	2.0	3.2	4.5	m	6
Tall shrubs	ST	4.0	5.3	7.0	m	12
Medium shrubs	SM	1.3	1.8	3.0	m	11
Low shrubs	SL	30.0	67.5	100.0	cm	4
Dwarf shrubs	SD	1.0	1.0	1.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	100.0	124.0	130.0	cm	5
Tall and medium forbs	FT, FM	30.0	58.0	150.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.6	4.8	10.0	cm	22

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested loamy flood plains, moderately wet (Aquic Cryofluvents, coarse-loamy over sandy-skeletal)
 Boreal-riparian scrub loamy schist flood plains (Typic Cryofluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1FP	Boreal Flood Plains with Discontinuous Permafrost, Minchumina Basin (Fluvaquentic Historthels, coarse-loamy-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryofluvents, coarse-loamy over sandy-skeletal Complex)
2FP2	Boreal Schist Flood Plains with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex)
2FP3	Boreal Flood Plains with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex)

3FP1 Boreal Flood Plains and Terraces with Discontinuous Permafrost
(Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes

131B_101—Loamy High Flood Plains:

This site occurs on higher positions with lower flooding frequency. The climax plant community is "White spruce/alder forest."

131B_104—Loamy Frozen Terraces:

This site occurs on uplands that are not flooded and have wetter soils with permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_501—Organic Depressions, Fens:

This site occurs on cutoff meanders with wetter soils. The climax plant community is "Sedge wet meadow."

131B_505—Loamy Channels:

This site occurs in channels with wetter soils that are moderately deep over permafrost. The climax plant community is "Tamarack-black spruce/leatherleaf woodland."

Similar Landtypes

131B_101—Loamy High Flood Plains:

This site occurs on higher flood plain positions. The climax plant community is "White spruce/alder forest."

131B_102—Loamy Frozen Flood Plains:

This site occurs on moderately deep soils over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on wetter soils that have permafrost at moderate depths. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

131B_255—Gravelly Flood Plains:

This site occurs on soils that are very shallow to sand and gravel. The climax plant community is "White spruce-poplar woodland."

Loamy High Flood Plains (131B_101)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

Elevation (meters): RV 259 Range 149 to 624

Slope Gradient (percent): 1 0 to 3

Aspect (clockwise direction): non-influencing

Landform: flood plains

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Occasional	Brief	May	Sep
Ponding:	None			

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	445	336 to 651
Annual Air Temperature (°C):	-2.6	-3.0 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: sandy and silty alluvium
sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 35 Range: 12 to 98

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
5	slightly decomposed plant material	moderately rapid	.34	3.9 to 5.4	30	
6 to 20	stratified fine sand to silt	moderate	.15 to .40	3.9 to 6.8	12	10 to 20
10 to 24	stratified fine sand to silt; stratified sand to silt	moderate	.15 to .18	5.8 to 6.8		10 to 20

Restrictive Features: strongly contrasting textural stratification at 73 to over 150 cm
permafrost at 78 to over 150 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
White spruce/alder forest	Climax plant community
White spruce-paper birch/alder forest	Late stage of primary succession on flood plains

Ecological Status-Transition Description:

Two plant communities are identified on this flood prone site including a potential community with white spruce/alder forest, and a late-seral community with white spruce-paper birch/alder forest on slightly lower flood plain positions. Flooding is considered a transitional pathway between seral communities within this site as well as between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce/alder forest	93	17	26	38	13
White spruce-paper birch/alder forest	76	12	26	33	9

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
White spruce/alder forest	CABU	Calypso bulbosa
	COCO9	Conocephalum conicum
	GOREO2	Goodyera repens var. ophioides
	CABU	Calypso bulbosa
White spruce-paper birch/alder forest	CIAL	Circaea alpina
	GOREO2	Goodyera repens var. ophioides

Characteristics of White spruce/alder forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 13. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	10.0	24	40	100	49
ST	ALVIC	Alnus viridis ssp. crispa	0.1	28	60	69	44
ST	ALTE2	Alnus tenuifolia	1.0	23	60	62	38
SL-SM	ROAC	Rosa acicularis	0.1	13	35	92	35
SM	SAPU15	Salix pulchra	0.1	7	20	31	15
SL	VAUL	Vaccinium uliginosum	0.1	11	25	46	22
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	15	55	77	34
SD	LIBO3	Linnaea borealis	0.1	5	15	85	21
SD	EMNI	Empetrum nigrum	0.1	5	15	54	16
GT	CACA4	Calamagrostis canadensis	0.1	13	60	85	33
FD-FM	EQAR	Equisetum arvense	0.1	19	50	54	32
FD-FM	EQPR	Equisetum pratense	0.1	10	30	46	21
FD	COCA13	Cornus canadensis	0.1	7	20	77	23
L	LICHEN	total lichens	0.1	3	10	100	17
M	MOSS	total bryophytes-mosses and liverworts	45.0	75	95	100	87
M1	HYSP70	Hylocomium splendens	10.0	35	75	100	59
M1	RHTR70	Rhytidiadelphus triquetrus	5.0	33	60	69	48
M1	ZZMOSS	unknown-mosses	5.0	10	20	100	32
M1	PLSC70	Pleurozium schreberi	5.0	11	15	38	20
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	27	55	100	52
B	LITTER2	litter-woody debris >2.5 cm	0.1	7	15	100	26
B	SOIL	mineral-bare soil	0.0	2	10	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	1	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	8.5	23.7	32.0	m	12
Tree regeneration	TR	2.0	2.0	2.0	m	1
Tall shrubs	ST	3.5	5.0	7.0	m	14
Medium shrubs	SM	1.2	1.8	2.2	m	6
Low shrubs	SL	40.0	77.8	110.0	cm	9
Dwarf shrubs	SD	1.0	8.5	20.0	cm	10
Tall and medium grasses and grass-likes	GT, GM	5.0	77.0	130.0	cm	5
Tall and medium forbs	FT, FM	20.0	41.1	70.0	cm	9
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	5.0	10.0	cm	25

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	92	23.4	17.1	23	B
	145	35.3	23.4		
	228	52.1	29.0		
					Min.
					Avg
					Max.

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
19.6	34.0	43.7	12

Characteristics of White spruce-paper birch/alder forest

Ecological Status: Late stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 12. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	<i>Picea glauca</i>	15.0	30	50	100	55
TT	BENE4	<i>Betula neoalaskana</i>	5.0	17	45	75	36
TM	BENE4	<i>Betula neoalaskana</i>	5.0	10	20	25	16
ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	10.0	34	65	75	50
ST	ALTE2	<i>Alnus tenuifolia</i>	0.1	16	50	42	26
SM-ST	SARI4	<i>Salix richardsonii</i>	0.1	8	15	17	12
SL-SM	ROAC	<i>Rosa acicularis</i>	5.0	19	60	100	44
SL-SM	VIED	<i>Viburnum edule</i>	0.1	5	15	83	20
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	0.1	18	60	58	32
SD	LIBO3	<i>Linnaea borealis</i>	0.1	9	30	67	25
GT	CACA4	<i>Calamagrostis canadensis</i>	0.1	12	45	75	30
GM-GT	ZZGRASS	unknown-grasses	5.0	10	15	17	13
FD-FM	EQPR	<i>Equisetum pratense</i>	1.0	23	70	33	28
FD-FM	EQAR	<i>Equisetum arvense</i>	0.1	9	25	75	26
FD-FM	PYAS	<i>Pyrola asarifolia</i>	0.1	5	35	58	17
FD	COCA13	<i>Cornus canadensis</i>	0.1	15	50	83	35
L	LICHEN	total lichens	0.0	1	5	100	10
M	MOSS	total bryophytes-mosses and liverworts	20.0	66	95	100	81
M1	HYSP70	<i>Hylocomium splendens</i>	0.1	33	85	92	55
M1	RHTR70	<i>Rhytidiadelphus triquetrus</i>	10.0	23	40	67	39
M1	ZZMOSS	unknown-mosses	3.0	10	15	75	27
M1	PTCR70	<i>Ptilium crista-castrensis</i>	0.1	5	15	58	17
M1	PLSC70	<i>Pleurozium schreberi</i>	1.0	8	10	33	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	33	60	100	57
B	LITTER2	litter-woody debris >2.5 cm	2.0	9	25	100	30
B	SOIL	mineral-bare soil	0.0	2	15	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	5	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	22.3	36.0	m	15
Tree regeneration	TR	1.0	2.5	4.0	m	2
Tall shrubs	ST	3.0	4.8	7.0	m	13
Medium shrubs	SM	1.2	1.6	1.8	m	9
Low shrubs	SL	20.0	82.5	100.0	cm	12
Dwarf shrubs	SD	0.7	10.2	20.0	cm	8
Tall and medium grasses and grass-likes	GT, GM	50.0	104.4	130.0	cm	9
Tall and medium forbs	FT, FM	15.0	36.4	90.0	cm	14
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	8.4	40.0	cm	24

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	59	20.1	16.2	Min.	19	B
	128	36.1	23.6	Avg		
	203	60.5	32.9	Max.		
Picea mariana	216	37.6	23.5	Min.	2	B
	238	38.4	24.5	Avg		
	260	39.1	25.6	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
17.2	32.7	48.3	9

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim (Typic Cryofluvents, coarse-loamy over sandy-skeletal)
 Boreal-riparian forested loamy flood plains, frozen, thick surface (Fluventic Haplorthels, coarse-loamy)
 Boreal-riparian forested loamy schist flood plains (Typic Cryofluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1FP	Boreal Flood Plains with Discontinuous Permafrost, Minchumina Basin (Fluvaquentic Historthels, coarse-loamy-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryofluvents, coarse-loamy over sandy-skeletal Complex)
1FP2	Boreal Terraces and Flood Plains with Discontinuous Permafrost (Typic Historthels, coarse-loamy-Typic Cryofluvents, coarse-loamy over sandy skeletal Complex)
2FP2	Boreal Schist Flood Plains with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex)
2FP3	Boreal Flood Plains with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex)
3FP1	Boreal Flood Plains and Terraces with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes**131B_100—Loamy Flood Plains:**

This site occurs on slightly lower positions. The climax plant community is "White spruce-poplar/alder forest."

131B_104—Loamy Frozen Terraces:

This site occurs on terraces with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on slightly lower positions soils that are poorly drained and have permafrost at moderate depths. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

131B_501—Organic Depressions, Fens:

This site occurs on cutoff meanders with wetter soils. The climax plant community is "Sedge wet meadow."

131B_505—Loamy Channels:

This site occurs in channels with wetter soils that are moderately deep over permafrost. The climax plant community is "Tamarack-black spruce/leatherleaf woodland."

Similar Landtypes

131B_100—Loamy Flood Plains:

This site occurs on lower flood plain positions. The climax plant community is "White spruce-poplar/alder forest."

131B_102—Loamy Frozen Flood Plains:

This site occurs on soils that are moderately deep over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on slightly lower positions soils that are poorly drained and have permafrost at moderate depths. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

131B_255—Gravelly Flood Plains:

This site occurs on soils that are very shallow to sand and gravel. The climax plant community is "White spruce-poplar woodland."

Loamy Frozen Flood Plains (131B_102)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	228	164 to 592
Slope Gradient (percent):	1	0 to 1
Aspect (clockwise direction):	non-influencing	
Landform:	flood plains	

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Occasional	Brief	May	Sep
Ponding:	None			

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	421	336 to 651
Annual Air Temperature (°C):	-2.7	-3.0 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over sandy and silty alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 35 Range: 7 to 78

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
8 to 9	slightly decomposed plant material	moderately rapid	.34	3.9 to 4.0	30	
13 to 21	silt loam	moderate	.26 to .40	3.9 to 4.3	12 to 20	
5 to 14	stratified silt to fine sand to muck	moderate to moderately rapid	.16 to .18	5.7 to 5.8	12 to 25	

Restrictive Features: permafrost at 78 cm
Water Table (May to September): none
Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Mixed paper birch-spruce/prickly rose forest	Climax plant community
Paper birch/prickly rose/bluejoint forest	Late stage of primary succession on flood plains
Paper birch/lingonberry forest	Mid stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant communities are identified on this flooding and fire influenced site including a potential community with mixed paper birch-spruce/prickly rose forest, a late-seral flood plain community with paper birch/prickly rose/bluejoint forest on slightly lower flood plain positions, and a mid-seral fire influenced community with paper birch/lingonberry forest where the potential community has been influenced by fire. Flooding and fire are considered transitional pathways between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Mixed paper birch-spruce/prickly rose forest	98	11	27	59	9
Paper birch/prickly rose/bluejoint forest	36	16	18	21	5
Paper birch/lingonberry forest	32	11	17	27	3

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Mixed paper birch-spruce/prickly rose forest	CYMO3	Cystopteris montana
	GOREO2	Goodyera repens var. ophioides
	LYTH2	Lysimachia thyriflora
	RAPE2	Ranunculus pensylvanicus
Paper birch/prickly rose/bluejoint forest	CAPA	Calla palustris
	LEMI3	Lemna minor
Paper birch/lingonberry forest	LETR	Lemna trisulca
	RINA99	Ricciocarpus natans
	UTMI	Utricularia minor

Characteristics of Mixed paper birch-spruce/prickly rose forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 13. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	BENE4	Betula neoalaskana	0.1	36	65	62	47
TT	PIGL	Picea glauca	4.0	21	50	62	36
TT	PIMA	Picea mariana	2.0	6	10	23	12
TM	PIMA	Picea mariana	30.0	35	40	15	23
TM	BENE4	Betula neoalaskana	0.1	22	40	23	22
TR	PIGL	Picea glauca	0.1	5	10	15	9
SM-ST	ALTE2	Alnus tenuifolia	0.1	22	70	46	32
SM-ST	ALVIC	Alnus viridis ssp. crispa	0.1	18	60	54	31
ST	SABE2	Salix bebbiana	0.1	8	30	38	17
SM-ST	B EGL	Betula glandulosa	0.1	5	15	23	11
SL-SM	ROAC	Rosa acicularis	0.1	19	55	92	42
SL	LEGR	Ledum groenlandicum	0.1	9	30	54	22
SL	CHCA2	Chamaedaphne calyculata	0.1	9	40	38	18

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	VAUL	Vaccinium uliginosum	2.0	8	20	31	16
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	12	25	92	33
SD	ARRU6	Arctous rubra	0.1	5	10	15	9
GT	CACA4	Calamagrostis canadensis	0.1	26	60	69	42
GM-GT	ZZGRASS	unknown-grasses	0.1	5	10	23	11
FM	EQPR	Equisetum pratense	15.0	49	65	31	39
FM	EQSY	Equisetum sylvaticum	0.1	17	25	23	20
FD-FM	RUCH	Rubus chamaemorus	1.0	8	15	15	11
FM	VACA3	Valeriana capitata	0.1	5	10	15	9
FD	COCA13	Cornus canadensis	0.1	6	25	92	23
FD	RUAR	Rubus arcticus	0.1	8	30	31	16
L	LICHEN	total lichens	0.0	2	10	100	14
M	MOSS	total bryophytes-mosses and liverworts	5.0	57	85	100	75
M1	HYSP70	Hylocomium splendens	5.0	34	80	69	48
M1	ZZMOSS	unknown-mosses	5.0	12	25	69	29
M1	RHTR70	Rhytidiadelphus triquetrus	0.1	21	30	31	26
M1	PLSC70	Pleurozium schreberi	5.0	11	20	31	18
M1	POCO38	Polytrichum commune	5.0	8	10	15	11
M1	SPHAG2	Sphagnum	0.1	5	10	15	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	45	95	100	67
B	LITTER2	litter-woody debris >2.5 cm	0.0	6	10	100	24
B	SOIL	mineral-bare soil	0.0	1	7	100	10
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	5	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.5	13.8	28.0	m	21
Tree regeneration	TR	4.0	4.0	4.0	m	3
Tall shrubs	ST	3.5	4.9	6.5	m	8
Medium shrubs	SM	1.0	1.7	2.5	m	16
Low shrubs	SL	30.0	45.0	70.0	cm	14
Dwarf shrubs	SD	4.0	10.8	20.0	cm	10
Tall and medium grasses and grass-likes	GT, GM	70.0	128.6	180.0	cm	7
Tall and medium forbs	FT, FM	12.0	33.8	100.0	cm	15
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	5.9	10.0	cm	22

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	61	22.1	16.2	Min.	8	B
	168	30.0	19.5	Avg.		
	267	39.4	23.2	Max.		
Picea mariana	60	13.5	11.9	Min.	4	B
	80	19.6	15.0	Avg.		
	97	26.4	18.0	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
12.6	19.6	32.2	5

Characteristics of Paper birch/prickly rose/bluejoint forest

Ecological Status: Late stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	BENE4	Betula neolaskana	50.0	70	80	71	70
TT	LALA	Larix laricina	5.0	8	10	29	15
TM	BENE4	Betula neolaskana	75.0	88	100	29	51
ST	ALVIC	Alnus viridis ssp. crispa	0.1	19	35	71	37
SL-SM	ROAC	Rosa acicularis	5.0	27	55	86	48
SL-SM	VIED	Viburnum edule	0.1	11	25	57	25
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	14	35	43	25
SD	LIBO3	Linnaea borealis	5.0	5	5	29	12
GM-GT	CACA4	Calamagrostis canadensis	5.0	21	40	100	46
FM-FT	EQSY	Equisetum sylvaticum	10.0	25	40	29	27
FM	EQAR	Equisetum arvense	0.1	18	60	86	39
FD	COCA13	Cornus canadensis	0.1	13	30	71	30
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	24	40	100	49
M1	HYSP70	Hylocomium splendens	7.0	15	25	71	33
M1	ZZMOSS	unknown-mosses	3.0	10	15	71	27
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	65.0	74	95	100	86
B	LITTER2	litter-woody debris >2.5 cm	7.0	13	20	100	36
B	SOIL	mineral-bare soil	0.0	2	5	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	12.1	20.0	m	10
Tree regeneration	TR	1.5	2.2	3.0	m	2
Tall shrubs	ST	4.5	6.3	10.0	m	5
Medium shrubs	SM	1.2	1.5	2.0	m	6
Low shrubs	SL	100.0	100.0	100.0	cm	2
Dwarf shrubs	SD	2.0	11.0	20.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	100.0	134.0	170.0	cm	5
Tall and medium forbs	FT, FM	20.0	60.9	200.0	cm	11
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.3	8.0	cm	8

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Betula	83	11.9	10.4	1	G
	83	11.9	10.4		
	83	11.9	10.4		
Larix laricina	94	34.5	19.8	1	B
	94	34.5	19.8		
	94	34.5	19.8		

Characteristics of Paper birch/lingonberry forest

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	BENE4	Betula neoalaskana	70.0	78	85	100	88
ST	SABE2	Salix bebbiana	5.0	5	5	33	13
SM	ROAC	Rosa acicularis	7.0	31	55	67	46
SM	SPST3	Spiraea stevenii	5.0	7	10	100	26
SM	RIHU	Ribes hudsonianum	10.0	10	10	33	18
SM	RITR	Ribes triste	5.0	5	5	33	13
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	40	80	100	63
GT	CACA4	Calamagrostis canadensis	5.0	42	65	100	65
FT	EPAN2	Epilobium angustifolium	1.0	6	10	67	20
FM	EQSY	Equisetum sylvaticum	35.0	38	40	67	50
FD	COCA13	Cornus canadensis	30.0	30	30	33	31
FD	MOLA6	Moehringia lateriflora	0.1	8	15	67	23
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	10.0	20	30	100	45
M1	HYSP70	Hylocomium splendens	10.0	15	20	67	32
M1	ZZMOSS	unknown-mosses	10.0	10	10	100	32
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	75.0	83	90	100	91
B	LITTER2	litter-woody debris >2.5 cm	5.0	12	15	100	35
B	WATER	water	0.0	1	3	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	7.0	14.0	22.0	m	5
Tree regeneration	TR	2.5	3.0	3.5	m	2
Tall shrubs	ST	3.5	3.5	3.5	m	1
Medium shrubs	SM	1.4	1.5	1.8	m	3
Dwarf shrubs	SD	10.0	14.0	20.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	150.0	166.7	180.0	cm	3
Tall and medium forbs	FT, FM	30.0	87.5	200.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.3	10.0	cm	4

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Betula	62	14.2	18.6	Min.	3	B
	77	23.0	20.0	Avg		
	90	27.9	20.7	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
41.4	41.4	41.4	1

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested loamy flood plains, frozen (Fluventic Haplorthels, coarse-loamy)

Boreal-riparian forested mica rich loamy flood plains, frozen (Fluventic Haplorthels, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1FP4	Boreal Flood Plains and Terraces with Discontinuous Permafrost, Wet (Fluvaquentic Historthels, coarse-loamy-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euc Complex)
1ST	Boreal Plains with Discontinuous Permafrost (Typic Historthels, coarse-silty-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euc Complex)
3FP3	Boreal Mica-Rich Terraces and Flood Plains with Discontinuous Permafrost (Typic Histoturbels, coarse-silty-Fluventic Haplorthels, coarse-loamy-Typic Historthels, coarse-loamy Association)

Geographically Associated Landtypes

131B_100—Loamy Flood Plains:

This site occurs on slightly lower positions. The climax plant community is "White spruce-poplar/alder forest."

131B_104—Loamy Frozen Terraces:

This site occurs in uplands with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on wetter soils that have permafrost at moderate depths. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

131B_501—Organic Depressions, Fens:

This site occurs on cutoff meanders with wetter soils. The climax plant community is "Sedge wet meadow."

131B_505—Loamy Channels:

This site occurs on channels with wetter soils that are moderately deep over permafrost. The climax plant community is "Tamarack-black spruce/leatherleaf woodland."

Similar Landtypes

131B_101—Loamy High Flood Plains:

This site occurs on very deep well drained soils. The climax plant community is "White spruce/alder forest."

Loamy Frozen Terraces (131B_104)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	265	149 to 630

Slope Gradient (percent):	1	0 to 2
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Aspect (clockwise direction): non-influencing

Landform: outwash plains; stream terraces

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	437	336 to 651
Annual Air Temperature (°C):	-2.6	-3.0 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty alluvium
mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium
mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium over sandy and gravelly alluvium
organic material over silty eolian deposits over sandy and silty alluvium over sandy and gravelly

Rooting Depth (cm): *RV:* 30 *Range:* 6 to 53

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
22 to 30	peat	moderately rapid	.34	3.8 to 5.0	30	
2 to 8	silt loam	moderate to moderately rapid	.14 to .40	4.5 to 5.3	6 to 15	

Restrictive Features: permafrost at 42 to 53 cm
strongly contrasting textural stratification at 90 cm in some components

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Black spruce-tamarack/Labrador tea woodland	Climax plant community
Willow/bluejoint/haircap moss scrub	Early stage of fire induced secondary succession
Labrador tea scrub	Mid stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant community are identified on this fire influenced site including a potential community with black spruce-tamarack/Labrador tea woodland, a mid-seral community with Labrador tea scrub and an early-seral community with willow/bluejoint/haircap moss scrub. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce-tamarack/Labrador tea woodland	108	10	21	40	36
Willow/bluejoint/haircap moss scrub	55	19	23	31	5
Labrador tea scrub	73	13	27	35	7

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Labrador tea scrub	POPR	Poa pratensis

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Labrador tea scrub	CAEB2	Carex eburnea

Characteristics of Black spruce-tamarack/Labrador tea woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 41. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	Picea mariana	5.0	22	60	63	37
TS	PIMA	Picea mariana	5.0	19	35	22	20
SL-SM	LEGR	Ledum groenlandicum	0.1	16	55	68	33
SL-SM	B EGL	Betula glandulosa	0.1	6	20	93	24
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	19	55	73	37
SD-SL	VAUL	Vaccinium uliginosum	0.1	12	40	100	35
SD-SL	CHCA2	Chamaedaphne calyculata	0.1	8	20	59	22
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	12	30	98	34
SD	EMNI	Empetrum nigrum	0.1	9	20	78	26
GM	ERBR6	Eriophorum brachyantherum	0.1	8	60	44	19
FD-FM	EQSY	Equisetum sylvaticum	0.1	8	20	32	16
FD	RUCH	Rubus chamaemorus	0.1	9	30	73	26
L	LICHEN	total lichens	0.0	17	85	100	41
L1	CLRA61	Cladina rangiferina group	0.1	6	25	61	19
L1	CLADI3	Cladina	0.1	5	20	59	17
L1	CLST60	Cladina stellaris	0.1	9	50	32	17
M	MOSS	total bryophytes-mosses and liverworts	30.0	78	95	100	88
M1	SPHAG2	Sphagnum	0.1	27	75	83	47
M1	PLSC70	Pleurozium schreberi	2.0	23	50	80	43
M1	HYS70	Hylocomium splendens	0.1	25	50	68	41
M1	ZZMOSS	unknown-mosses	5.0	11	40	88	31
M1	TONI70	Tomentypnum nitens	0.1	5	10	20	10
M1	POCO38	Polytrichum commune	0.1	5	15	15	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	10	60	100	32
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	6	100	14
B	SOIL	mineral-bare soil	0.0	0	7	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	2	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.5	8.0	21.0	m	52
Tree regeneration	TR	0.2	1.3	3.0	m	33
Tall shrubs	ST	3.0	3.5	4.0	m	2
Medium shrubs	SM	1.0	1.7	2.5	m	22
Low shrubs	SL	20.0	60.5	100.0	cm	59
Dwarf shrubs	SD	3.0	9.4	20.0	cm	39
Tall and medium grasses and grass-likes	GT, GM	20.0	56.0	120.0	cm	20
Tall and medium forbs	FT, FM	10.0	24.3	50.0	cm	15
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.5	10.0	cm	92

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea mariana	57	5.8	4.6	6	G
	124	9.2	6.6		
	222	12.2	8.8		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
m ² / ha			of Stands
0.2	0.2	0.2	1

Characteristics of Willow/bluejoint/haircap moss scrub

Ecological Status: Early stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIMA	Picea mariana	5.0	5	5	20	10
TM	PIMA	Picea mariana	7.0	7	7	20	12
SM	SAGL	Salix glauca	0.1	7	15	100	26
SM	BEGL	Betula glandulosa	0.1	6	20	80	22
SL-SM	ROAC	Rosa acicularis	0.1	5	15	100	22
SM	SABE2	Salix bebbiana	5.0	5	5	20	10
SL	LEGR	Ledum groenlandicum	5.0	6	10	80	22
SL	VAUL	Vaccinium uliginosum	0.1	6	15	80	22
SL	RUID	Rubus idaeus	10.0	10	10	20	14
SL	PEFL15	Pentaphylloides floribunda	5.0	5	5	20	10
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	2.0	5	10	80	20
GT	CACA4	Calamagrostis canadensis	5.0	31	70	100	56
FM-FT	EPAN2	Epilobium angustifolium	0.1	5	10	100	22
FD-FT	EQSY	Equisetum sylvaticum	2.0	8	15	40	18
FD	EQPR	Equisetum pratense	0.1	5	10	40	14
L	LICHEN	total lichens	0.1	10	25	100	32
L1	CLCO19	Cladonia cornuta	10.0	10	10	20	14
L1	PELT12	Peltigera	5.0	5	5	20	10
M	MOSS	total bryophytes-mosses and liverworts	0.1	29	65	100	54
M1	POCO38	Polytrichum commune	0.1	15	20	80	35
M1	ZZMOSS	unknown-mosses	0.1	8	20	100	28
M1	POLYT5	Polytrichum	20.0	20	20	20	20
M1	HYSPT0	Hylocomium splendens	15.0	15	15	20	17
M1	PLSC70	Pleurozium schreberi	10.0	10	10	20	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	54	70	100	73
B	LITTER2	litter-woody debris >2.5 cm	0.0	10	20	100	32
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	16.0	30.0	m	3
Tree regeneration	TR	0.5	1.8	4.0	m	11
Medium shrubs	SM	1.3	2.1	3.0	m	6
Low shrubs	SL	70.0	72.5	80.0	cm	4
Dwarf shrubs	SD	3.0	3.0	3.0	cm	1
Tall and medium grasses and grass-like	GT, GM	130.0	146.7	160.0	cm	3
Tall and medium forbs	FT, FM	90.0	138.0	220.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	1.8	3.0	cm	6

Characteristics of Labrador tea scrub

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	BENE4	Betula neolaskana	0.1	8	20	43	19
TR	PIGL	Picea glauca	0.1	5	15	57	17
TR	PIMA	Picea mariana	0.1	5	15	57	17
SL-ST	SAGL	Salix glauca	0.1	5	15	86	21
SL	LEGR	Ledum groenlandicum	20.0	27	40	86	48
SL	LEPAD	Ledum palustre ssp. decumbens	15.0	32	45	43	37
SD-SL	VAUL	Vaccinium uliginosum	5.0	11	20	100	33
SL	CHCA2	Chamaedaphne calyculata	0.1	13	25	29	19
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	16	40	100	40
SD	EMNI	Empetrum nigrum	0.1	7	10	43	17
SD	LIBO3	Linnaea borealis	5.0	10	15	29	17
GM	CAVA2	Carex vaginata	0.1	7	15	43	17
GM	ERBR6	Eriophorum brachyantherum	0.1	7	15	43	17
FD-FM	EQPR	Equisetum pratense	0.1	13	40	43	24
FD-FM	EQSY	Equisetum sylvaticum	4.0	5	7	43	15
FD	EQSC	Equisetum scirpoides	0.1	10	15	43	21
FD	RUCH	Rubus chamaemorus	0.1	6	20	57	18
L	LICHEN	total lichens	0.0	6	20	100	24
L1	CLADO3	Cladonia	1.0	6	15	43	16
M	MOSS	total bryophytes-mosses and liverworts	30.0	58	85	100	76
M1	ZZMOSS	unknown-mosses	10.0	19	30	100	44
M1	POCO38	Polytrichum commune	10.0	25	50	71	42
M1	HYSPT0	Hylocomium splendens	0.1	23	50	43	31
M1	SPHAG2	Sphagnum	5.0	13	20	43	24
M1	PLSC70	Pleurozium schreberi	5.0	10	15	29	17
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	39	60	100	62
B	LITTER2	litter-woody debris >2.5 cm	1.0	11	25	100	33
B	SOIL	mineral-bare soil	0.0	4	30	100	20
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	7.0	13.8	25.0	m	10
Tree regeneration	TR	0.4	1.3	2.6	m	11
Tall shrubs	ST	3.5	3.8	4.0	m	2
Medium shrubs	SM	1.8	2.3	3.0	m	5
Low shrubs	SL	40.0	75.0	90.0	cm	6
Dwarf shrubs	SD	3.0	6.3	9.0	cm	6
Tall and medium grasses and grass-likes	GT, GM	30.0	76.0	130.0	cm	5
Tall and medium forbs	FT, FM	30.0	82.5	130.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.2	5.0	cm	13

Map Unit Components**Common Name (Soils Name):**

- Boreal-taiga deep loamy terraces, frozen (Typic Historthels, coarse-loamy)
- Boreal-taiga loamy terraces, frozen (Typic Historthels, coarse-loamy over sandy-skeletal)
- Boreal-taiga mica rich loamy terraces, frozen (Typic Historthels, coarse-loamy)
- Boreal-taiga silty outwash plains, frozen (Typic Historthels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1FP2	Boreal Terraces and Flood Plains with Discontinuous Permafrost (Typic Historthels, coarse-loamy-Typic Cryofluvents, coarse-loamy over sandy skeletal Complex)
1FW1	Boreal Terraces with Continuous Permafrost (Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Complex)
1ST1	Boreal Terraces with Discontinuous Permafrost, Minchumina Basin (Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty-Cryofibrists, eucic Association)
1STW	Boreal Terraces with Continuous Permafrost, Wet (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association)
2FW2	Boreal Terraces and High Flood Plains with Continuous Permafrost (Typic Historthels, coarse-loamy Complex)
2P	Boreal Plains with Continuous Permafrost (Typic Historthels, coarse-silty)
2ST	Boreal Terraces with Discontinuous Permafrost (Typic Eutrocrypts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal Complex)
3FP1	Boreal Flood Plains and Terraces with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes

131B_100—Loamy Flood Plains:

This site occurs on flood plains with very deep, well drained soils. The climax plant community is "White spruce-poplar/alder forest."

131B_102—Loamy Frozen Flood Plains:

This site occurs on high flood plains with soils that are well drained and moderately deep over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on flood plains. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

Similar Landtypes

131B_105—Loamy Frozen Terraces, Wet:

This site occurs on soils that are wetter and moderately deep over permafrost. The climax plant community is "Black spruce-tamarack/tussock cottongrass woodland."

131B_108—Gravelly and Sandy Terraces:

This site occurs on very deep soils that are very shallow to sand and gravel.. The climax plant community is "Spruce/ericaceous woodland."

131B_113—Loamy Frozen Slopes, Ice Cored:

This site occurs on steeper slopes and is well drained. The climax plant community is "Black spruce/green alder/Labrador tea woodland."

131B_400—Loamy Frozen Slopes:

This site occurs on loess plains and hills and lacks subsurface gravel at depth. The climax plant community is "Black spruce/Labrador tea woodland."

M135A_505—Loamy Drainages, High Elevation:

This site occurs in flooded channels. The climax plant community is "Diamondleaf willow-green alder scrub."

Loamy Frozen Terraces, Wet (131B_105)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
 Lowland Flood Plains & Terraces (131B.V1)
 Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	228	149 to 592
Slope Gradient (percent):	1	0 to 4
Aspect (clockwise direction): non-influencing		
Landform: turf hummocks on plains; turf hummocks on stream terraces		

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	None				
Ponding:	Frequent	Long	May	Jun	to

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	436	336 to 651
Annual Air Temperature (°C):	-2.6	-3.0 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: grassy organic material over loamy cryoturbate over loamy eolian deposits
 grassy organic material over sandy and silty cryoturbate

Rooting Depth (cm): RV: 44 Range: 19 to 73

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
24 to 44	peat	moderately rapid	.34	3.8 to 4.3	30	
6 to 20		moderate to moderately rapid	.17 to .40	5.6	15 to 20	

Restrictive Features: permafrost at 48 to 64 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Black spruce-tamarack/tussock cottongrass woodland	Climax plant community
Mixed ericaceous/tussock cottongrass scrub2	Mid stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with black spruce-tamarack/tussock cottongrass woodland and mid-seral community with mixed ericaceous/tussock cottongrass scrub2. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce-tamarack/tussock cottongrass woodland	43	12	17	23	11
Mixed ericaceous/tussock cottongrass scrub2	44	7	16	25	10

Characteristics of Black spruce-tamarack/tussock cottongrass woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 15. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	<i>Picea mariana</i>	1.0	13	20	60	28
TS	PIMA	<i>Picea mariana</i>	0.1	10	25	33	18
TS	LALA	<i>Larix laricina</i>	0.1	6	20	27	13
SL-SM	B EGL	<i>Betula glandulosa</i>	0.1	8	30	100	28
SL-SM	SAPU15	<i>Salix pulchra</i>	0.1	5	25	53	16
SL-SM	LEGR	<i>Ledum groenlandicum</i>	0.1	7	15	27	14
SD-SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	2.0	21	40	100	46
SD-SL	VAUL	<i>Vaccinium uliginosum</i>	0.1	9	20	87	28
SD-SL	CHCA2	<i>Chamaedaphne calyculata</i>	0.1	11	30	67	27
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	3.0	9	20	93	29
GM	ERBR6	<i>Eriophorum brachyantherum</i>	25.0	49	70	73	60
GM	ERIOP	<i>Eriophorum</i>	55.0	70	85	27	43
L	LICHEN	total lichens	0.0	11	30	100	33
L1	CLADI3	<i>Cladina</i>	0.1	6	15	47	17
M	MOSS	total bryophytes-mosses and liverworts	15.0	50	90	100	71
M1	SPHAG2	<i>Sphagnum</i>	5.0	29	50	87	50
M1	PLSC70	<i>Pleurozium schreberi</i>	0.1	12	30	60	27
M1	ZZMOSS	unknown-mosses	2.0	9	20	73	26
M1	HYSP70	<i>Hylocomium splendens</i>	5.0	14	45	33	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	39	80	100	62
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	5	100	10
B	WATER	water	0.0	1	7	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	5.3	8.5	m	19
Tree regeneration	TR	0.3	0.9	1.8	m	19
Medium shrubs	SM	1.0	1.3	2.0	m	7
Low shrubs	SL	20.0	46.0	100.0	cm	21
Dwarf shrubs	SD	3.0	11.3	20.0	cm	15
Tall and medium grasses and grass-likes	GT, GM	20.0	49.3	130.0	cm	14
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.3	10.0	cm	31

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
					G
<i>Picea mariana</i>	71	4.8	3.0	2	G
	92	6.5	4.1		
	112	8.1	5.2		

Characteristics of Mixed ericaceous/tussock cottongrass scrub2

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 10. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy			
			Min.	Avg.	Max.		
SD-SM	LEPAD	Ledum palustre ssp. decumbens	0.1	36	60	100	60
SD-SM	B EGL	Betula glandulosa	0.1	12	50	100	35
SD-SL	VAUL	Vaccinium uliginosum	0.1	6	15	100	24
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	10	15	100	32
SD	EMNI	Empetrum nigrum	1.0	8	15	20	13
GM	ERBR6	Eriophorum brachyantherum	25.0	52	80	100	72
FD	RUCH	Rubus chamaemorus	0.1	8	20	100	28
L	LICHEN	total lichens	0.1	6	31	100	24
M	MOSS	total bryophytes-mosses and liverworts	5.0	36	60	100	60
M1	SPHAG2	Sphagnum	3.0	21	30	100	46
M1	ZZMOSS	unknown-mosses	2.0	8	15	100	28
M1	POCO38	Polytrichum commune	0.1	8	25	40	18
M1	PLSC70	Pleurozium schreberi	5.0	12	20	20	15
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	30.0	67	95	100	82
B	LITTER2	litter-woody debris >2.5 cm	0.0	9	20	100	30
B	SOIL	mineral-bare soil	0.0	0	3	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.5	5.2	8.0	m	6
Tree regeneration	TR	0.3	1.1	2.5	m	12
Medium shrubs	SM	1.0	1.3	1.5	m	7
Low shrubs	SL	20.0	58.9	100.0	cm	9
Dwarf shrubs	SD	1.0	7.9	15.0	cm	9
Tall and medium grasses and grass-likes	GT, GM	30.0	53.3	130.0	cm	9
Tall and medium forbs	FT, FM	20.0	43.3	80.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.0	10.0	cm	21

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements	
Picea mariana	35	6.4	3.7	Min.	1	G
	35	6.4	3.7	Avg.		
	35	6.4	3.7	Max.		

Map Unit Components

Common Name (Soils Name):

- Boreal-taiga/tussock loamy eolian slopes, frozen (Typic Histoturbels, coarse-loamy)
- Boreal-taiga/tussock mica rich silty terraces, frozen (Typic Histoturbels, coarse-silty)
- Boreal-taiga/tussock silty terraces, frozen (Typic Histoturbels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 1FW1 Boreal Terraces with Continuous Permafrost
(Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Complex)

1ST1	Boreal Terraces with Discontinuous Permafrost, Minchumina Basin (Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty-Cryofibrists, euic Association)
1STW	Boreal Terraces with Continuous Permafrost, Wet (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association)
2FG	Boreal Terraces with Continuous Permafrost, Very Wet (Typic Histoturbels, coarse-silty-Glacial Folistels, dysic Association)
3FP3	Boreal Mica-Rich Terraces and Flood Plains with Discontinuous Permafrost (Typic Histoturbels, coarse-silty-Fluventic Haploorthels, coarse-loamy-Typic Historthels, coarse-loamy Association)
3FU3	Boreal Eolian Plains and Dunes with Discontinuous Permafrost (Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-loamy-Typic Haplocryods, sandy Association, 0 to 38 percent slopes)

Geographically Associated Landtypes

131B_100—Loamy Flood Plains:

This site occurs on flood plains with very deep, well drained soils. The climax plant community is "White spruce-poplar/alder forest."

131B_102—Loamy Frozen Flood Plains:

This site occurs on high flood plains with soils that are well drained and moderately deep over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_104—Loamy Frozen Terraces:

This site occurs on slightly drier soils. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on flood plains. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

Gravelly and Sandy Terraces (131B_108)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Lowland Flood Plains & Terraces (131B.V1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	366	195 to 630
Slope Gradient (percent):	1	0 to 2
Aspect (clockwise direction):	non-influencing	
Landform:	stream terraces	

	<i>Frequency</i>
Flooding:	None
Ponding:	None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	482	380 to 602
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: silty eolian deposits over sandy and gravelly alluvium

Rooting Depth (cm): *RV:* 31 *Range:* 8 to 213

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
10	slightly decomposed plant material	moderately rapid	.34	6.1	30	
10	silt loam	moderate	.18	5.2	12	
2 to 9	very gravelly loamy sand; very gravelly coarse sand	rapid	.03	5.7 to 6.4		2

Restrictive Features: strongly contrasting textural stratification at 8 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Spruce/ericaceous woodland	Climax plant community
Black spruce/lichen woodland	Climax plant community on drier microsites
Aspen/bluejoint/kinnikinnick forest	Early stage of fire induced secondary succession
Aspen-spruce/lingonberry forest	Mid stage of fire induced secondary succession

Ecological Status-Transition Description:

Four plant communities are identified within this fire influenced site including a potential community with spruce/ericaceous woodland, a mid-seral community with aspen-spruce/lingonberry forest, and an early-seral community with aspen/bluejoint/kinnikinnick forest. Additionally, a drier potential community is identified where depth to sandy and gravelly material is somewhat shallower with black spruce/lichen woodland. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Spruce/ericaceous woodland	76	9	21	35	9
Black spruce/lichen woodland	42	10	18	25	5
Aspen/bluejoint/kinnikinnick forest	48	18	22	28	3
Aspen-spruce/lingonberry forest	59	12	24	48	5

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Aspen/bluejoint/kinnikinnick forest	POPR	Poa pratensis

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Spruce/ericaceous woodland	GOREO2	Goodyera repens var. ophioides
Aspen/bluejoint/kinnikinnick forest	GEDEY	Gentianopsis detonsa ssp. yukonensis
Aspen-spruce/lingonberry forest	GOREO2	Goodyera repens var. ophioides

Characteristics of Spruce/ericaceous woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 9. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value
			Canopy Cover	Constancy		
			Min.	Avg.	Max.	
TT	PIGL	Picea glauca	10.0	19	30	44
TM	PIMA	Picea mariana	7.0	22	35	33
TM	PIGL	Picea glauca	15.0	18	20	22
SM	BEGL	Betula glandulosa	0.1	12	45	78
SD-SL	VAUL	Vaccinium uliginosum	10.0	18	30	100

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	LEPAD	Ledum palustre ssp. decumbens	5.0	14	40	56	28
SL	LEGR	Ledum groenlandicum	0.1	8	15	44	19
SD	EMNI	Empetrum nigrum	5.0	18	50	100	42
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	16	35	100	40
SD	DRIN4	Dryas integrifolia	5.0	6	7	22	11
L	LICHEN	total lichens	1.0	15	35	100	39
L1	STERE2	Stereocaulon	1.0	10	20	44	21
M	MOSS	total bryophytes-mosses and liverworts	35.0	80	95	100	89
M1	HYSP70	Hylocomium splendens	5.0	41	65	89	60
M1	PLSC70	Pleurozium schreberi	10.0	34	65	67	48
M1	ZZMOSS	unknown-mosses	0.1	7	15	100	26
M1	PTCR70	Ptilium crista-castrensis	4.0	11	20	56	25
M1	SPHAG2	Sphagnum	0.1	8	20	44	19
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	12	30	100	35
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	5	100	14
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	12.1	18.0	m	9
Tree regeneration	TR	4.0	4.0	4.0	m	1
Tall shrubs	ST	4.5	4.5	4.5	m	1
Medium shrubs	SM	1.4	1.9	2.4	m	10
Low shrubs	SL	40.0	70.0	100.0	cm	7
Dwarf shrubs	SD	8.0	11.6	18.0	cm	7
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.1	10.0	cm	17

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	133	22.0	12.8		
	178	30.5	17.1		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
13.8	17.0	20.7	5

Characteristics of Black spruce/lichen woodland

Ecological Status: Climax plant community on drier microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIMA	Picea mariana	10.0	10	10	40	20
TT	PIGL	Picea glauca	5.0	5	5	20	10
TT	POTR5	Populus tremuloides	5.0	5	5	20	10
TM	PIMA	Picea mariana	7.0	12	20	60	27
TR	PIMA	Picea mariana	10.0	10	10	40	20
SM	BEGL	Betula glandulosa	0.1	12	50	100	35

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	VAUL	Vaccinium uliginosum	10.0	16	30	100	40
SL	LEPAD	Ledum palustre ssp. decumbens	40.0	40	40	20	28
SL	LEGR	Ledum groenlandicum	5.0	8	10	80	25
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	13	25	100	36
SD	EMNI	Empetrum nigrum	5.0	8	15	100	28
L	LICHEN	total lichens	60.0	72	85	100	85
L1	CLRA61	Cladina rangiferina group	15.0	24	40	100	49
L1	CLMI61	Cladina mitis group	15.0	22	30	60	36
L1	NEAR60	Nephroma arcticum	0.1	7	15	100	26
L1	CLST60	Cladina stellaris	3.0	6	10	100	24
L1	CLADI3	Cladina	5.0	8	10	60	22
L1	CLADO3	Cladonia	0.1	10	20	40	20
L1	CLMU60	Cladonia multiformis	0.1	5	10	60	17
L1	CLUN61	Cladonia uncialis group	5.0	5	5	40	14
L1	STERE2	Stereocaulon	0.1	5	10	40	14
M	MOSS	total bryophytes-mosses and liverworts	30.0	38	40	100	62
M1	PLSC70	Pleurozium schreberi	5.0	15	25	100	39
M1	HYSP70	Hylocomium splendens	2.0	11	20	100	33
M1	ZZMOSS	unknown-mosses	5.0	5	5	100	22
M1	POCO38	Polytrichum commune	5.0	5	5	40	14
M1	DICRA8	Dicranum	5.0	5	5	20	10
M1	RHTR70	Rhytidiadelphus triquetrus	5.0	5	5	20	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.1	12	30	100	35
B	LITTER2	litter-woody debris >2.5 cm	0.1	2	2	100	14
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	10.0	15.0	m	5
Tree regeneration	TR	1.3	2.2	3.0	m	2
Medium shrubs	SM	1.3	1.6	2.0	m	5
Low shrubs	SL	20.0	36.0	50.0	cm	5
Dwarf shrubs	SD	8.0	8.5	9.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	20.0	20.0	20.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	3.3	4.0	cm	10

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	76	17.3	10.4	2	B
	76	18.0	10.7		
	77	18.8	11.0		
Picea mariana	44	15.2	8.2	2	B
	54	15.7	8.5		
	64	16.3	8.8		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
11.5	12.6	13.8	2

Characteristics of Aspen/bluejoint/kinnikinnick forest

Ecological Status: Early stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIMA	Picea mariana	7.0	7	7	33	15
TT	PIGL	Picea glauca	5.0	5	5	33	13
TM	POTR5	Populus tremuloides	35.0	38	40	67	50
TR	POTR5	Populus tremuloides	75.0	75	75	33	50
SM	SAPS	Salix pseudomonticola	5.0	5	5	33	13
SL	LEGR	Ledum groenlandicum	7.0	8	10	67	23
SL	ROAC	Rosa acicularis	15.0	15	15	33	22
SL	SHCA	Shepherdia canadensis	10.0	10	10	33	18
SD	ARUV	Arctostaphylos uva-ursi	2.0	9	20	100	30
SD	LIBO3	Linnaea borealis	15.0	15	15	33	22
GT	LEIN6	Leymus innovatus	35.0	35	35	33	34
GT	CACA4	Calamagrostis canadensis	5.0	10	15	67	26
FD	COCA13	Cornus canadensis	10.0	10	10	33	18
FD	EQAR	Equisetum arvense	5.0	5	5	33	13
L	LICHEN	total lichens	0.1	10	25	100	32
L1	CLADO3	Cladonia	20.0	20	20	33	26
L1	CLCO19	Cladonia cornuta	5.0	5	5	33	13
M	MOSS	total bryophytes-mosses and liverworts	20.0	28	40	100	53
M1	ZZMOSS	unknown-mosses	10.0	15	20	100	39
M1	POCO38	Polytrichum commune	5.0	13	25	100	36
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	50.0	60	70	100	77
B	LITTER2	litter-woody debris >2.5 cm	1.0	12	20	100	35
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	10.6	18.0	m	5
Tree regeneration	TR	0.5	0.5	0.5	m	1
Medium shrubs	SM	1.5	2.0	2.5	m	3
Low shrubs	SL	70.0	70.0	70.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	130.0	130.0	130.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	1.9	5.0	cm	4

Characteristics of Aspen-spruce/lingonberry forest

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	20.0	20	20	20	20
TT	POTR5	Populus tremuloides	2.0	6	10	40	15
TM	POTR5	Populus tremuloides	5.0	13	25	60	28
TM	PIMA	Picea mariana	2.0	11	20	40	21
TR	PIMA	Picea mariana	0.1	6	10	80	22
SM-ST	SABE2	Salix bebbiana	3.0	22	40	40	30
SM	BEGL	Betula glandulosa	0.1	12	40	100	35

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	LEGR	Ledum groenlandicum	0.1	20	50	60	35
SL	VAUL	Vaccinium uliginosum	7.0	12	20	100	35
SL	LEPAD	Ledum palustre ssp. decumbens	0.1	11	25	80	30
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	7.0	30	50	100	55
SD	LIBO3	Linnaea borealis	5.0	12	20	40	22
FD	COCA13	Cornus canadensis	0.1	7	15	100	26
L	LICHEN	total lichens	5.0	14	20	100	37
L1	CLCO19	Cladonia cornuta	3.0	6	10	80	22
M	MOSS	total bryophytes-mosses and liverworts	40.0	58	70	100	76
M1	HYSP70	Hylocomium splendens	0.1	19	60	100	44
M1	ZZMOSS	unknown-mosses	5.0	16	40	100	40
M1	POCO38	Polytrichum commune	5.0	18	35	80	38
M1	POPI10	Polytrichum piliferum	40.0	40	40	20	28
M1	PLSC70	Pleurozium schreberi	5.0	5	5	40	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	30.0	46	60	100	68
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	10	100	20
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	10.7	18.0	m	6
Tree regeneration	TR	0.4	2.2	4.0	m	4
Tall shrubs	ST	3.5	3.5	3.5	m	1
Medium shrubs	SM	2.0	2.2	2.5	m	4
Low shrubs	SL	20.0	47.5	90.0	cm	4
Dwarf shrubs	SD	7.0	11.0	20.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	140.0	140.0	140.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.7	3.2	10.0	cm	9

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea mariana	24	5.8	3.4	Min.	G
	24	5.8	3.4	Avg.	
	24	5.8	3.4	Max.	

Map Unit Components

Common Name (Soils Name):

Boreal-forested gravelly terraces (Typic Eutrocryepts, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

2ST Boreal Terraces with Discontinuous Permafrost
(Typic Eutrocryepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes

131B_104—Loamy Frozen Terraces:

This site occurs on wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_255—Gravelly Flood Plains:

This site occurs on flood plains. The climax plant community is "White spruce-poplar woodland."

Similar Landtypes**131B_104—Loamy Frozen Terraces:**

This site occurs on wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_113—Loamy Frozen Slopes, Ice Cored:

This site occurs on soils that are moderately deep over permafrost. The climax plant community is "Black spruce/green alder/Labrador tea woodland."

131B_400—Loamy Frozen Slopes:

This site occurs on wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

131B_505—Loamy Channels:

This site occurs on soils that are wetter and have permafrost at moderate depths. The climax plant community is "Tamarack-black spruce/leatherleaf woodland."

Peat Plateaus (131B_111)**Ecoregion Classification**

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

Elevation (meters): RV 254 Range 149 to 599

Slope Gradient (percent): 0 0 to 3

Aspect (clockwise direction): non-influencing

Landform: peat plateaus on plains

Frequency

Flooding: None

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 480 Range 359 to 651

Annual Air Temperature (°C): -2.6 -2.9 to -2.4

Frost Free Days: 100 80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty eolian deposits

Rooting Depth (cm): RV: 48 Range: 18 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
45	peat	moderately rapid	.34	4.7	30	

Restrictive Features: permafrost at 45 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Black spruce-tamarack/lichen woodland	Climax plant community
Labrador tea/cloudberry scrub	Early stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with black spruce-tamarack/lichen woodland and an early-seral community with Labrador tea/cloudberry scrub. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce-tamarack/lichen woodland	35	11	15	20	11
Labrador tea/cloudberry scrub	17	12	14	16	3

Characteristics of Black spruce-tamarack/lichen woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 17. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent			Percent Constancy	Importance Value
			Canopy Cover	Min.	Avg.		
TM	PIMA	Picea mariana	10.0	16	20	53	29
TS	PIMA	Picea mariana	3.0	10	20	47	22
TS	LALA	Larix laricina	0.1	5	7	29	12
TR	PIMA	Picea mariana	0.1	7	20	76	23
SL-SM	BEGL	Betula glandulosa	0.1	6	15	82	22
SL	LEPAD	Ledum palustre ssp. decumbens	5.0	22	40	100	47
SL	VAUL	Vaccinium uliginosum	5.0	12	25	100	35
SL	CHCA2	Chamaedaphne calyculata	0.1	9	30	82	27
SD-SL	ANPO	Andromeda polifolia	0.1	6	40	65	20
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	2.0	9	35	100	30
GM	CAREX	Carex	0.1	8	35	29	15
GM	ERBR6	Eriophorum brachyantherum	0.1	7	20	24	13
FD-FM	RUCH	Rubus chamaemorus	0.1	6	15	100	24
L	LICHEN	total lichens	2.0	33	70	100	57
L1	CLADI3	Cladina	1.0	14	45	47	26
L1	CLRA61	Cladina rangiferina group	5.0	8	15	53	21
L1	CLADO3	Cladonia	0.1	7	20	59	20
L1	CLMI61	Cladina mitis group	5.0	12	20	24	17
L1	CLMU60	Cladonia multiformis	0.1	5	10	47	15
M	MOSS	total bryophytes-mosses and liverworts	35.0	65	95	100	81
M1	SPHAG2	Sphagnum	5.0	46	95	82	61
M1	PLSC70	Pleurozium schreberi	5.0	20	40	65	36
M1	ZZMOSS	unknown-mosses	2.0	7	15	65	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	8	20	100	28
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	5	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	2	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	4.9	9.0	m	20
Tree regeneration	TR	0.3	1.2	2.0	m	13
Medium shrubs	SM	1.0	1.1	1.4	m	5
Low shrubs	SL	20.0	37.6	100.0	cm	29
Dwarf shrubs	SD	4.0	8.3	10.0	cm	18
Tall and medium grasses and grass-likes	GT, GM	30.0	60.0	130.0	cm	5
Tall and medium forbs	FT, FM	20.0	20.0	20.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.9	10.0	cm	35

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea mariana	181	9.9	4.0	Min.	G
	181	9.9	4.0	Avg.	
	181	9.9	4.0	Max.	

Characteristics of Labrador tea/cloudberry scrub

Ecological Status: Early stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	Picea mariana	5.0	6	6	67	20
TS	PIMA	Picea mariana	5.0	5	5	33	13
TR	PIMA	Picea mariana	1.0	10	25	100	32
SD-SL	LEPAD	Ledum palustre ssp. decumbens	40.0	48	65	100	69
SL	CHCA2	Chamaedaphne calyculata	4.0	10	15	100	32
SD-SL	VAUL	Vaccinium uliginosum	1.0	9	15	100	30
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	8	15	100	28
GM	ERBR6	Eriophorum brachyantherum	0.1	5	10	67	18
FD	RUCH	Rubus chamaemorus	15.0	32	45	100	57
L	LICHEN	total lichens	2.0	9	20	100	30
L1	CLMI61	Cladina mitis group	5.0	5	5	33	13
M	MOSS	total bryophytes-mosses and liverworts	40.0	65	80	100	81
M1	SPHAG2	Sphagnum	15.0	42	65	100	65
M1	ZZMOSS	unknown-mosses	10.0	10	10	100	32
M1	PLSC70	Pleurozium schreberi	20.0	20	20	33	26
M1	POLYT5	Polytrichum	5.0	10	15	67	26
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	32	70	100	57
B	LITTER2	litter-woody debris >2.5 cm	5.0	9	15	100	30
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	5.0	6.0	m	4
Tree regeneration	TR	0.7	1.1	1.5	m	3
Medium shrubs	SM	1.1	1.3	1.5	m	3
Low shrubs	SL	30.0	33.3	40.0	cm	3
Dwarf shrubs	SD	3.0	9.3	20.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	40.0	40.0	40.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.9	8.0	cm	8

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea mariana	18	4.6	3.0	<i>Min.</i>	1	G
	18	4.6	3.0	<i>Avg.</i>		
	18	4.6	3.0	<i>Max.</i>		

Map Unit Components**Common Name (Soils Name):**

Boreal-taiga peat plateaus, frozen (Glacic Folistels, dysic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

2FG	Boreal Terraces with Continuous Permafrost, Very Wet (Typic Histoturbels, coarse-silty-Glacic Folistels, dysic Association)
3FG3	Boreal Loess Plains and Peat Plateaus with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Glacic Folistels, dysic Association, 0 to 14 percent slopes)
3FU2	Boreal Peat Plateaus and Loess Plains with Continuous Permafrost (Glacic Folistels, dysic-Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes)

Geographically Associated Landtypes**131B_105—Loamy Frozen Terraces, Wet:**

This site occurs on terraces with wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce-tamarack/tussock cottongrass woodland."

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on loess plains and hills with wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

131B_530—Depressions, Bogs:

This site occurs on bogs with very deep, wetter soils. The climax plant community is "Sedge/sphagnum moss bog."

Similar Landtypes**131B_185—Sandy Hills:**

This site occurs on very deep soils that are somewhat excessively drained. The climax plant community is "Black spruce/lingonberry/lichen woodland."

Loamy Frozen Slopes, Ice Cored (131B_113)**Ecoregion Classification**

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Eolian Lowlands (131B.L1)

Physiographic Features

Elevation (meters):	RV 342	Range 165 to 649
Slope Gradient (percent):	20	14 to 33
Aspect (clockwise direction):	non-influencing	
Landform:	hills	

Landform Positions: backslopes; shoulders

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	479	359 to 651
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty eolian deposits

Rooting Depth (cm): RV: 38 Range: 18 to 96

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
23	slightly decomposed plant material	moderately rapid	.34	4.8	30	
4	mucky silt loam	moderate	.26	5.5	12	

Restrictive Features: permafrost at 27 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Black spruce/green alder/Labrador tea woodland

Paper birch/prickly rose forest2

Mixed paper birch-spruce/green alder forest

Ecological Status

Climax plant community

Mid stage of fire induced secondary succession

Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant communities are identified on this fire influenced site including a potential community with black spruce/green alder/Labrador tea woodland, a mid-seral community with paper birch/prickly rose forest2 and a late-seral community with mixed paper birch-spruce/green alder forest. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/green alder/Labrador tea woodland	33	11	15	19	6
Paper birch/prickly rose forest2	16	12	13	14	2
Mixed paper birch-spruce/green alder forest	21	16	16	16	2

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type

Paper birch/prickly rose forest2

Symbol

GOREO2

Scientific Name

Goodyera repens var. ophioides

Characteristics of Black spruce/green alder/Labrador tea woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 9. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Importance	
			Min.	Avg.	Max.	Constancy	Value
TT	PIMA	Picea mariana	7.0	16	25	22	19
TM	PIMA	Picea mariana	7.0	20	35	67	37
TR	PIMA	Picea mariana	0.1	5	10	44	15
SL-ST	ALVIC	Alnus viridis ssp. crispa	0.1	17	55	89	39
SL-SM	BEGL	Betula glandulosa	0.1	10	25	78	28
SD-SL	LEPAD	Ledum palustre ssp. decumbens	10.0	24	35	78	43
SL	VAUL	Vaccinium uliginosum	0.1	11	20	78	29
SL	LEGR	Ledum groenlandicum	0.1	18	60	44	28
SL	CHCA2	Chamaedaphne calyculata	5.0	5	5	33	13
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	15	30	100	39
SD	EMNI	Empetrum nigrum	0.1	8	15	22	13
GM	CABI5	Carex bigelowii	0.1	5	15	33	13
GM	ERBR6	Eriophorum brachyantherum	1.0	6	10	22	11
L	LICHEN	total lichens	0.0	8	30	100	28
L1	NEAR60	Nephroma arcticum	0.1	5	10	33	13
M	MOSS	total bryophytes-mosses and liverworts	70.0	85	95	100	92
M1	SPHAG2	Sphagnum	0.1	49	90	100	70
M1	PLSC70	Pleurozium schreberi	30.0	34	40	56	44
M1	HYSP70	Hylocomium splendens	5.0	18	55	56	32
M1	ZZMOSS	unknown-mosses	0.1	6	15	67	20
M1	THRE7	Thuidium recognitum	5.0	5	5	22	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.1	11	35	100	33
B	ROCK	mineral-surface rock fragments	0.0	1	5	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	2	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	WATER	water	0.0	0	2	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	7.3	15.0	m	11
Tree regeneration	TR	1.0	1.5	2.0	m	5
Tall shrubs	ST	3.5	4.1	4.5	m	3
Medium shrubs	SM	1.2	1.9	3.0	m	4
Low shrubs	SL	20.0	54.7	100.0	cm	19
Dwarf shrubs	SD	4.0	9.1	12.0	cm	9
Tall and medium grasses and grass-likes	GT, GM	40.0	45.0	50.0	cm	2
Tall and medium forbs	FT, FM	20.0	52.0	100.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	5.5	10.0	cm	13

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea mariana	128	10.4	5.8	2	G
	128	11.9	5.9		
	129	13.5	6.1		

Characteristics of Paper birch/prickly rose forest2

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Importance	
			Min.	Avg.	Max.	Constancy	Value
TT	BENE4	Betula neoalaskana	85.0	88	90	40	59
TT	PIMA	Picea mariana	20.0	20	20	20	20
TM	BENE4	Betula neoalaskana	70.0	77	80	60	68
ST	ALVIC	Alnus viridis ssp. crispa	10.0	12	15	40	22
ST	SABE2	Salix bebbiana	3.0	6	10	60	19
SL-SM	ROAC	Rosa acicularis	5.0	35	65	100	59
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	5	10	80	20
GM-GT	CACA4	Calamagrostis canadensis	4.0	12	20	80	31
GM	ZZGRASS	unknown-grasses	5.0	12	20	40	22
FD-FM	EQSY	Equisetum sylvaticum	0.1	15	60	100	39
FD	COCA13	Cornus canadensis	0.1	9	25	100	30
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	8	20	100	28
M1	HYSP70	Hylocomium splendens	7.0	11	15	40	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	60.0	73	85	100	85
B	LITTER2	litter-woody debris >2.5 cm	5.0	8	15	100	28
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	12.1	24.0	m	9
Tree regeneration	TR	2.5	2.5	2.5	m	1
Tall shrubs	ST	4.0	4.7	5.5	m	5
Medium shrubs	SM	1.0	1.2	1.5	m	3
Low shrubs	SL	30.0	50.0	100.0	cm	10
Dwarf shrubs	SD	10.0	13.2	18.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	30.0	70.0	130.0	cm	4
Tall and medium forbs	FT, FM	10.0	47.5	100.0	cm	8
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	7.4	10.0	cm	7

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	71	29.5	18.6		
	74	36.3	20.7		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
4.6	4.6	4.6	1

Characteristics of Mixed paper birch-spruce/green alder forest

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Importance	
			Min.	Avg.	Max.	Constancy	Value
TT	PIGL	<i>Picea glauca</i>	0.1	15	30	67	32
TT	BENE4	<i>Betula neoalaskana</i>	10.0	22	35	33	27
TT	PIMA	<i>Picea mariana</i>	20.0	20	20	17	18
TM	BENE4	<i>Betula neoalaskana</i>	15.0	20	25	67	37
TM	PIMA	<i>Picea mariana</i>	10.0	17	20	50	29
TS	PIGL	<i>Picea glauca</i>	5.0	5	5	33	13
TR	PIMA	<i>Picea mariana</i>	5.0	8	10	33	16
SM-ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	5.0	24	60	100	49
SL	LEGR	<i>Ledum groenlandicum</i>	1.0	11	15	83	30
SL	ROAC	<i>Rosa acicularis</i>	0.1	9	15	100	30
SL	SPST3	<i>Spiraea stevenii</i>	5.0	8	10	50	20
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	3.0	10	20	100	32
GT	CACA4	<i>Calamagrostis canadensis</i>	10.0	10	10	17	13
FM	EQSY	<i>Equisetum sylvaticum</i>	5.0	11	20	83	30
FM	EQAR	<i>Equisetum arvense</i>	5.0	5	5	33	13
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	37	85	100	61
M1	SPHAG2	Sphagnum	0.1	32	85	50	40
M1	HYSP70	<i>Hylocomium splendens</i>	15.0	28	40	33	30
M1	PLSC70	<i>Pleurozium schreberi</i>	5.0	5	5	17	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	53	85	100	73
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	10	100	22
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	9.9	16.0	m	15
Tree regeneration	TR	2.0	2.5	3.0	m	2
Tall shrubs	ST	4.0	5.1	8.0	m	7
Medium shrubs	SM	1.5	1.5	1.5	m	1
Low shrubs	SL	20.0	57.5	100.0	cm	12
Dwarf shrubs	SD	10.0	10.0	10.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	50.0	90.0	130.0	cm	2
Tall and medium forbs	FT, FM	20.0	39.2	100.0	cm	12
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	8.6	10.0	cm	9

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
<i>Picea glauca</i>	60	18.3	13.7	1	B
	60	18.3	13.7		
	60	18.3	13.7		
<i>Picea mariana</i>	54	17.8	13.4	2	B
	54	18.3	13.4		
	54	18.8	13.4		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
m ² / ha			of Stands
17.2	17.2	17.2	1

Map Unit Components**Common Name (Soils Name):**

Boreal-taiga silty loess hills, frozen (Typic Umbrorthels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

3FU4	Boreal Loess Plains, Hills, and Drains with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 2 to 35 percent slopes)
3Y	Boreal Ice Cored Loess Hills and Plains with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 0 to 26 percent slopes)

Geographically Associated Landtypes**131B_400—Loamy Frozen Slopes:**

This site occurs on more gentle slopes with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on loess plains and hills with wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

131B_530—Depressions, Bogs:

This site occurs on bogs with very deep and wetter soils. The climax plant community is "Sedge/sphagnum moss bog."

Similar Landtypes**131B_104—Loamy Frozen Terraces:**

This site occurs on wetter soils on terraces. The climax plant community is "Black spruce-tamarack/Labrador tea

131B_108—Gravelly and Sandy Terraces:

This site occurs on very deep soils that are very shallow to sand and gravel. The climax plant community is "Spruce/ericaceous woodland."

131B_400—Loamy Frozen Slopes:

This site occurs on more gentle slopes with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

131B_505—Loamy Channels:

This site occurs on wetter soils in flooded channels. The climax plant community is "Tamarack-black spruce/leatherleaf woodland."

Loamy Wet Flood Plains (131B_153)**Ecoregion Classification**

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)

Soil Features

Parent Materials: silty alluvium

Rooting Depth (cm): RV: 20 Range: 8 to 38

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4	slightly decomposed plant material	moderately rapid	.34	7.1	80	
16	silt loam	moderate	.18	7.1	16	

Water Table (May to September): 0 to 60 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Feltleaf willow-thinleaf alder scrub, wet	Climax plant community

Ecological Status-Transition Description:

A single plant community with feltleaf willow-thinleaf alder scrub, wet is identified on this site. Flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Feltleaf willow-thinleaf alder scrub, wet	62	5	22	34	4

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Feltleaf willow-thinleaf alder scrub, wet	POPRP	Poa pratensis ssp. pratensis

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Feltleaf willow-thinleaf alder scrub, wet	RAPE2	Ranunculus pensylvanicus
	SAEXI	Salix exigua ssp. interior
	SALUL	Salix lucida ssp. lasiandra
	TYLA	Typha latifolia

Characteristics of Feltleaf willow-thinleaf alder scrub, wet

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TR	POBA2	Populus balsamifera	10.0	10	10	25	16
SM-ST	SAAL	Salix alaxensis	5.0	30	65	100	55
SM-ST	ALTE2	Alnus tenuifolia	25.0	32	40	75	49
ST	SALUL	Salix lucida ssp. lasiandra	20.0	20	20	25	22
ST	SAPU15	Salix pulchra	10.0	10	10	25	16
GT	CACA4	Calamagrostis canadensis	0.1	18	50	75	37
GT	CAAQ	Carex aquatilis	3.0	6	10	75	21
GT	ARFU2	Arctophila fulva	5.0	5	5	25	11
FT	EQFL	Equisetum fluviatile	60.0	68	75	50	58
FT	POAC	Polemonium acutiflorum	10.0	10	10	25	16
FM	EQAR	Equisetum arvense	15.0	32	50	50	40
FM	EQVA	Equisetum variegatum	15.0	15	15	50	27
FM	EQPR	Equisetum pratense	5.0	5	5	25	11

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
FD	RUAR	Rubus arcticus	5.0	5	5	25	11
FD	VIEPR	Viola epipsila ssp. repens	5.0	5	5	25	11
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.1	35	90	100	59
M1	ZZMOSS	unknown-mosses	0.1	20	40	50	32
M1	PLAGI7	Plagiomnium	30.0	30	30	25	27
M1	CALLI10	Calliergon	20.0	20	20	25	22
B	SOIL	mineral-bare soil	0.0	41	80	100	64
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	30	50	100	55
B	LITTER2	litter-woody debris >2.5 cm	2.0	7	15	100	26
B	WATER	water	0.0	4	10	100	20
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	1.1	1.1	1.1	m	1
Tall shrubs	ST	3.0	5.0	6.0	m	3
Medium shrubs	SM	1.3	1.8	2.5	m	4
Tall and medium grasses and grass-likes	GT, GM	110.0	130.0	150.0	cm	2
Tall and medium forbs	FT, FM	20.0	75.7	130.0	cm	7
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	1.5	3.0	cm	3

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian scrub silty flood plains, wet (Typic Cryaquents, coarse-silty)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

1FP4 Boreal Flood Plains and Terraces with Discontinuous Permafrost, Wet
(Fluvaquentic Historthels, coarse-loamy-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euc Complex)

Geographically Associated Landtypes**131B_102—Loamy Frozen Flood Plains:**

This site occurs on high flood plains with well drained and moderately deep soils over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on soils that have permafrost at moderate depths. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

131B_501—Organic Depressions, Fens:

This site occurs on slightly lower positions in cutoff meanders with wetter soils. The climax plant community is "Sedge wet meadow."

Loamy Wet Flood Plains, Frozen (131B_156)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)

Lowland Flood Plains & Terraces (131B.V1)

Physiographic Features

	<i>RV</i>	<i>Range</i>	
Elevation (meters):	200	160 to 307	

Slope Gradient (percent):	1	0 to 1	
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Aspect (clockwise direction): non-influencing

Landform: flood plains

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Occasional	Brief	May	Sep

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>	
Annual Precipitation (millimeters):	392	336 to 565	

Annual Air Temperature (°C):	-2.7	-3.0 to -2.5	
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Frost Free Days:	100	80 to 110	
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Soil Features

Parent Materials: mossy organic material and/or woody organic material over sandy and silty alluvium
sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): *RV:* 39 *Range:* 21 to 84

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
20	mucky peat	moderately rapid	.34	4.7	15	
5 to 19	very fine sandy loam, muck	moderate or moderately rapid	.16 to .26	6.7 to 6.9		20 to 25
22		moderate	.15	7.0		20

Restrictive Features: permafrost at 41 cm
strongly contrasting textural stratification at 20 to 84 cm in some components

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained or very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
White spruce-tamarack/thinleaf alder forest	Climax plant community
Diamondleaf willow-shrub birch/bluejoint scrub	Early stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire and flooding influenced site including a potential community with white spruce-tamarack/thinleaf alder forest and an early-seral community with diamondleaf willow-shrub birch/bluejoint scrub. Flooding and fire are considered transitional pathways between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce-tamarack/thinleaf alder forest	133	21	34	43	18
Diamondleaf willow-shrub birch/bluejoint scrub	12	12	12	12	1

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
White spruce-tamarack/thinleaf alder forest	POPR	Poa pratensis

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
White spruce-tamarack/thinleaf alder forest	CASTS	Calamagrostis stricta ssp. stricta
	GOREO2	Goodyera repens var. ophioides
	RINA99	Ricciocarpus natans
	STLO	Stellaria longifolia

Characteristics of White spruce-tamarack/thinleaf alder forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 18. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	5.0	13	25	61	28
TT	LALA	Larix laricina	0.1	14	55	50	26
TM	LALA	Larix laricina	0.1	8	25	44	19
SM-ST	ALTE2	Alnus tenuifolia	2.0	14	40	83	34
SM-ST	SAPU15	Salix pulchra	0.1	12	45	67	28
SM-ST	ALVIC	Alnus viridis ssp. crispa	0.1	15	55	22	18
SM-ST	SAAL	Salix alaxensis	0.1	7	40	33	15
SL-SM	ROAC	Rosa acicularis	0.1	6	25	78	22
SL-SM	MYGA	Myrica gale	0.1	13	45	28	19
SM	B EGL	Betula glandulosa	0.1	5	15	61	17
SL-SM	SARI4	Salix richardsonii	0.1	5	15	39	14
SL	VAUL	Vaccinium uliginosum	0.1	16	40	100	40
SL	LEGR	Ledum groenlandicum	1.0	7	10	83	24
SL	CHCA2	Chamaedaphne calyculata	0.1	7	50	56	20
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	12	40	89	33
SD	EMNI	Empetrum nigrum	0.1	7	15	67	22
GT	CACA4	Calamagrostis canadensis	0.1	18	60	78	37
FD-FM	EQAR	Equisetum arvense	0.1	22	65	83	43
FD	RUAR	Rubus arcticus	0.1	5	20	72	19
FD	COCA13	Cornus canadensis	0.1	5	15	56	17
FD	RUCH	Rubus chamaemorus	5.0	8	15	17	12
L	LICHEN	total lichens	0.1	2	10	100	14
M	MOSS	total bryophytes-mosses and liverworts	30.0	72	95	100	85
M1	HYSP70	Hylocomium splendens	15.0	41	65	89	60
M1	ZZMOSS	unknown-mosses	10.0	23	70	100	48
M1	SPHAG2	Sphagnum	0.1	7	20	56	20
M1	TONI70	Tomentypnum nitens	0.1	6	15	56	18
M1	PLSC70	Pleurozium schreberi	2.0	10	20	22	15
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	33	70	100	57
B	LITTER2	litter-woody debris >2.5 cm	2.0	6	15	100	24
B	WATER	water	0.0	2	15	100	14

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	SOIL	mineral-bare soil	0.0	1	7	100	10
B	ROCK	mineral-surface rock fragments	0.0	1	15	100	10

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	12.9	29.0	m	22
Tree regeneration	TR	2.0	2.2	2.5	m	2
Tall shrubs	ST	3.0	4.1	5.5	m	14
Medium shrubs	SM	1.0	1.8	2.5	m	12
Low shrubs	SL	30.0	61.9	110.0	cm	16
Dwarf shrubs	SD	4.0	8.3	20.0	cm	12
Tall and medium grasses and grass-likes	GT, GM	10.0	103.5	170.0	cm	17
Tall and medium forbs	FT, FM	30.0	53.1	130.0	cm	16
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	5.3	60.0	cm	38

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Larix laricina	48	11.7	11.3	4	B
	56	13.5	13.4		
	63	14.5	15.8		
Picea glauca	42	19.0	10.7	14	B
	127	26.1	15.0		
	288	42.4	25.6		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
12.6	15.5	19.6	8

Characteristics of Diamondleaf willow-shrub birch/bluejoint scrub

Ecological Status: Early stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM	SAPU15	Salix pulchra	45.0	45	45	100	67
SM	BEGL	Betula glandulosa	30.0	30	30	100	55
SL	CHCA2	Chamaedaphne calyculata	15.0	15	15	100	39
SL	VAUL	Vaccinium uliginosum	5.0	5	5	100	22
GT	CACA4	Calamagrostis canadensis	55.0	55	55	100	74
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	40.0	40	40	100	63
M1	ZZMOSS	unknown-mosses	25.0	25	25	100	50
M1	POLYT5	Polytrichum	10.0	10	10	100	32
M1	SPHAG2	Sphagnum	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	80.0	80	80	100	89
B	LITTER2	litter-woody debris >2.5 cm	20.0	20	20	100	45
B	WATER	water	5.0	5	5	100	22
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.2	0.2	0.2	m	1
Medium shrubs	SM	2.1	2.1	2.1	m	1
Low shrubs	SL	30.0	30.0	30.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.0	2.0	cm	1

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested loamy wet flood plains, frozen (Fluvaquentic Historthels, coarse-loamy)

Boreal-riparian woodland loamy flood plains, wet (Typic Cryaquents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1FP	Boreal Flood Plains with Discontinuous Permafrost, Minchumina Basin (Fluvaquentic Historthels, coarse-loamy-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryofluvents, coarse-loamy over sandy-skeletal Complex)
1FP4	Boreal Flood Plains and Terraces with Discontinuous Permafrost, Wet (Fluvaquentic Historthels, coarse-loamy-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euic Complex)

Geographically Associated Landtypes**131B_101—Loamy High Flood Plains:**

This site occurs on very deep, well drained soils. The climax plant community is "White spruce/alder forest."

131B_102—Loamy Frozen Flood Plains:

This site occurs on high flood plains with soils that are well drained and moderately deep over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_104—Loamy Frozen Terraces:

This site occurs on non-flooded terraces with wetter soils and permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_501—Organic Depressions, Fens:

This site occurs on cutoff meanders with wetter soils. The climax plant community is "Sedge wet meadow."

Similar Landtypes**131B_100—Loamy Flood Plains:**

This site occurs on very deep, well drained soils. The climax plant community is "White spruce-poplar/alder forest."

131B_101—Loamy High Flood Plains:

This site occurs on very deep, well drained soils. The climax plant community is "White spruce/alder forest."

131B_255—Gravelly Flood Plains:

This site occurs on very deep, soils that are very shallow to sand and gravel.. The climax plant community is "White spruce-poplar woodland."

Sandy Hills (131B_185)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	234	170 to 320

Slope Gradient (percent):	19	5 to 38
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Aspect (clockwise direction): non-influencing

Landform: hills

	Frequency
Flooding:	None

Ponding:	None
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Climatic Features

	RV	Range
Annual Precipitation (millimeters):	479	359 to 651

Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
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Frost Free Days:	100	80 to 110
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Soil Features

Parent Materials: silty eolian deposits over sandy eolian deposits

Rooting Depth (cm): RV: 29 Range: 9 to 52

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
7	slightly decomposed plant material	moderately rapid	.34	3.9	30	
2 to 7	silt loam	moderate	.31	5.3 to 5.6		16
2 to 13	silt loam; fine sand	moderate to rapid	.06 to .31	5.3 to 6.1		6 to 16

Restrictive Features: strongly contrasting textural stratification at 16 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Black spruce/lingonberry/lichen woodland	Climax plant community
Broadleaf hardwood woodland	Early stage of fire induced secondary succession
Black spruce-mixed broadleaf hardwood forest	Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant communities are identified within this fire influenced site, including a potential community with black spruce/lingonberry/lichen woodland, an early-seral community with broadleaf hardwood forest, and a late-seral community with black spruce-mixed broadleaf forest. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/lingonberry/lichen woodland	24	9	12	16	6
Broadleaf hardwood woodland	22	13	16	18	2
Black spruce-mixed broadleaf hardwood forest	42	13	16	18	6

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Black spruce-mixed broadleaf hardwood forest	GOORE02	Goodyera repens var. ophioides

Characteristics of Black spruce/lingonberry/lichen woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	Picea mariana	25.0	25	25	83	46
TS	PIMA	Picea mariana	6.0	6	6	17	10
SM	ALVIC	Alnus viridis ssp. crispa	5.0	5	5	17	9
SL	LEGR	Ledum groenlandicum	1.0	12	25	67	28
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	10.0	24	35	100	49
SD	EMNI	Empetrum nigrum	0.1	11	25	100	33
SD	ARUV	Arctostaphylos uva-ursi	2.0	11	20	50	23
L	LICHEN	total lichens	3.0	50	80	100	71
L1	STERE2	Stereocaulon	1.0	23	50	67	39
L1	CLADI3	Cladina	0.1	12	20	50	24
L1	CLST60	Cladina stellaris	1.0	7	15	83	24
L1	NEAR60	Nephroma arcticum	0.1	6	15	100	24
L1	CLMI61	Cladina mitis group	0.1	7	15	50	19
L1	CLADO3	Cladonia	0.1	5	10	67	18
L1	CLRA61	Cladina rangiferina group	0.1	5	10	50	16
L1	CLMU60	Cladonia multiformis	5.0	5	5	50	16
M	MOSS	total bryophytes-mosses and liverworts	7.0	45	80	100	67
M1	HYSP70	Hylocomium splendens	3.0	28	55	67	43
M1	ZZMOSS	unknown-mosses	2.0	13	50	100	36
M1	POCO38	Polytrichum commune	0.1	11	30	50	23
M1	PLSC70	Pleurozium schreberi	5.0	8	10	50	20
M1	AUTU70	Aulacomnium turgidum	5.0	5	5	17	9
M1	PTCR70	Ptilium crista-castrensis	5.0	5	5	17	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.1	18	35	100	42
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	15	100	20
B	SOIL	mineral-bare soil	0.0	0	1	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.0	5.4	8.0	m	8
Tree regeneration	TR	0.1	0.7	1.1	m	3
Medium shrubs	SM	1.3	1.6	2.0	m	2
Low shrubs	SL	70.0	80.0	90.0	cm	3
Dwarf shrubs	SD	3.0	10.3	20.0	cm	4
Tall and medium forbs	FT, FM	20.0	60.0	130.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	3.6	8.0	cm	15

Characteristics of Broadleaf hardwood woodland

Ecological Status: Early stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TR	BENE4	Betula neoalaskana	5.0	10	15	100	32
TR	POTR5	Populus tremuloides	7.0	7	7	50	19
SM	SABE2	Salix bebbiana	5.0	5	5	50	16
SM	SAGL	Salix glauca	5.0	5	5	50	16
SD	ARUV	Arctostaphylos uva-ursi	15.0	20	25	100	45
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	15.0	18	20	100	42
SD	LIBO3	Linnaea borealis	5.0	5	5	50	16
FD-FM	GELI2	Geocaulon lividum	3.0	6	10	100	24
FD	EQPR	Equisetum pratense	5.0	5	5	50	16
L	LICHEN	total lichens	5.0	18	30	100	42
L1	CLADO3	Cladonia	2.0	11	20	100	33
L2	ZZCRUST	unknown-crustose and soil crust lichens	10.0	10	10	50	22
M	MOSS	total bryophytes-mosses and liverworts	20.0	30	40	100	55
M1	POLYT5	Polytrichum	7.0	21	35	100	46
M1	ZZMOSS	unknown-mosses	5.0	8	10	100	28
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	40.0	62	85	100	79
B	LITTER2	litter-woody debris >2.5 cm	7.0	16	25	100	40
B	SOIL	mineral-bare soil	0.1	3	5	100	17
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.3	7.1	14.0	m	4
Tree regeneration	TR	0.3	2.4	4.0	m	3
Medium shrubs	SM	1.8	1.8	1.8	m	1
Low shrubs	SL	20.0	20.0	20.0	cm	1
Dwarf shrubs	SD	6.0	6.0	6.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	130.0	130.0	130.0	cm	1
Tall and medium forbs	FT, FM	15.0	63.8	110.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.8	10.0	cm	5

Characteristics of Black spruce-mixed broadleaf hardwood forest

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIMA	Picea mariana	10.0	22	30	50	33
TT	POTR5	Populus tremuloides	5.0	32	60	33	32
TT	BENE4	Betula neoalaskana	5.0	10	20	83	29
TT	PIGL	Picea glauca	5.0	5	5	17	9
TT	POBA2	Populus balsamifera	5.0	5	5	17	9
TM	PIMA	Picea mariana	0.1	5	10	33	13
TM	PIGL	Picea glauca	7.0	7	7	17	11
TR	BENE4	Betula neoalaskana	0.1	7	20	50	19
TR	POTR5	Populus tremuloides	1.0	6	15	50	17
ST	ALVIC	Alnus viridis ssp. crispa	5.0	5	5	33	13
SL	LEGR	Ledum groenlandicum	0.1	7	20	83	24

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	VAUL	Vaccinium uliginosum	0.1	7	20	83	24
SL	LEPAD	Ledum palustre ssp. decumbens	5.0	5	5	17	9
SL	VIED	Viburnum edule	5.0	5	5	17	9
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	6.0	37	75	100	61
SD	ARUV	Arctostaphylos uva-ursi	20.0	20	20	17	18
SD	EMNI	Empetrum nigrum	0.1	5	20	67	18
GT	CACA4	Calamagrostis canadensis	0.1	7	20	67	22
GM	CAREX	Carex	10.0	10	10	17	13
FM	EQPR	Equisetum pratense	60.0	60	60	17	32
FD-FM	EQSY	Equisetum sylvaticum	0.1	8	20	67	23
FD	COCA13	Cornus canadensis	1.0	27	80	50	37
L	LICHEN	total lichens	0.0	15	60	100	39
L1	CLADI3	Cladina	3.0	9	15	33	17
L1	STERE2	Stereocaulon	0.1	8	15	33	16
M	MOSS	total bryophytes-mosses and liverworts	2.0	48	85	100	69
M1	HYSPT0	Hylocomium splendens	1.0	26	80	100	51
M1	PLSC70	Pleurozium schreberi	1.0	13	35	67	30
M1	ZZMOSS	unknown-mosses	1.0	7	15	100	26
M1	PTCR70	Ptilium crista-castrensis	0.1	5	10	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	40	100	100	63
B	LITTER2	litter-woody debris >2.5 cm	1.0	7	20	100	26
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.5	11.4	17.0	m	12
Tree regeneration	TR	0.5	2.2	4.0	m	7
Tall shrubs	ST	4.0	4.5	5.0	m	2
Medium shrubs	SM	1.5	1.7	2.0	m	3
Low shrubs	SL	50.0	81.7	100.0	cm	6
Dwarf shrubs	SD	5.0	10.4	15.0	cm	5
Tall and medium grasses and grass-likes	GT, GM	40.0	40.0	40.0	cm	1
Tall and medium forbs	FT, FM	20.0	43.3	60.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.5	10.0	cm	13

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea mariana	38	12.2	7.9	Min.	4	B
	74	15.0	11.0	Avg.		
	109	17.5	13.4	Max.		
Picea mariana	102	9.1	4.6	Min.	1	G
	102	9.1	4.6	Avg.		
	102	9.1	4.6	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
13.8	21.8	29.9	2

Map Unit Components

Common Name (Soils Name):

Boreal-forested sandy hills (Typic Haplocryods, sandy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

3FU3 Boreal Eolian Plains and Dunes with Discontinuous Permafrost
(Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-loamy-Typic Haplocryods, sandy Association, 0 to 38 percent slopes)

Geographically Associated Landtypes

131B_105—Loamy Frozen Terraces, Wet:

This site occurs on nearly level areas between dunes with wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce-tamarack/tussock cottongrass woodland."

131B_400—Loamy Frozen Slopes:

This site occurs on nearly level areas between dunes with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

Similar Landtypes

131B_111—Peat Plateaus:

This site occurs on soils that are moderately deep over permafrost. The climax plant community is "Black spruce-tamarack/lichen woodland."

Gravelly Flood Plains (131B_255)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)

Physiographic Features

Elevation (meters): RV 362 Range 192 to 624

Slope Gradient (percent): 1 0 to 2

Aspect (clockwise direction): non-influencing

Landform: flood plains

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Occasional	Brief	May	Sep
Ponding:	None			

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	482	380 to 602
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 38 Range: 17 to 81

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4	moderately decomposed plant material	moderately rapid	.34	6.2		80
4	stratified sand to silt	moderate	.15	6.7		20
11 to 19	extremely gravelly coarse sand	rapid	.06	7.6 to 7.8		2

Restrictive Features: strongly contrasting textural stratification at 8 cm

Water Table (May to September): none

Drainage Class: excessively drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
White spruce-poplar woodland	Climax plant community
Drummond mountain avens-herbaceous dwarf scrub	Climax plant community on drier microsites
White spruce/feathermoss woodland	Post climax plant community
Poplar/grayleaf willow/soapberry woodland	Early stage of primary succession on flood plains

Ecological Status-Transition Description:

Four plant communities are identified on this site including a potential with white spruce-poplar woodland; a drier micro-site with Drummonds mountain avens-herbaceous dwarf scrub where a slightly drier condition exists due to rapid channel incision which has resulted in slightly thinner surface deposits of alluvium than the potential; an early-successional community with poplar/grayleaf willow/soapberry woodland is described on slightly lower terraces with slightly higher flooding frequency; and an occasionally occurring post potential community with white spruce/feathermoss woodland is described for areas with slightly higher terrace height and associated lower flooding frequency or duration than the prevalent condition. Flooding is considered a transitional pathway between seral communities within this site as well as between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce-poplar woodland	80	21	28	36	6
Drummond mountain avens-herbaceous dwarf scrub	43	28	29	30	2
White spruce/feathermoss woodland	29	29	29	29	1
Poplar/grayleaf willow/soapberry woodland	21	21	21	21	1

Notable Plants:

Notable plants Include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
White spruce-poplar woodland	CAEB2	Carex eburnea
Drummond mountain avens-herbaceous dwarf scrub	EPL	Epilobium leptocarpum
	SAEX1	Salix exigua ssp. interior
White spruce/feathermoss woodland	GOREO2	Goodyera repens var. ophioides
Poplar/grayleaf willow/soapberry woodland	SASE4	Salix setchelliana

Characteristics of White spruce-poplar woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover		Percent Constancy	Importance Value
			Min.	Avg. Max.		
TT	POBA2	Populus balsamifera	5.0	10 15	57	24
TT	PIGL	Picea glauca	4.0	8 15	57	21
TM	PIGL	Picea glauca	5.0	8 10	29	15
TR	POBA2	Populus balsamifera	5.0	8 10	29	15

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	ALVIC	Alnus viridis ssp. crispa	0.1	39	70	71	53
ST	SAAL	Salix alaxensis	0.1	18	60	57	32
SL-SM	SHCA	Shepherdia canadensis	3.0	8	15	71	24
SM	SAGL	Salix glauca	5.0	10	15	43	21
SM	SANI10	Salix niphoclada	0.1	8	15	29	15
SL	JUCO6	Juniperus communis	10.0	17	20	43	27
SD	ARUV	Arctostaphylos uva-ursi	5.0	7	10	43	17
SD	ARRU6	Arctous rubra	0.1	8	15	29	15
SD	DRDR	Dryas drummondii	1.0	6	10	29	13
GM-GT	CACA4	Calamagrostis canadensis	0.1	23	60	43	31
GT	LEIN6	Leymus innovatus	5.0	8	10	29	15
FD	RUAR	Rubus arcticus	0.1	5	10	29	12
L	LICHEN	total lichens	0.0	8	50	100	28
L1	CLADO3	Cladonia	2.0	16	30	29	22
M	MOSS	total bryophytes-mosses and liverworts	5.0	39	70	100	62
M1	HYSP70	Hylocomium splendens	0.1	29	55	71	45
M1	ZZMOSS	unknown-mosses	5.0	16	25	86	37
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	30.0	55	85	100	74
B	LITTER2	litter-woody debris >2.5 cm	0.1	3	10	100	17
B	SOIL	mineral-bare soil	0.0	3	15	100	17
B	ROCK	mineral-surface rock fragments	0.0	0	2	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	8.0	15.8	22.0	m	9
Tree regeneration	TR	1.0	2.8	5.0	m	5
Tall shrubs	ST	4.0	4.9	6.0	m	6
Medium shrubs	SM	1.5	2.0	2.5	m	5
Low shrubs	SL	100.0	100.0	100.0	cm	5
Dwarf shrubs	SD	5.0	5.7	7.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	110.0	120.0	130.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.6	4.0	cm	7

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	60	22.4	15.2	2	B
	61	22.6	15.8		
	62	22.9	16.5		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
8.0	8.0	8.0	2

Characteristics of Drummond mountain avens-herbaceous dwarf scrub

Ecological Status: Climax plant community on drier microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TR	POBA2	Populus balsamifera	7.0	7	7	50	19
SM	SANI10	Salix niphoclada	0.1	5	10	100	22
SD	DRDR	Dryas drummondii	50.0	50	50	100	71
L	LICHEN	total lichens	0.0	2	5	100	14
L1	CLADO3	Cladonia	5.0	5	5	50	16
M	MOSS	total bryophytes-mosses and liverworts	2.0	14	25	100	37
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	50.0	52	55	100	72
B	ROCK	mineral-surface rock fragments	10.0	20	30	100	45
B	SOIL	mineral-bare soil	15.0	18	20	100	42
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	6.0	6.0	m	1
Tree regeneration	TR	2.0	2.0	2.0	m	1
Tall shrubs	ST	4.0	4.0	4.0	m	2
Medium shrubs	SM	1.5	1.5	1.5	m	1
Dwarf shrubs	SD	3.0	3.0	3.0	cm	1
Tall and medium forbs	FT, FM	40.0	60.0	80.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.2	0.4	0.5	cm	3

Characteristics of White spruce/feathermoss woodland

Ecological Status: Post climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	20.0	20	20	100	45
SL	VAUL	Vaccinium uliginosum	5.0	5	5	100	22
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	15.0	15	15	100	39
GT	LEIN6	Leymus innovatus	5.0	5	5	100	22
L	LICHEN	total lichens	7.0	7	7	100	26
L1	CLRA61	Cladina rangiferina group	5.0	5	5	100	22
M	MOSS	total bryophytes-mosses and liverworts	85.0	85	85	100	92
M1	HYSP70	Hylocomium splendens	50.0	50	50	100	71
M1	PLSC70	Pleurozium schreberi	20.0	20	20	100	45
M1	ZZMOSS	unknown-mosses	10.0	10	10	100	32
M1	POCO38	Polytrichum commune	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	15	15	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	29.0	29.0	29.0	m	1
Medium shrubs	SM	1.7	1.7	1.7	m	1
Low shrubs	SL	90.0	90.0	90.0	cm	1
Dwarf shrubs	SD	12.0	12.0	12.0	cm	1

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall and medium grasses and grass-likes	GT, GM	130.0	130.0	130.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	4.0	5.0	cm	2

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	127	25.9	18.3	Min.	2	B
	128	30.9	19.7	Avg		
	128	35.8	21.0	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
27.6	27.6	27.6	1

Characteristics of Poplar/grayleaf willow/soapberry woodland

Ecological Status: Early stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover		Percent Constancy	Importance Value
			Min.	Avg./Max.		
TR	POBA2	Populus balsamifera	15.0	15 15	100	39
SM	SAGL	Salix glauca	10.0	10 10	100	32
SM	SANI10	Salix niphoclada	5.0	5 5	100	22
SM	SHCA	Shepherdia canadensis	5.0	5 5	100	22
FD	OXCA4	Oxytropis campestris	15.0	15 15	100	39
L	LICHEN	total lichens	0.0	0 0	100	0
M	MOSS	total bryophytes-mosses and liverworts	50.0	50 50	100	71
B	ROCK	mineral-surface rock fragments	35.0	35 35	100	59
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	15 15	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.0	0 0	100	0
B	SOIL	mineral-bare soil	0.1	0 0	100	0
B	WATER	water	0.0	0 0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.3	1.3	1.3	m	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.2	0.2	0.2	cm	1

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested gravelly flood plains (Typic Cryorthents, sandy-skeletal)

Boreal-riparian forested gravelly high flood plains, Yukon-Kuskokwim (Typic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

2FP2	Boreal Schist Flood Plains with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex)
2FP3	Boreal Flood Plains with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex)
2ST2	Boreal Mid to High Level Flood Plains (Typic Cryorthents, sandy-skeletal Complex)

Geographically Associated Landtypes

131B_100—Loamy Flood Plains:

This site occurs on slightly higher positions with well drained soils with thick loamy surface textures. The climax plant community is "White spruce-poplar/alder forest."

131B_101—Loamy High Flood Plains:

This site occurs on higher positions with thick loamy surface textures. The climax plant community is "White spruce/alder forest."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren flood plains. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes

131B_100—Loamy Flood Plains:

This site occurs on soils with a thick loamy surface mantle. The climax plant community is "White spruce-poplar/alder forest."

131B_101—Loamy High Flood Plains:

This site occurs on soils with a thick loamy surface mantle. The climax plant community is "White spruce/alder forest."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on wetter soils that are moderately deep over permafrost. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

Loamy Frozen Slopes (131B_400)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	290	153 to 649
Slope Gradient (percent):	6	0 to 20

Aspect (clockwise direction): non-influencing

Landform: hills; plains

Landform Positions: footslopes; toeslopes

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	470	336 to 651
Annual Air Temperature (°C):	-2.6	-3.0 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty colluvium
mossy organic material and/or woody organic material over silty eolian deposits
mossy organic material and/or woody organic material over silty eolian deposits over loamy eolian deposits

Rooting Depth (cm): RV: 33 Range: 5 to 58

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
23 to 29	peat	moderately rapid	.34	3.8 to 4.8	30	
4 to 10	silt loam	moderate	.26	5.0 to 5.5	15	

Restrictive Features: permafrost at 39 to 58 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Black spruce/Labrador tea woodland	Climax plant community

Ecological Status-Transition Description:

A single plant community with black spruce/Labrador tea woodland is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/Labrador tea woodland	56	9	16	24	42

Characteristics of Black spruce/Labrador tea woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 49. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	Picea mariana	10.0	20	55	88	42
SD-SM	LEPAD	Ledum palustre ssp. decumbens	3.0	21	60	88	43
SL-SM	BEGL	Betula glandulosa	0.1	5	20	100	22
SD-SL	VAUL	Vaccinium uliginosum	2.0	12	25	94	34
SL	LEGR	Ledum groenlandicum	0.1	20	60	29	24
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	3.0	12	35	98	34
SD	EMNI	Empetrum nigrum	0.1	8	30	69	23
GM	CABI5	Carex bigelowii	0.1	8	50	57	21
FD	RUCH	Rubus chamaemorus	0.1	7	25	98	26
L	LICHEN	total lichens	0.1	25	75	100	50
L1	CLRA61	Cladina rangiferina group	0.1	6	15	80	22
L1	CLMI61	Cladina mitis group	0.1	7	20	49	19
L1	CLADI3	Cladina	0.1	9	25	33	17
M	MOSS	total bryophytes-mosses and liverworts	30.0	78	95	100	88
M1	SPHAG2	Sphagnum	0.1	35	85	86	55
M1	PLSC70	Pleurozium schreberi	10.0	28	85	86	49
M1	HYSP70	Hylocomium splendens	0.1	16	40	43	26
M1	ZZMOSS	unknown-mosses	0.1	8	20	86	26
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	7	35	100	26
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	5	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	6.1	11.0	m	57
Tree regeneration	TR	0.1	1.2	4.5	m	35
Tall shrubs	ST	5.0	5.0	5.0	m	1
Medium shrubs	SM	1.0	1.5	2.5	m	27
Low shrubs	SL	20.0	49.0	100.0	cm	64
Dwarf shrubs	SD	2.0	9.3	20.0	cm	42
Tall and medium grasses and grass-likes	GT, GM	20.0	42.3	170.0	cm	22
Tall and medium forbs	FT, FM	15.0	30.9	70.0	cm	16
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.5	4.5	10.0	cm	110

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea mariana	58	8.6	5.8	Min.	1	B
	58	8.6	5.8	Avg.		
	58	8.6	5.8	Max.		
Picea mariana	55	7.1	3.4	Min.	9	G
	122	8.2	5.3	Avg.		
	163	9.7	6.7	Max.		

Map Unit Components**Common Name (Soils Name):**

- Boreal-taiga loamy eolian slopes, frozen (Typic Historthels, coarse-loamy)
- Boreal-taiga silty colluvial slopes, frozen (Typic Historthels, coarse-silty)
- Boreal-taiga silty loess slopes, frozen (Typic Historthels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 1ST Boreal Plains with Discontinuous Permafrost
(Typic Historthels, coarse-silty-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euic Complex)
- 3C Boreal Colluvial Hill Footslopes with Continuous Permafrost
(Typic Histoturbels, coarse-silty and Typic Historthels, coarse-silty Soils, 4 to 15 percent slopes)
- 3DH Boreal Loess Footslopes and Gravelly Colluvial Hills With Continuous Permafrost
(Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 3 to 45 percent slopes)
- 3FG Boreal Loess Plains with Continuous Permafrost
(Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes)
- 3FG3 Boreal Loess Plains and Peat Plateaus with Continuous Permafrost
(Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Glacial Folistels, dysic Association, 0 to 14 percent slopes)
- 3FU Boreal Loess Plains and Hills with Continuous Permafrost
(Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 10 percent slopes)
- 3FU2 Boreal Peat Plateaus and Loess Plains with Continuous Permafrost
(Glacial Folistels, dysic-Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes)
- 3FU3 Boreal Eolian Plains and Dunes with Discontinuous Permafrost
(Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-loamy-Typic Haplocryods, sandy Association, 0 to 38 percent slopes)
- 3FU4 Boreal Loess Plains, Hills, and Drains with Continuous Permafrost
(Typic Historthels, coarse-silty-Typic Umbrothels, coarse-silty Association, 2 to 35 percent slopes)
- 3Y Boreal Ice Cored Loess Hills and Plains with Continuous Permafrost
(Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrothels, coarse-silty Association, 0 to 26 percent slopes)

Geographically Associated Landtypes

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

131B_530—Depressions, Bogs:

This site occurs on soils that are very deep and wetter. The climax plant community is "Sedge/sphagnum moss bog."

Similar Landtypes

131B_104—Loamy Frozen Terraces:

This site occurs on terraces with gravelly material at depth. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_108—Gravelly and Sandy Terraces:

This site occurs on very deep soils that are very shallow to sand and gravel. The climax plant community is "Spruce/ericaceous woodland."

131B_113—Loamy Frozen Slopes, Ice Cored:

This site occurs on well drained soils that are moderately deep over permafrost. The climax plant community is "Black spruce/green alder/Labrador tea woodland."

131B_505—Loamy Channels:

This site occurs in flooded channels. The climax plant community is "Tamarack-black spruce/leatherleaf woodland."

Loamy Frozen Slopes, Wet (131B_402)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Eolian Lowlands (131B.L1)

Physiographic Features

	<i>RV</i>	<i>Range</i>			
Elevation (meters):	300	153 to 599			
Slope Gradient (percent):	4	0 to 15			
Aspect (clockwise direction):	non-influencing				
Landform:	turf hummocks on hills; turf hummocks on plains				
Landform Positions:	footslopes; summits; toeslopes				
	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	None				
Ponding:	Frequent	Long	May	Jun	to

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	479	359 to 651
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: grassy organic material over silty colluvium and/or silty cryoturbate
grassy organic material over silty cryoturbate

Rooting Depth (cm): RV: 40 Range: 21 to 68

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
40	peat	moderately rapid	.34	3.3	30	

Restrictive Features: permafrost at 61 to 77 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Black spruce/tussock cottongrass woodland	Climax plant community
Mixed ericaceous/tussock cottongrass scrub1	Mid stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with black spruce/tussock cottongrass woodland and a mid-seral community with mixed ericaceous/tussock cottongrass scrub1. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/tussock cottongrass woodland	26	10	14	19	15
Mixed ericaceous/tussock cottongrass scrub1	22	11	13	15	7

Characteristics of Black spruce/tussock cottongrass woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 21. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	Picea mariana	5.0	13	30	76	31
TS	PIMA	Picea mariana	5.0	15	25	24	19
TR	PIMA	Picea mariana	1.0	5	10	81	20
SD-SM	BEGL	Betula glandulosa	0.1	6	25	100	24
SM	ALVIC	Alnus viridis ssp. crispa	0.1	5	15	19	10
SD-SL	LEPAD	Ledum palustre ssp. decumbens	7.0	18	40	100	42
SD-SL	VAUL	Vaccinium uliginosum	5.0	9	15	100	30
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	3.0	7	20	100	26
SD	EMNI	Empetrum nigrum	0.1	9	25	71	25
GM	ERBR6	Eriophorum brachyantherum	25.0	44	60	71	56
GM	ERIOP	Eriophorum	40.0	54	65	29	40
L	LICHEN	total lichens	5.0	18	40	100	42
L1	CLADI3	Cladina	0.1	6	10	62	19
L1	CLRA61	Cladina rangiferina group	1.0	5	10	62	18
L1	CLMI61	Cladina mitis group	1.0	5	7	33	13
M	MOSS	total bryophytes-mosses and liverworts	20.0	51	90	100	71
M1	SPHAG2	Sphagnum	2.0	34	85	86	54
M1	PLSC70	Pleurozium schreberi	0.1	13	25	71	30
M1	ZZMOSS	unknown-mosses	0.1	7	15	71	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	26	60	100	51
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	4	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	5	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	5.0	8.0	m	22
Tree regeneration	TR	0.5	1.4	2.0	m	19
Medium shrubs	SM	1.2	1.7	2.5	m	4
Low shrubs	SL	20.0	40.7	80.0	cm	29
Dwarf shrubs	SD	3.0	10.6	20.0	cm	30
Tall and medium grasses and grass-likes	GT, GM	20.0	39.3	50.0	cm	15
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.3	10.0	cm	39

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea mariana	66	7.1	4.6	Min. 2	G
	72	7.2	4.6	Avg.	
	78	7.4	4.6	Max.	

Characteristics of Mixed ericaceous/tussock cottongrass scrub1

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 14. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	BEGL	Betula glandulosa	0.1	13	25	100	36
SD-SL	LEPAD	Ledum palustre ssp. decumbens	5.0	25	55	100	50
SD-SL	VAUL	Vaccinium uliginosum	5.0	11	20	93	32
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	10	25	100	32
GM	ERiop	Eriophorum	60.0	70	80	50	59
GM	ERBR6	Eriophorum brachyantherum	30.0	46	60	50	48
FD	RUCH	Rubus chamaemorus	0.1	5	20	100	22
L	LICHEN	total lichens	0.0	4	15	100	20
M	MOSS	total bryophytes-mosses and liverworts	15.0	47	85	100	69
M1	SPHAG2	Sphagnum	10.0	36	85	93	58
M1	ZZMOSS	unknown-mosses	5.0	8	10	50	20
M1	PLSC70	Pleurozium schreberi	2.0	10	15	36	19
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	28	75	100	53
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	15	100	14
B	SOIL	mineral-bare soil	0.0	0	5	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	4.0	9.0	m	22
Tree regeneration	TR	0.3	1.0	2.0	m	16
Medium shrubs	SM	1.1	1.4	1.7	m	5
Low shrubs	SL	10.0	40.4	100.0	cm	23
Dwarf shrubs	SD	5.0	10.0	20.0	cm	19
Tall and medium grasses and grass-likes	GT, GM	20.0	40.0	60.0	cm	7
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	5.4	10.0	cm	21

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea mariana	59	3.8	2.1	Min.	1	B
	59	3.8	2.1	Avg		
	59	3.8	2.1	Max.		
Picea mariana	24	4.8	2.1	Min.	3	G
	37	5.3	3.0	Avg		
	50	6.4	3.7	Max.		

Map Unit Components**Common Name (Soils Name):**

Boreal-taiga/tussock silty colluvial slopes, frozen (Typic Histoturbels, coarse-silty)
Boreal-taiga/tussock silty loess slopes, frozen (Typic Histoturbels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

3C	Boreal Colluvial Hill Footslopes with Continuous Permafrost (Typic Histoturbels, coarse-silty and Typic Historthels, coarse-silty Soils, 4 to 15 percent slopes)
3DH	Boreal Loess Footslopes and Gravelly Colluvial Hills With Continuous Permafrost (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 3 to 45 percent slopes)
3FG	Boreal Loess Plains with Continuous Permafrost (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes)
3FG3	Boreal Loess Plains and Peat Plateaus with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Glacial Folistels, dysic Association, 0 to 14 percent slopes)
3FU	Boreal Loess Plains and Hills with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 10 percent slopes)
3FU2	Boreal Peat Plateaus and Loess Plains with Continuous Permafrost (Glacial Folistels, dysic-Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes)
3Y	Boreal Ice Cored Loess Hills and Plains with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 0 to 26 percent slopes)

Geographically Associated Landtypes**131B_400—Loamy Frozen Slopes:**

This site occurs on slightly drier soils that have permafrost at moderately depths. The climax plant community is "Black spruce/Labrador tea woodland."

131B_530—Depressions, Bogs:

This site occurs on soils that are very deep and wetter. The climax plant community is "Sedge/sphagnum moss bog."

Organic Depressions, Fens (131B_501)**Ecoregion Classification**

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

	<i>RV</i>	<i>Range</i>			
Elevation (meters):	196	160 to 236			
Slope Gradient (percent):	0	0 to 0			
Aspect (clockwise direction):	non-influencing				
Landform:	cutoffs on flood plains				
	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	Occasional	Long	May	Sep	
Ponding:	Frequent	Very long	May	Sep	0 to 20

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	392	336 to 565
Annual Air Temperature (°C):	-2.7	-3.0 to -2.5
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: grassy organic material over sandy and silty alluvium

Rooting Depth (cm): *RV*: 88 *Range*: 13 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
56	peat	moderately rapid	.34	6.0		80
32	silt loam	moderate	.18	6.8		16

Restrictive Features: strongly contrasting textural stratification at 56 cm

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Sedge wet meadow	Climax plant community
Bluejoint wet meadow	Post climax plant community
Water horsetail-marsh five finger-buckbean wet meadow	Early stage of pond/fen/bog succession

Ecological Status-Transition Description:

Three plant communities are identified on this site based on relative position and wetness within the site. An early pond succession community with water horsetail-marsh five finger-buckbean wet meadow is described in wetter areas often associated with the narrow fringe adjacent to open water. A potential community with sedge wet meadow is described for the most extensive condition observed within the site. A post successional community with bluejoint wet meadow is described along the upland fringe where site conditions are slightly drier and the organic surface layer thinner. Many areas of this site are also influenced by flooding, but saturated conditions on this site are largely attributed to ground water discharge. Pond succession is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sedge wet meadow	83	7	19	30	11
Bluejoint wet meadow	51	9	17	29	5
Water horsetail-marsh five finger-buckbean wet meadow	84	12	21	34	9

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Bluejoint wet meadow	RUMAM	Rumex maritimus ssp. maritimus

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sedge wet meadow	CAPA	Calla palustris
	CACH5	Carex chordorrhiza
	CADI4	Carex diandra
	CALAA5	Carex lasiocarpa ssp. americana
	GLBO	Glyceria borealis
	GLMAG	Glyceria maxima ssp. grandis
	LYTH2	Lysimachia thyrsiflora
	MYVE3	Myriophyllum verticillatum
	NYTE	Nymphaea tetragona
	PEMA	Pedicularis macrodonta
	RINA99	Ricciocarpus natans
	SPMI	Sparganium minimum
	STLO	Stellaria longifolia
	TYLA	Typha latifolia
Bluejoint wet meadow	BITR	Bidens tripartita
	CAPA	Calla palustris
	CANA	Caltha natans
	POPEO	Polygonum pensylvanicum ssp. oneillii
	RINA99	Ricciocarpus natans
Water horsetail-marsh five finger-buckbean wet meadow	ASJU	Aster junciformis
	CAPA	Calla palustris
	CACH5	Carex chordorrhiza
	CADI4	Carex diandra
	CEDE4	Ceratophyllum demersum
	CIBU	Cicuta bulbifera
	ERGR8	Eriophorum gracile
	LEMI3	Lemna minor
	LYTH2	Lysimachia thyrsiflora
	MYVE3	Myriophyllum verticillatum
	NAFL	Najas flexilis
	NYTE	Nymphaea tetragona
	PEMA	Pedicularis macrodonta
	POAML	Polygonum amphibium ssp. laevimarginatum
	POPEO	Polygonum pensylvanicum ssp. oneillii
	RINA99	Ricciocarpus natans
	SAEXI	Salix exigua ssp. interior
	SALUL	Salix lucida ssp. lasiandra
	SCVA	Scirpus validus
	STLO	Stellaria longifolia
TYLA	Typha latifolia	
UTMI	Utricularia minor	
VESC2	Veronica scutellata	

Characteristics of Sedge wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 11. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover		Percent Importance		
			Min.	Max.	Constancy	Value	
SL	CHCA2	Chamaedaphne calyculata	1.0	6	15	36	15
GT	CAAQ	Carex aquatilis	1.0	34	80	91	56
GM-GT	CARO6	Carex rostrata	1.0	28	85	91	50
GT	CACA4	Calamagrostis canadensis	5.0	21	40	82	41
GT	ARFU2	Arctophila fulva	0.1	8	25	36	17

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GM	AGSC5	Agrostis scabra	0.1	7	20	27	14
FM-FT	EQFL	Equisetum fluviatile	0.1	15	30	91	37
FM-FT	COPA28	Comarum palustre	1.0	11	30	91	32
FD	RUAR	Rubus arcticus	0.1	10	30	27	16
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.1	25	60	100	50
M1	ZZMOSS	unknown-mosses	5.0	18	40	45	28
M1	CALLI10	Calliergon	5.0	13	25	27	19
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	58	90	100	76
B	WATER	water	0.1	46	95	100	68
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	7	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.0	3.5	4.0	m	2
Tree regeneration	TR	0.7	0.7	0.7	m	1
Tall shrubs	ST	4.0	4.0	4.0	m	1
Medium shrubs	SM	1.1	2.0	3.0	m	7
Low shrubs	SL	30.0	63.3	100.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	30.0	99.2	160.0	cm	13
Tall and medium forbs	FT, FM	40.0	82.7	200.0	cm	11
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.0	10.0	cm	11

Characteristics of Bluejoint wet meadow

Ecological Status: Post climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM	SAPU15	Salix pulchra	5.0	25	45	40	32
SM	RUID	Rubus idaeus	5.0	5	5	20	10
SL	SAFU	Salix fuscescens	5.0	5	5	20	10
GT	CACA4	Calamagrostis canadensis	50.0	71	90	100	84
GT	CAAQ	Carex aquatilis	5.0	5	5	40	14
GT	CAUT	Carex utriculata	10.0	10	10	20	14
GM	CASAL2	Carex saxatilis ssp. laxa	20.0	20	20	20	20
FT	COPA28	Comarum palustre	2.0	6	15	80	22
FT	EPAN2	Epilobium angustifolium	5.0	5	5	20	10
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	10.0	30	70	100	55
M1	ZZMOSS	unknown-mosses	5.0	22	40	60	36
M1	CALLI10	Calliergon	5.0	12	20	60	27
M1	TONI70	Tomentypnum nitens	20.0	20	20	20	20
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	35.0	66	95	100	81
B	SOIL	mineral-bare soil	0.0	14	50	100	37
B	WATER	water	0.1	10	35	100	32
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	2	100	10
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.4	1.8	m	3
Low shrubs	SL	30.0	30.0	30.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	2.0	106.0	180.0	cm	7
Tall and medium forbs	FT, FM	20.0	55.0	80.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.5	10.0	cm	6

Characteristics of Water horsetail-marsh five finger-buckbean wet meadow

Ecological Status: Early stage of pond/fen/bog succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 11. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	ANPO	Andromeda polifolia	1.0	8	20	27	15
SL	MYGA	Myrica gale	5.0	8	10	27	15
GT	CARO6	Carex rostrata	10.0	28	45	45	35
GM-GT	CAAQ	Carex aquatilis	5.0	14	25	64	30
GM-GT	CAUT	Carex utriculata	3.0	12	20	18	15
FT	EQFL	Equisetum fluviatile	2.0	49	85	100	70
FM-FT	COPA28	Comarum palustre	3.0	17	50	82	37
FM	METR3	Menyanthes trifoliata	5.0	38	80	45	41
FM	CAPA	Calla palustris	0.1	5	20	36	13
FD	UTIN2	Utricularia intermedia	0.1	12	35	27	18
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	19	65	100	44
M1	ZZMOSS	unknown-mosses	0.1	19	45	55	32
M1	SPHAG2	Sphagnum	0.1	8	20	45	19
M1	TONI70	Tomentypnum nitens	4.0	10	15	18	13
M2	RINA99	Ricciocarpus natans	0.1	5	15	27	12
B	WATER	water	5.0	64	100	100	80
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	25	50	100	50
B	SOIL	mineral-bare soil	0.0	7	60	100	26
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	2.0	2.0	m	1
Tree regeneration	TR	1.5	1.5	1.5	m	1
Medium shrubs	SM	1.2	1.4	1.5	m	5
Low shrubs	SL	30.0	76.7	100.0	cm	6
Tall and medium grasses and grass-likes	GT, GM	2.0	80.1	160.0	cm	17
Tall and medium forbs	FT, FM	20.0	71.7	140.0	cm	23
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	1.9	3.0	cm	8

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian wet meadow organic depressions (Cryofibrists, euic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1FP4	Boreal Flood Plains and Terraces with Discontinuous Permafrost, Wet (Fluvaquentic Historthels, coarse-loamy-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euc Complex)
1ST	Boreal Plains with Discontinuous Permafrost (Typic Historthels, coarse-silty-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euc Complex)
1ST1	Boreal Terraces with Discontinuous Permafrost, Minchumina Basin (Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty-Cryofibrists, euc Association)

Geographically Associated Landtypes

131B_101—Loamy High Flood Plains:

This site occurs on higher positions. The climax plant community is "White spruce/alder forest."

131B_102—Loamy Frozen Flood Plains:

This site occurs on higher positions with well drained soils that are moderately deep over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_104—Loamy Frozen Terraces:

This site occurs on terraces with loamy soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on slightly higher positions with loamy soils that have permafrost at moderate depths. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

Similar Landtypes

131B_506—Organic Depressions, Eutrophic Fens:

This site occurs on soils in more nutrient rich fens with thinner organic mats. The climax plant community is "Tulfted bulrush meadow."

131B_530—Depressions, Bogs:

This site occurs on soils in acid bogs. The climax plant community is "Sedge/sphagnum moss bog."

Silty Drainages, Frozen (131B_502)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	402	260 to 649
Slope Gradient (percent):	2	0 to 6
Aspect (clockwise direction):	non-influencing	
Landform:	drainageways on hills and plains	

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	Frequent	Long	May	Sep	
Ponding:	Frequent	Long	May	Sep	0 to 20

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	479	359 to 651
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4

Frost Free Days: 100 80 to 110

Soil Features

Parent Materials: woody organic material and/or silty alluvium over silty alluvium

Rooting Depth (cm): RV: 53 Range: 15 to 96

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
9	moderately decomposed plant material	moderately rapid	.34	3.6	30	
39	stratified silt loam to muck	moderate	.19	5.3	25	

Restrictive Features: permafrost at 48 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Shrub birch-diamondleaf willow-leatherleaf scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with shrub birch-diamondleaf willow-leatherleaf scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand				Number of Stands
	Total	Min.	Avg.	Max.	
Shrub birch-diamondleaf willow-leatherleaf scrub	49	12	21	33	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Shrub birch-diamondleaf willow-leatherleaf scrub	CACH5	Carex chordorrhiza

Characteristics of Shrub birch-diamondleaf willow-leatherleaf scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	BEGL	Betula glandulosa	10.0	23	50	100	48
SM	SAPU15	Salix pulchra	10.0	20	30	100	45
SM	ALVIC	Alnus viridis ssp. crispa	5.0	5	5	60	17
SL	CHCA2	Chamaedaphne calyculata	25.0	40	55	80	57
SL	VAUL	Vaccinium uliginosum	0.1	19	30	100	44
SL	LEPAD	Ledum palustre ssp. decumbens	0.1	7	15	60	20
SL	SAFU	Salix fuscescens	2.0	7	15	60	20
SL	MYGA	Myrica gale	5.0	5	5	20	10
SD	EMNI	Empetrum nigrum	0.1	6	15	80	22
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	8	15	60	22
GT	CACA4	Calamagrostis canadensis	0.1	19	45	100	44
GM	CAAQ	Carex aquatilis	5.0	5	5	20	10
GM	ERRU2	Eriophorum russeolum	5.0	5	5	20	10
FD-FM	COPA28	Comarum palustre	0.1	7	15	80	24
FD	RUCH	Rubus chamaemorus	0.1	7	20	60	20

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	35.0	62	80	100	79
M1	SPHAG2	Sphagnum	15.0	40	65	100	63
M1	ZZMOSS	unknown-mosses	5.0	15	25	100	39
M1	HYSP70	Hylocomium splendens	15.0	15	15	20	17
M1	PLSC70	Pleurozium schreberi	0.1	5	10	40	14
M1	SPSQ99	Sphagnum squarrosum	5.0	5	5	20	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	33	70	100	57
B	WATER	water	0.0	6	15	100	24
B	SOIL	mineral-bare soil	0.0	5	20	100	22
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	15	100	20
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	9.0	16.0	m	4
Tree regeneration	TR	2.0	2.4	2.8	m	2
Medium shrubs	SM	1.8	2.5	3.0	m	6
Low shrubs	SL	40.0	57.5	90.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	50.0	116.7	170.0	cm	3
Tall and medium forbs	FT, FM	40.0	45.0	50.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	4.8	7.0	cm	6

Map Unit Components

Common Name (Soils Name):

Boreal-riparian tall scrub silty frozen drains, Yukon-Kuskokwim (Fluvaquentic Aquorthels, coarse-silty)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

3C	Boreal Colluvial Hill Footslopes with Continuous Permafrost (Typic Histoturbels, coarse-silty and Typic Historthels, coarse-silty Soils, 4 to 15 percent slopes)
3FU4	Boreal Loess Plains, Hills, and Drains with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Umbrothels, coarse-silty Association, 2 to 35 percent slopes)

Geographically Associated Landtypes

131B_400—Loamy Frozen Slopes:

This site occurs on adjacent uplands that are not flooded and have loamy soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on toeslopes of hills with wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

Silty Drainages, Very Wet (131B_503)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

Elevation (meters): RV Range
197 168 to 289

Slope Gradient (percent): 0 0 to 1

Aspect (clockwise direction): non-influencing

Landform: drainageways on hills; drainageways on outwash plains; drainageways on plains

Landform Positions: footslopes

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	Frequent	Long	May	Sep	
Ponding:	Frequent	Long	May	Sep	to

Climatic Features

Annual Precipitation (millimeters): RV Range
392 336 to 565

Annual Air Temperature (°C): -2.7 -3.0 to -2.5

Frost Free Days: 100 80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over sandy and silty alluvium
mossy organic material and/or woody organic material over silty alluvium

Rooting Depth (cm): RV: 59 Range: 33 to 116

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
24 to 43	mucky peat	moderately rapid	.34	3.6 to 6.8	30	80
16 to 35	silt loam, mucky peat	moderate or moderately rapid	.14 to .19	5.3 to 6.8	25	2

Restrictive Features: permafrost at 99 to 150 cm or more

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Leatherleaf-sweetgale/sedge scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with leatherleaf-sweetgale/sedge scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Leatherleaf-sweetgale/sedge scrub	56	15	19	32	8

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Leatherleaf-sweetgale/sedge scrub	CAPA	Calla palustris
	CACH5	Carex chordorrhiza
	CADI4	Carex diandra
	GLMAG	Glyceria maxima ssp. grandis
	TYLA	Typha latifolia

Characteristics of Leatherleaf-sweetgale/sedge scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 8. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy	Value		
			Min.	Avg.	Max.		
SM	BEGL	Betula glandulosa	10.0	22	40	100	47
SM	SAPU15	Salix pulchra	0.1	7	20	62	21
SL	CHCA2	Chamaedaphne calyculata	20.0	33	60	100	57
SD-SL	VAUL	Vaccinium uliginosum	0.1	12	20	100	35
SL	MYGA	Myrica gale	5.0	19	40	62	34
SL	SAFU	Salix fuscescens	2.0	10	15	88	30
SL	LEGR	Ledum groenlandicum	1.0	10	20	25	16
GT	CACA4	Calamagrostis canadensis	0.1	14	40	88	35
GM-GT	CAAQ	Carex aquatilis	5.0	17	35	62	32
GM-GT	ERAN6	Eriophorum angustifolium	5.0	18	45	50	30
GM	ERSC2	Eriophorum scheuchzeri	5.0	8	10	25	14
GM	CAMAI2	Carex magellanica ssp. irrigua	5.0	6	7	25	12
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	10.0	58	95	100	76
M1	SPHAG2	Sphagnum	0.1	38	70	100	62
M1	ZZMOSS	unknown-mosses	10.0	15	30	100	39
M1	POLYT5	Polytrichum	0.1	7	20	62	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	39	80	100	62
B	WATER	water	1.0	26	55	100	51
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	7	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.5	6.2	8.0	m	3
Tree regeneration	TR	0.8	2.6	4.0	m	5
Medium shrubs	SM	1.2	1.5	2.0	m	8
Low shrubs	SL	40.0	67.1	90.0	cm	7
Tall and medium grasses and grass-likes	GT, GM	20.0	91.0	150.0	cm	10
Tall and medium forbs	FT, FM	20.0	42.0	130.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.0	7.0	cm	11

Map Unit Components

Common Name (Soils Name):

Boreal-riparian scrub silty drains, frozen (Fluvaquentic Historthels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1STW2 Boreal Groundwater Discharge Plains with Discontinuous Permafrost
(Histic Cryaquepts, coarse-loamy-Terric Cryohemists, loamy Association)

Geographically Associated Landtypes

131B_400—Loamy Frozen Slopes:

This site occurs on adjacent uplands that are not flooded and have loamy soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on toeslopes of hills with wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

Loamy Channels (131B_505)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	233	150 to 592
Slope Gradient (percent):	1	0 to 1
Aspect (clockwise direction):	non-influencing	
Landform:	channels on stream terraces; plains	
	<i>Frequency</i>	
Flooding:	None	
Ponding:	None	

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	427	336 to 651
Annual Air Temperature (°C):	-2.7	-3.0 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over gravelly alluvium
mossy organic material and/or woody organic material over silty alluvium over sandy and silty alluvium

Rooting Depth (cm): RV: 49 Range: 23 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
24 to 43	peat	moderately rapid	.34	5.0 to 6.8	30	80
6 to 7	silt loam	moderate or moderately rapid	.14 to .26	5.6 to 6.8		2 to 16
18	stratified silt to fine sand to muck	moderately rapid	.16	5.6		25

Restrictive Features: permafrost at 53 to 150 cm or more

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained or very poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Tamarack-black spruce/leatherleaf woodland	Climax plant community
Leatherleaf-shrub birch scrub	Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with tamarack-black spruce/leatherleaf woodland and a late-seral community with leatherleaf-shrub birch scrub. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Tamarack-black spruce/leatherleaf woodland	65	16	23	32	10
Leatherleaf-shrub birch scrub	55	16	20	26	8

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Tamarack-black spruce/leatherleaf woodland	CACH5	Carex chordorrhiza
	CAIN11	Carex interior
	CALAA5	Carex lasiocarpa ssp. americana
	SACA4	Salix candida
	CACH5	Carex chordorrhiza
Leatherleaf-shrub birch scrub	CACH5	Carex chordorrhiza
	PEMA	Pedicularis macrodonta

Characteristics of Tamarack-black spruce/leatherleaf woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 12. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	LALA	Larix laricina	3.0	13	50	92	35
TM	PIMA	Picea mariana	0.1	9	20	75	26
SM-ST	ALTE2	Alnus tenuifolia	0.1	6	10	33	14
SM-ST	ALVIC	Alnus viridis ssp. crispa	0.1	5	20	42	14
SL-SM	LEGR	Ledum groenlandicum	5.0	17	40	92	40
SL-SM	BEGL	Betula glandulosa	0.1	15	45	100	39
SL-SM	SAPU15	Salix pulchra	0.1	5	20	92	21
SL-SM	PEFL15	Pentaphylloides floribunda	3.0	8	15	42	18
SL	CHCA2	Chamaedaphne calyculata	25.0	45	75	100	67
SL	VAUL	Vaccinium uliginosum	2.0	9	15	100	30
SL	MYGA	Myrica gale	0.1	9	20	50	21

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	LEPAD	Ledum palustre ssp. decumbens	15.0	22	30	17	19
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	10	30	75	27
SD	ARRU6	Arctous rubra	0.1	5	15	50	16
FD-FM	EQAR	Equisetum arvense	0.1	5	10	33	13
L	LICHEN	total lichens	0.0	2	10	100	14
M	MOSS	total bryophytes-mosses and liverworts	35.0	73	90	100	85
M1	HYSP70	Hylocomium splendens	5.0	35	75	92	57
M1	SPHAG2	Sphagnum	4.0	20	50	83	41
M1	ZZMOSS	unknown-mosses	5.0	12	25	83	32
M1	PLSC70	Pleurozium schreberi	0.1	11	20	58	25
M1	TONI70	Tomentypnum nitens	0.1	7	20	58	20
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	21	50	100	46
B	WATER	water	0.0	8	80	100	28
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	10	100	20
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	5.8	8.5	m	16
Tree regeneration	TR	0.8	1.8	2.0	m	6
Tall shrubs	ST	3.0	3.2	3.5	m	2
Medium shrubs	SM	1.0	1.6	2.5	m	17
Low shrubs	SL	20.0	65.8	100.0	cm	19
Dwarf shrubs	SD	3.0	7.5	20.0	cm	8
Tall and medium grasses and grass-likes	GT, GM	10.0	70.5	150.0	cm	8
Tall and medium forbs	FT, FM	15.0	33.0	60.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	3.4	10.0	cm	18

Characteristics of Leatherleaf-shrub birch scrub

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 10. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	BEGL	Betula glandulosa	0.1	24	60	100	49
SL	CHCA2	Chamaedaphne calyculata	10.0	44	80	100	66
SL	VAUL	Vaccinium uliginosum	1.0	18	75	90	40
SL	MYGA	Myrica gale	3.0	18	35	70	35
SL	LEGR	Ledum groenlandicum	2.0	9	20	50	21
SL	PEFL15	Pentaphylloides floribunda	3.0	6	10	30	13
SD	ANPO	Andromeda polifolia	0.1	18	50	30	23
GM-GT	CAAQ	Carex aquatilis	0.1	10	20	20	14
GM	CARO7	Carex rotundata	0.1	13	25	20	16
GM	CATE5	Carex tenuiflora	0.1	5	15	40	14
GM	ERBR6	Eriophorum brachyantherum	1.0	8	15	20	13
FD-FT	EQFL	Equisetum fluviatile	0.1	14	45	50	26
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	35.0	62	90	100	79
M1	SPHAG2	Sphagnum	20.0	42	75	80	58
M1	ZZMOSS	unknown-mosses	5.0	16	30	70	33
M1	HYSP70	Hylocomium splendens	5.0	22	50	30	26
M1	TONI70	Tomentypnum nitens	2.0	13	40	40	23
M1	PLSC70	Pleurozium schreberi	5.0	7	10	30	14

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	36	70	100	60
B	WATER	water	0.0	10	30	100	32
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	10	100	20
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.5	4.4	8.0	m	10
Tree regeneration	TR	0.3	1.1	3.0	m	5
Medium shrubs	SM	1.5	1.8	2.5	m	9
Low shrubs	SL	30.0	60.0	100.0	cm	12
Dwarf shrubs	SD	4.0	10.5	20.0	cm	6
Tall and medium grasses and grass-likes	GT, GM	10.0	66.7	150.0	cm	9
Tall and medium forbs	FT, FM	20.0	51.2	130.0	cm	8
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.1	10.0	cm	9

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	45	5.3	3.0	Min.	B
	45	5.3	3.0	Avg.	
	45	5.3	3.0	Max.	

Map Unit Components**Common Name (Soils Name):**

- Boreal-taiga gravelly alluvial plains, wet (Histic Cryaquepts, loamy-skeletal)
- Boreal-taiga loamy channels, frozen (Typic Historthels, coarse-loamy)
- Boreal-taiga mica rich loamy channels, frozen (Typic Historthels, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 1FW1 Boreal Terraces with Continuous Permafrost
(Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Complex)
- 1STW Boreal Terraces with Continuous Permafrost, Wet
(Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association)
- 1STW2 Boreal Groundwater Discharge Plains with Discontinuous Permafrost
(Histic Cryaquepts, coarse-loamy-Terric Cryohemists, loamy Association)
- 2FW2 Boreal Terraces and High Flood Plains with Continuous Permafrost
(Typic Historthels, coarse-loamy Complex)
- 3FP3 Boreal Mica-Rich Terraces and Flood Plains with Discontinuous Permafrost
(Typic Histoturbels, coarse-silty-Fluventic Haplorthels, coarse-loamy-Typic Historthels, coarse-loamy Association)

Geographically Associated Landtypes**131B_101—Loamy High Flood Plains:**

This site occurs on higher positions with very deep, well drained soils. The climax plant community is "White spruce/alder forest."

131B_102—Loamy Frozen Flood Plains:

This site occurs on soils that are well drained and moderately deep over permafrost. The climax plant community is "Mixed paper birch-spruce/prickly rose forest."

131B_104—Loamy Frozen Terraces:

This site occurs on terraces that are not flooded. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_156—Loamy Wet Flood Plains, Frozen:

This site occurs on similar soils on slightly higher positions with slightly lower flooding frequency. The climax plant community is "White spruce-tamarack/thinleaf alder forest."

131B_501—Organic Depressions, Fens:

This site occurs on wetter soils in cutoff meanders. The climax plant community is "Sedge wet meadow."

Similar Landtypes**131B_104—Loamy Frozen Terraces:**

This site occurs in uplands and is not flooded. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_113—Loamy Frozen Slopes, Ice Cored:

This site occurs in uplands and is well drained. The climax plant community is "Black spruce/green alder/Labrador tea woodland."

131B_400—Loamy Frozen Slopes:

This site occurs in uplands and is not flooded. The climax plant community is "Black spruce/Labrador tea woodland."

Organic Depressions, Eutrophic Fens (131B_506)**Ecoregion Classification**

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)

Physiographic Features

Elevation (meters): RV 197 Range 168 to 289

Slope Gradient (percent): 0 0 to 0

Aspect (clockwise direction): non-influencing

Landform: depressions on plains

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	Occasional	Long	May	Sep	
Ponding:	Frequent	Very long	May	Sep	0 to 20

Climatic Features

Annual Precipitation (millimeters): RV 392 Range 336 to 565

Annual Air Temperature (°C): -2.7 -3.0 to -2.5

Frost Free Days: 100 80 to 110

Soil Features

Parent Materials: grassy organic material over sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 57 Range: 37 to 100

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
54	mucky peat	moderately rapid	.34	6.9		80
3	stratified fine sand to silt	moderately rapid	.14	6.9		20

Restrictive Features: strongly contrasting textural stratification at 130 cm

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Tufted bulrush meadow	Climax plant community
Shrubby cinquefoil-sweetgale scrub	Climax plant community on drier microsites

Ecological Status-Transition Description:

Two plant communities are identified within this site based on relative wetness including a potential community with tufted bulrush wet meadow and a drier community with shrubby cinquefoil-sweetgale scrub along fen margins and

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Tufted bulrush meadow	55	22	31	36	3
Shrubby cinquefoil-sweetgale scrub	65	17	27	40	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name	
Tufted bulrush meadow	CASTS	Calamagrostis stricta ssp. stricta	
	CACH5	Carex chordorrhiza	
	CAIN11	Carex interior	
	CAOEV	Carex oederi ssp. viridula	
	ELQU2	Eleocharis quinqueflora	
	PEMA	Pedicularis macrodonta	
	SACA4	Salix candida	
	TOGLB	Tofieldia glutinosa ssp. brevistyla	
	Shrubby cinquefoil-sweetgale scrub	CASTS	Calamagrostis stricta ssp. stricta
		SACA4	Salix candida
TYLA		Typha latifolia	

Characteristics of Tufted bulrush meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
SL-SM	PEFL15	Pentaphragmoides floribunda	3.0	9	20	100	30
SL	MYGA	Myrica gale	2.0	6	15	100	24
SD	ANPO	Andromeda polifolia	1.0	5	10	100	22
GM	TRCE3	Trichophorum cespitosum	4.0	31	60	100	56
GM	CALI7	Carex limosa	15.0	18	20	67	35
GM	CAAQ	Carex aquatilis	4.0	11	25	100	33
GM	CALI	Carex livida	1.0	6	10	100	24
GM	CAMAI2	Carex magellanica ssp. irrigua	5.0	8	10	67	23
GM	ERAN6	Eriophorum angustifolium	5.0	5	5	33	13
FD	UTIN2	Utricularia intermedia	1.0	8	15	67	23
FD	METR3	Menyanthes trifoliata	1.0	5	10	100	22
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	35.0	47	70	100	69
M1	ZZMOSS	unknown-mosses	10.0	27	40	100	52
M1	DRRE99	Drepanocladus revolvens	30.0	30	30	33	31
M1	DREPA3	Drepanocladus	25.0	25	25	33	29
M2	ZZLIV	unknown-liverworts	25.0	25	25	33	29
B	WATER	water	25.0	55	80	100	74
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	35.0	42	50	100	65

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	2.0	2.0	m	1
Tree regeneration	TR	0.1	0.1	0.1	m	1
Medium shrubs	SM	1.2	1.3	1.5	m	3
Low shrubs	SL	20.0	65.0	80.0	cm	4
Dwarf shrubs	SD	5.0	6.0	7.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	15.0	26.2	50.0	cm	4
Tall and medium forbs	FT, FM	30.0	30.0	30.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.2	10.0	cm	5

Characteristics of Shrubby cinquefoil-sweetgale scrub

Ecological Status: Climax plant community on drier microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	PEFL15	Pentaphylloides floribunda	15.0	28	40	100	53
SL-SM	MYGA	Myrica gale	15.0	24	35	100	49
SM	B EGL	Betula glandulosa	10.0	18	25	100	42
SM	SAPS	Salix pseudomonticola	5.0	5	5	20	10
SL	VAUL	Vaccinium uliginosum	5.0	11	25	80	30
SL	CHCA2	Chamaedaphne calyculata	5.0	9	15	80	27
SL	SAFU	Salix fuscescens	5.0	5	5	20	10
SD	EMNI	Empetrum nigrum	5.0	5	5	20	10
GM-GT	CAAQ	Carex aquatilis	0.1	15	40	100	39
GM	CALE10	Carex leptalea	1.0	13	35	80	32
FM-FT	EQFL	Equisetum fluviatile	1.0	10	20	40	20
FD-FM	COPA28	Comarum palustre	3.0	10	20	80	28
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	10.0	35	80	100	59
M1	ZZMOSS	unknown-mosses	7.0	29	70	60	42
M1	POCO38	Polytrichum commune	5.0	5	5	20	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	30.0	67	95	100	82
B	WATER	water	0.1	13	30	100	36
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	4	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	6.6	10.0	m	5
Tree regeneration	TR	1.8	1.8	1.8	m	1
Tall shrubs	ST	3.0	4.0	5.0	m	3
Medium shrubs	SM	1.0	1.4	2.0	m	8
Low shrubs	SL	50.0	80.0	100.0	cm	4
Dwarf shrubs	SD	5.0	7.0	9.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	10.0	59.0	130.0	cm	10
Tall and medium forbs	FT, FM	20.0	50.0	80.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	2.1	7.0	cm	6

Map Unit Components

Common Name (Soils Name):

Boreal-riparian fen organic depressions (Terric Cryohemists, loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

1STW2 Boreal Groundwater Discharge Plains with Discontinuous Permafrost
(Histic Cryaquepts, coarse-loamy-Terric Cryohemists, loamy Association)

Geographically Associated Landtypes

131B_104—Loamy Frozen Terraces:

This site occurs on terraces that are not flooded. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_503—Silty Drainages, Very Wet:

This site occurs on wetter soils. The climax plant community is "Leatherleaf-sweetgale/sedge scrub."

131B_505—Loamy Channels:

This site occurs on channels with wetter soils that are moderately deep over permafrost. The climax plant community is "Tamarack-black spruce/leatherleaf woodland."

Similar Landtypes

131B_501—Organic Depressions, Fens:

This site occurs on soils in less nutrient rich fens with thicker organic mats. The climax plant community is "Sedge wet meadow."

131B_530—Depressions, Bogs:

This site occurs on soils in acid bogs. The climax plant community is "Sedge/sphagnum moss bog."

Depressions, Bogs (131B_530)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)
Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

Elevation (meters): RV 252 Range 232 to 266

Slope Gradient (percent): 0 0 to 0

Aspect (clockwise direction): non-influencing

Landform: bogs on hills; bogs on peat plateaus; bogs on plains; bogs on outwash plains

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	None				
Ponding:	Frequent	Very long	May	Sep	0 to 20

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	479	359 to 651
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or grassy organic material

Rooting Depth (cm): RV: 110 Range: 45 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
63	peat	moderately rapid	.34	4.2	30	

Restrictive Features: strongly contrasting textural stratification at 150 cm or more

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Sedge/sphagnum moss bog	Climax plant community
Sedge/bog rosemary bog	Post climax plant community
Sphagnum moss bog	Early stage of pond/fen/bog succession

Ecological Status-Transition Description:

Three plant communities are identified on this site based on relative position and wetness within the site as defined. An early pond succession community of sphagnum moss bog is described in wetter areas often associated with the narrow fringe of vegetation adjacent to open water. A potential community of sedge/sphagnum bog is described for the most extensive condition observed within the site. A post successional community is described near the upland fringe where site conditions are slightly drier and the organic surface layer thinner. Pond succession is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sedge/sphagnum moss bog	50	10	15	26	19
Sedge/bog rosemary bog	38	10	16	31	5
Sphagnum moss bog	4	4	4	4	1

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sedge/sphagnum moss bog	CACH5	Carex chordorrhiza
	HAPA11	Hammarbya paludosa
	JUSTA	Juncus stygius ssp. americanus
	PEMA	Pedicularis macrodonta
	CACH5	Carex chordorrhiza
	POEP2	Potamogeton epihydrus
Sedge/bog rosemary bog	UTMI	Utricularia minor

Characteristics of Sedge/sphagnum moss bog

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 21. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy			
			Min.	Avg.	Max.		
GM-GT	CARO6	Carex rostrata	2.0	21	40	57	35
GM-GT	CAAQ	Carex aquatilis	2.0	27	60	33	30
GM	CARO7	Carex rotundata	5.0	31	80	67	46
GM	CALI7	Carex limosa	5.0	16	40	67	33
GM	CAMAI2	Carex magellanica ssp. irrigua	0.1	6	35	62	19
GM	ERRU2	Eriophorum russeolum	2.0	7	20	43	17

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
GM	ERSC2	Eriophorum scheuchzeri	0.1	8	20	38	17
GM	TRCE3	Trichophorum cespitosum	0.1	7	30	24	13
FD	UTIN2	Utricularia intermedia	0.1	5	15	19	10
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	50.0	80	95	100	89
M1	SPHAG2	Sphagnum	35.0	71	95	95	82
M1	ZZMOSS	unknown-mosses	0.1	9	20	86	28
B	WATER	water	0.0	25	100	100	50
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	23	70	100	48
B	SOIL	mineral-bare soil	0.0	1	30	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	3	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	2.0	2.0	m	1
Tree regeneration	TR	0.1	1.2	3.0	m	5
Medium shrubs	SM	1.1	1.2	1.3	m	2
Low shrubs	SL	23.0	54.6	100.0	cm	17
Dwarf shrubs	SD	0.5	6.9	20.0	cm	12
Tall and medium grasses and grass-likes	GT, GM	20.0	60.6	110.0	cm	24
Tall and medium forbs	FT, FM	15.0	39.2	110.0	cm	6
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.3	10.0	cm	19

Characteristics of Sedge/bog rosemary bog

Ecological Status: Post climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
SD-SL	ANPO	Andromeda polifolia	20.0	32	50	100	57
SD	OXMI3	Oxycoccus microcarpos	0.1	6	15	100	24
GM-GT	CARO6	Carex rostrata	7.0	11	15	33	19
GT	CACA4	Calamagrostis canadensis	0.1	8	15	33	16
GM-GT	CAAQ	Carex aquatilis	0.1	5	10	33	13
GM	CARO7	Carex rotundata	5.0	26	65	83	46
GM	CALI7	Carex limosa	10.0	16	25	67	33
GM	CACH5	Carex chordorrhiza	30.0	30	30	17	23
GM	CAMAI2	Carex magellanica ssp. irrigua	0.1	10	25	50	22
GM	ERRU2	Eriophorum russeolum	0.1	7	20	50	19
GM	CAREX	Carex	20.0	20	20	17	18
GM	ERBR6	Eriophorum brachyantherum	0.1	10	20	33	18
GM	ERSC2	Eriophorum scheuchzeri	5.0	5	5	17	9
FD	METR3	Menyanthes trifoliata	0.1	13	25	50	25
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	80.0	89	100	100	94
M1	SPHAG2	Sphagnum	45.0	78	95	100	88
M1	ZZMOSS	unknown-mosses	0.1	10	20	67	26
M1	POLYT5	Polytrichum	25.0	25	25	17	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	24	50	100	49
B	WATER	water	0.0	9	30	100	30
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	1	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.5	0.5	0.5	m	1
Medium shrubs	SM	1.1	1.1	1.1	m	1
Low shrubs	SL	20.0	28.0	40.0	cm	5
Dwarf shrubs	SD	1.5	9.9	15.0	cm	6
Tall and medium grasses and grass-likes	GT, GM	3.0	56.1	130.0	cm	7
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	4.9	10.0	cm	7

Characteristics of Sphagnum moss bog

Ecological Status: Early stage of pond/fen/bog succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GM	ERSC2	Eriophorum scheuchzeri	15.0	15	15	100	39
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	100	100	100	100	100
M1	SPHAG2	Sphagnum	100	100	100	100	100
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	10	10	100	32
B	WATER	water	1.0	1	1	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	40.0	40.0	40.0	cm	1
Dwarf shrubs	SD	0.5	0.5	0.5	cm	1
Tall and medium grasses and grass-likes	GT, GM	30.0	30.0	30.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	3.0	3.0	cm	1

Map Unit Components**Common Name (Soils Name):**

Boreal-bog organic depressions (Hydric Cryofibrists, dysic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

3BG Boreal Wet Meadows and Bogs
(Humic Cryaquepts, coarse-loamy-Hydric Cryofibrists, dysic Complex)

Geographically Associated Landtypes**131B_104—Loamy Frozen Terraces:**

This site occurs on terraces with loamy soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_105—Loamy Frozen Terraces, Wet:

This site occurs on terraces with soils that are wetter and moderately deep over permafrost. The climax plant community is "Black spruce-tamarack/tussock cottongrass woodland."

131B_400—Loamy Frozen Slopes:

This site occurs on loess plains and hills with poorly drained soils that are moderately deep over permafrost. The climax plant community is "Black spruce/Labrador tea woodland."

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on loess plains and hills with soils that are wetter and moderately deep over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

Similar Landtypes**131B_501—Organic Depressions, Fens:**

This site occurs on soils in more nutrient rich fens. The climax plant community is "Sedge wet meadow."

131B_506—Organic Depressions, Eutrophic Fens:

This site occurs on soils in nutrient rich fens. The climax plant community is "Tulfted bulrush meadow."

Peat Slopes, Frozen (131B_531)**Ecoregion Classification**

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Eolian Lowlands (131B.L1)

Physiographic Features

	RV	Range
Elevation (meters):	231	153 to 381
Slope Gradient (percent):	6	0 to 10
Aspect (clockwise direction):	non-influencing	
Landform:	plains	

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	479	359 to 651
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty eolian deposits

Rooting Depth (cm): RV: 49 Range: 39 to 58

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
49	mucky peat	moderately rapid	.34	3.9	30	

Restrictive Features: permafrost at 66 cm
strongly contrasting textural stratification at 81 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Black spruce/cloudberry woodland	Climax plant community

Ecological Status-Transition Description:

A single plant community with black spruce/cloudberry woodland is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand			Number of Stands	
	Total	Min.	Avg.		Max.
Black spruce/cloudberry woodland	23	12	16	20	5

Characteristics of Black spruce/cloudberry woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TS	PIMA	<i>Picea mariana</i>	10.0	15	20	100	39
SD-SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	20.0	24	30	100	49
SD-SL	VAUL	<i>Vaccinium uliginosum</i>	2.0	8	15	100	28
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	5.0	8	10	100	28
SD	ANPO	<i>Andromeda polifolia</i>	0.1	6	15	100	24
SD	EMNI	<i>Empetrum nigrum</i>	1.0	6	10	80	22
FD	RUCH	<i>Rubus chamaemorus</i>	20.0	30	35	100	55
L	LICHEN	total lichens	10.0	25	45	100	50
L1	CLADI3	<i>Cladina</i>	3.0	6	10	80	22
L1	CLRA61	<i>Cladina rangiferina</i> group	0.1	5	10	100	22
L1	CLADO3	<i>Cladonia</i>	1.0	5	10	100	22
L1	CLMU60	<i>Cladonia multiformis</i>	2.0	7	15	60	20
L1	CLST60	<i>Cladina stellaris</i>	2.0	5	10	60	17
M	MOSS	total bryophytes-mosses and liverworts	45.0	67	90	100	82
M1	SPHAG2	<i>Sphagnum</i>	30.0	48	65	100	69
M1	PLSC70	<i>Pleurozium schreberi</i>	5.0	11	25	100	33
M1	ZZMOSS	unknown-mosses	0.1	8	15	100	28
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	4.0	15	20	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.1	1	2	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	4.3	4.5	m	5
Tree regeneration	TR	0.3	0.8	1.0	m	5
Low shrubs	SL	25.0	41.2	50.0	cm	4
Dwarf shrubs	SD	8.0	11.7	15.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	50.0	50.0	50.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.2	5.0	cm	12

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured.

G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
<i>Picea mariana</i>	169	8.1	3.7	Min.	1	G
	169	8.1	3.7	Avg.		
	169	8.1	3.7	Max.		

Map Unit Components

Common Name (Soils Name):

Boreal-taiga peat slopes, frozen (Terric Hemistels, loamy)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

3FU Boreal Loess Plains and Hills with Continuous Permafrost
(Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 10 percent slopes)

Geographically Associated Landtypes

131B_400—Loamy Frozen Slopes:

This site occurs on plains and hills with loamy soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on loess plains and hills with soils that are wetter and moderately deep over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

131B_530—Depressions, Bogs:

This site occurs on wetter soils that lack permafrost. The climax plant community is "Sedge/sphagnum moss bog."

Loamy Depressions, Eutrophic Bogs (131B_532)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Lowland Flood Plains & Terraces (131B.V1)
Eolian Lowlands (131B.L1)

Physiographic Features

Elevation (meters):	RV	Range			
	252	232 to 266			
Slope Gradient (percent):	0	0 to 0			
Aspect (clockwise direction):	non-influencing				
Landform:	depressions on outwash plains; depressions on plains				
Flooding:	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
	None				
Ponding:	Occasional	Long	May	Sep	0 to 20

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	479	359 to 651
Annual Air Temperature (°C):	-2.6	-2.9 to -2.4
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: silty eolian deposits over loamy eolian deposits

Rooting Depth (cm): RV: 61 Range: 32 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
8	slightly decomposed plant material	moderately rapid	.34	3.4	30	
20	silt loam	moderate	.26	4.2	15	
33	fine sandy loam	moderate	.15	5.0	15	

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Bluejoint wet meadow	Climax plant community
Haircap moss-sphagnum moss wet meadow	Early stage of pond/fen/bog succession
Woollyfruit sedge wet meadow	Late stage of pond/fen/bog succession

Ecological Status-Transition Description:

Three plant communities are identified on this site based on relative position and associated wetness. An early pond succession community of haircap moss-sphagnum moss wet meadow is described where ponds have drained by natural processes including fire removal of permafrost from adjoining landscapes or infilling of ponds by natural erosion following fire. As succession proceeds this community is replaced by a late-seral community of woollyfruit sedge wet meadow and, eventually the potential community of bluejoint wet meadow. Pond succession is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Bluejoint wet meadow	49	4	13	22	7
Haircap moss-sphagnum moss wet meadow	10	10	10	10	1
Woollyfruit sedge wet meadow	63	11	19	25	6

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Bluejoint wet meadow	CALAA5	Carex lasiocarpa ssp. americana
	LEMI3	Lemna minor
	LYDE	Lycopodium dendroideum
Woollyfruit sedge wet meadow	CAAD	Carex adelostoma
	CACH5	Carex chordorrhiza
	CALAA5	Carex lasiocarpa ssp. americana
	GLBO	Glyceria borealis
	ISEC	Isoetes echinospora
	POEP2	Potamogeton epihydrus
	SUAQ	Subularia aquatica
	UTMI	Utricularia minor

Characteristics of Bluejoint wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GT	CACA4	Calamagrostis canadensis	25.0	67	90	100	82
GT	CALAA5	Carex lasiocarpa ssp. americana	15.0	33	50	43	38
GT	CARO6	Carex rostrata	0.1	6	15	71	21
GM-GT	CASAL2	Carex saxatilis ssp. laxa	1.0	7	15	43	17

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GT	CAUT	Carex utriculata	5.0	8	10	29	15
GM	CARO7	Carex rotundata	3.0	6	10	29	13
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	38	85	100	62
M1	POLYT5	Polytrichum	0.1	12	60	86	32
M1	SPHAG2	Sphagnum	0.1	15	40	57	29
M1	ZZMOSS	unknown-mosses	3.0	10	20	86	29
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	40.0	77	95	100	88
B	WATER	water	0.0	15	35	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.5	4.5	6.5	m	2
Tree regeneration	TR	2.0	2.0	2.0	m	1
Tall shrubs	ST	3.0	3.0	3.0	m	1
Medium shrubs	SM	1.5	1.7	2.0	m	3
Low shrubs	SL	30.0	45.0	60.0	cm	2
Dwarf shrubs	SD	20.0	20.0	20.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	30.0	103.0	170.0	cm	10
Tall and medium forbs	FT, FM	20.0	25.0	30.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.1	1.7	3.0	cm	7

Characteristics of Haircap moss-sphagnum moss wet meadow

Ecological Status: Early stage of pond/fen/bog succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	SPST3	Spiraea stevenii	10.1	10	10	100	32
GT	CACA4	Calamagrostis canadensis	5.0	5	5	100	22
FM	EQSY	Equisetum sylvaticum	15.0	15	15	100	39
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	95.0	95	95	100	97
M1	POLYT5	Polytrichum	65.0	65	65	100	81
M1	SPHAG2	Sphagnum	50.0	50	50	100	71
M1	ZZMOSS	unknown-mosses	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	15	15	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	2.2	2.2	2.2	m	1
Tall and medium grasses and grass-likes	GT, GM	150.0	150.0	150.0	cm	1
Tall and medium forbs	FT, FM	30.0	30.0	30.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	5.0	5.0	5.0	cm	1

Characteristics of Woollyfruit sedge wet meadow

Ecological Status: Late stage of pond/fen/bog succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GT	CALAA5	Carex lasiocarpa ssp. americana	0.1	24	60	100	49
GT	ERAN6	Eriophorum angustifolium	10.0	40	70	33	36
GT	CARO6	Carex rostrata	5.0	15	20	50	27
GT	CAUT	Carex utriculata	35.0	35	35	17	24
GT	ERANS2	Eriophorum angustifolium ssp. subarcticum	35.0	35	35	17	24
GT	CACA4	Calamagrostis canadensis	4.0	8	15	67	23
GT	CAAD	Carex adelostoma	30.0	30	30	17	23
GM-GT	CAAQ	Carex aquatilis	2.0	9	20	50	21
GT	ELPA3	Eleocharis palustris	1.0	8	15	33	16
GM	CACH5	Carex chordorrhiza	0.1	7	15	50	19
GM	CARO7	Carex rotundata	2.0	11	20	33	19
GM	CAMAI2	Carex magellanica ssp. irrigua	0.1	5	10	67	18
GM	AGSC5	Agrostis scabra	15.0	15	15	17	16
GM	CALI7	Carex limosa	2.0	8	15	33	16
GM	CATE5	Carex tenuiflora	5.0	5	5	17	9
GM	ELAC	Eleocharis acicularis	5.0	5	5	17	9
FT	EQFL	Equisetum fluviatile	20.0	20	20	17	18
FD	METR3	Menyanthes trifoliata	1.0	7	15	50	19
FD	GATR2	Galium trifidum	5.0	5	5	17	9
FD	RUAR	Rubus arcticus	5.0	5	5	17	9
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	25	60	100	50
M1	DRRE99	Drepanocladus revolvens	50.0	50	50	17	29
M1	ZZMOSS	unknown-mosses	0.1	9	15	83	27
M1	SPHAG2	Sphagnum	0.1	7	30	83	24
M1	TONI70	Tomentypnum nitens	5.0	5	5	33	13
M1	CALLI10	Calliergon	5.0	5	5	17	9
B	WATER	water	40.0	58	85	100	76
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	48	90	100	69
B	SOIL	mineral-bare soil	0.0	3	15	100	17
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.5	1.6	1.8	m	2
Low shrubs	SL	40.0	60.0	70.0	cm	3
Dwarf shrubs	SD	20.0	20.0	20.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	5.0	89.6	180.0	cm	14
Tall and medium forbs	FT, FM	40.0	60.0	120.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	3.9	10.0	cm	9

Map Unit Components

Common Name (Soils Name):

Boreal-loamy wet meadows (Humic Cryaquepts, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

3BG Boreal Wet Meadows and Bogs
(Humic Cryaquepts, coarse-loamy-Hydric Cryofibrists, dysic Complex)

Geographically Associated Landtypes

131B_104—Loamy Frozen Terraces:

This site occurs on terraces with loamy soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_105—Loamy Frozen Terraces, Wet:

This site occurs on terraces with soils that are wetter and moderately deep over permafrost. The climax plant community is "Black spruce-tamarack/tussock cottongrass woodland."

131B_400—Loamy Frozen Slopes:

This site occurs on plains and hills with loamy soils that have permafrost at moderate depths. The climax plant

131B_402—Loamy Frozen Slopes, Wet:

This site occurs on loess plains and hills with soils that are wetter and moderately deep over permafrost. The climax plant community is "Black spruce/tussock cottongrass woodland."

Organic Moderately Wet Depressions, Bogs (131B_533)

Ecoregion Classification

Section: Yukon-Kuskokwim Bottomlands (131B)

Subsection(s): Minchumina Basin Lowlands (131B.V2)

Physiographic Features

Elevation (meters): RV 185 Range 165 to 236

Slope Gradient (percent): 0 0 to 0

Aspect (clockwise direction): non-influencing

Landform: bogs on alluvial flats

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	None				
Ponding:	None				

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	392	336 to 565
Annual Air Temperature (°C):	-2.7	-3.0 to -2.5
Frost Free Days:	100	80 to 110

Soil Features

Parent Materials: mossy organic material and/or herbaceous organic material

Rooting Depth (cm): RV: 150 Range: 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
34 to 116	peat; mucky peat	moderately rapid	.33	6.1 to 6.2		80

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Tamarack/bog rosemary/water horsetail woodland	Climax plant community

Ecological Status-Transition Description:

A single plant community with tamarack/bog rosemary/water horsetail woodland is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Tamarack/bog rosemary/water horsetail woodland	25	15	18	20	2

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Tamarack/bog rosemary/water horsetail woodland	CACH5	Carex chordorrhiza
	PEMA	Pedicularis macrodonta
	SACA4	Salix candida

Characteristics of Tamarack/bog rosemary/water horsetail woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TM	LALA	Larix laricina	15.0	15	15	50	27
TS	LALA	Larix laricina	10.0	10	10	50	22
SM	BEGL	Betula glandulosa	5.0	8	10	100	28
SL	ANPO	Andromeda polifolia	25.0	30	35	100	55
SL	CHCA2	Chamaedaphne calyculata	20.0	28	35	100	53
GM	CAMAI2	Carex magellanica ssp. irrigua	0.1	8	15	100	28
GM	CALI7	Carex limosa	15.0	15	15	50	27
GM	CATE5	Carex tenuiflora	4.0	7	10	100	26
GM	CACH5	Carex chordorrhiza	10.0	10	10	50	22
FT	EQFL	Equisetum fluviatile	20.0	22	25	100	47
FM	COPA28	Comarum palustre	10.0	10	10	100	32
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	45.0	58	70	100	76
M1	SPHAG2	Sphagnum	5.0	22	40	100	47
M1	ZZMOSS	unknown-mosses	10.0	18	25	100	42
M1	TONI70	Tomentypnum nitens	10.0	12	15	100	35
M1	HYSP70	Hylocomium splendens	10.0	10	10	50	22
B	WATER	water	25.0	38	50	100	62
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	15	20	100	39
B	LITTER2	litter-woody debris >2.5 cm	1.0	2	2	100	14
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.5	3.8	5.0	m	2
Tree regeneration	TR	2.5	2.5	2.5	m	1
Medium shrubs	SM	1.2	1.5	1.8	m	2
Low shrubs	SL	30.0	35.0	40.0	cm	2
Dwarf shrubs	SD	1.0	9.5	18.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	20.0	36.7	50.0	cm	3
Tall and medium forbs	FT, FM	50.0	100.0	130.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.7	8.0	cm	3

Map Unit Components**Common Name (Soils Name):**

Boreal-taiga scrub bog organic depressions (Typic Cryohemists, euic)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

1STW Boreal Terraces with Continuous Permafrost, Wet
(Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association)

Geographically Associated Landtypes**131B_104—Loamy Frozen Terraces:**

This site occurs on terraces with loamy soils that have permafrost at moderate depths. The climax plant community is "Black spruce-tamarack/Labrador tea woodland."

131B_105—Loamy Frozen Terraces, Wet:

This site occurs on slightly higher terrace positions with wetter, moderately deep soils over permafrost. The climax plant community is "Black spruce-tamarack/tussock cottongrass woodland."

131B_501—Organic Depressions, Fens:

This site occurs on wetter, very deep soils in cutoff meanders. The climax plant community is "Sedge wet meadow."

Loamy Flood Plains (135A_100)**Ecoregion Classification**

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

Elevation (meters): RV 281 Range 90 to 969

Slope Gradient (percent): 1 0 to 8

Aspect (clockwise direction): non-influencing

Landform: channels on flood plains; flood plains; flood plains on alluvial fans on mountains

Flooding: Frequency Occasional Duration Brief Beginning Month May Ending Month Sep

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,112	408 to 3,051
Annual Air Temperature (°C):	-1.8	-6.9 to 1.0
Frost Free Days:	75	60 to 100

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 28 Range: 4 to 62

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3	moderately decomposed plant material	moderately rapid	.34	5.4	30	
13	stratified sand to silt	moderate	.15	5.5	15	
12	extremely cobbly coarse sand	rapid	.06	5.7		2

Restrictive Features: strongly contrasting textural stratification at 16 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Poplar/alder forest	Climax plant community
White spruce-poplar/Sitka alder forest	Post climax plant community

Ecological Status-Transition Description:

Two plant communities are identified on this site including a potential with poplar/alder forest and a post potential community of minor extent with white spruce-poplar/Sitka alder forest in areas of slightly lower flooding frequency or duration. Flooding disturbance is identified as a transitional pathway on this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Poplar/alder forest	107	15	26	45	13
White spruce-poplar/Sitka alder forest	48	15	25	33	3

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Poplar/alder forest	POPA2	Poa palustris

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Poplar/alder forest	BOVIE	Botrychium virginianum ssp. europaeum
	CIAL	Circaea alpina
	COCO9	Conocephalum conicum
	ELTRN	Elymus trachycaulus ssp. novae-angliae
	GLSTS	Glyceria striata ssp. stricta
	GOREO2	Goodyera repens var. ophioides
	OSDE	Osmorhiza depauperata
	POBRA	Polystichum braunii var. alaskense
	SASE4	Salix setchelliana
	SWST2	Swida stolonifera
	WISE2	Viola selkirkii

Characteristics of Poplar/alder forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 13. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	15.0	42	75	92	62
SM-ST	ALSI3	Alnus sinuata	5.0	44	70	77	58
SM-ST	ALTE2	Alnus tenuifolia	2.0	32	60	54	42
SM-ST	SABA3	Salix barclayi	0.1	10	15	62	25
SM-ST	SAAL	Salix alaxensis	0.1	9	30	46	20
SM-ST	SASI2	Salix sitchensis	0.1	10	30	38	19
SM-ST	SAPU15	Salix pulchra	1.0	6	10	15	9
SM	OPHO	Oplopanax horridus	0.1	25	85	85	46
SM	VIED	Viburnum edule	5.0	14	45	62	29
SL-SM	RITR	Ribes triste	1.0	9	25	54	22
SM	SHCA	Shepherdia canadensis	5.0	14	30	23	18
SL-SM	ROAC	Rosa acicularis	1.0	5	15	38	14
GT	CACA4	Calamagrostis canadensis	0.1	13	55	85	33
FT	DRDI2	Dryopteris dilatata	0.1	9	40	77	26
FM-FT	EPAN2	Epilobium angustifolium	0.1	7	20	46	18
FM	EQAR	Equisetum arvense	0.1	11	40	62	26
FD-FM	GYDR	Gymnocarpium dryopteris	1.0	10	40	62	25
FM	EQPR	Equisetum pratense	2.0	6	10	31	14
FD	PYAS	Pyrola asarifolia	0.1	12	60	69	29
FD	CIAL	Circaea alpina	7.0	7	7	15	10
L	LICHEN	total lichens	0.1	1	15	100	10
M	MOSS	total bryophytes-mosses and liverworts	2.0	15	51	100	39
M1	ZZMOSS	unknown-mosses	2.0	7	15	62	21
M1	PLSC70	Pleurozium schreberi	1.0	6	15	23	12
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	70.0	87	100	100	93
B	LITTER2	litter-woody debris >2.5 cm	3.0	9	15	100	30
B	SOIL	mineral-bare soil	0.0	2	20	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	23.2	36.0	m	14
Tree regeneration	TR	2.5	3.6	4.2	m	3
Tall shrubs	ST	3.0	4.5	5.0	m	11
Medium shrubs	SM	1.2	1.6	3.0	m	14
Low shrubs	SL	50.0	75.0	90.0	cm	4
Tall and medium grasses and grass-like	GT, GM	100.0	137.5	200.0	cm	8
Tall and medium forbs	FT, FM	15.0	83.1	190.0	cm	13
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.6	10.0	cm	24

Characteristics of White spruce-poplar/Sitka alder forest

Ecological Status: Post climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	15.0	17	20	100	41
TT	POBA2	Populus balsamifera	10.0	15	20	67	32

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TS	POBA2	Populus balsamifera	5.0	5	5	33	13
ST	ALSI3	Alnus sinuata	20.0	38	55	67	50
SM-ST	SABA3	Salix barclayi	1.0	9	15	100	30
ST	SAAL	Salix alaxensis	5.0	7	10	100	26
SL-SM	SHCA	Shepherdia canadensis	10.0	20	35	100	45
SM	SACO2	Salix commutata	15.0	15	15	33	22
SD-SL	VAUL	Vaccinium uliginosum	1.0	6	10	67	20
SD	EMNI	Empetrum nigrum	2.0	6	10	100	24
SD	ARRU6	Arctous rubra	5.0	5	5	67	18
L	LICHEN	total lichens	0.1	15	45	100	39
L1	CLADO3	Cladonia	1.0	10	20	67	26
L1	CLADI3	Cladina	10.0	10	10	33	18
L1	STERE2	Stereocaulon	10.0	10	10	33	18
L1	CLRA61	Cladina rangiferina group	5.0	5	5	33	13
M	MOSS	total bryophytes-mosses and liverworts	20.0	32	40	100	57
M1	PLSC70	Pleurozium schreberi	10.0	13	20	100	36
M1	ZZMOSS	unknown-mosses	5.0	8	10	100	28
M1	HYSP70	Hylocomium splendens	10.0	10	10	33	18
M2	PTPU99	Ptilidium pulcherrimum	5.0	5	5	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	58	80	100	76
B	LITTER2	litter-woody debris >2.5 cm	5.0	7	10	100	26
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	7.0	16.5	26.0	m	4
Tall shrubs	ST	3.0	4.3	5.0	m	3
Medium shrubs	SM	1.1	1.4	1.9	m	3
Low shrubs	SL	40.0	70.0	100.0	cm	2
Dwarf shrubs	SD	4.0	4.5	5.0	cm	2
Tall and medium forbs	FT, FM	30.0	30.0	30.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.0	10.0	cm	7

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	124	28.4	15.9		
	143	30.0	17.7		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
17.2	21.3	25.3	2

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested gravelly high flood plains, Cook Inlet (Typic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13FP	Boreal Flood Plains (Typic Cryorthents-Oxyaquic Cryorthents, sandy-skeletal-Riverwash Complex)
9AF2	Boreal Fans (Typic Cryorthents, sandy-skeletal-Spodic Dystrocryepts, sandy-skeletal Association, 2 to 10 percent slopes)

Geographically Associated Landtypes

135A_156—Loamy Wet High Flood Plains:

This site occurs on wet high flood plains. The climax plant community is "Mixed white spruce-poplar/thinleaf alder forest."

135A_200—Gravelly Low Flood Plains:

This site occurs on low flood plains. The climax plant community is "Sitka alder-Barclay willow-Sitka willow scrub."

135A_201—Gravelly Flood Plains:

This site occurs on flood plains. The climax plant community is "Poplar/soapberry forest."

135A_500—Loamy Wet Flood Plains:

This site occurs on wet flood plains. The climax plant community is "Thinleaf alder-mixed willow scrub."

Similar Landtypes

135A_156—Loamy Wet High Flood Plains:

This site has wetter soils. The climax plant community is "Mixed white spruce-poplar/thinleaf alder forest."

135A_201—Gravelly Flood Plains:

This site lacks a thick loamy surface mantle. The climax plant community is "Poplar/soapberry forest."

Loamy Flood Plains, High Elevation (135A_150)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from diorite

Rooting Depth (cm): RV: 22 Range: 10 to 45

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2	slightly decomposed plant material	moderately rapid	.34	5.0 to 5.2	30	
7 to 13	stratified sand to silt	moderate	.15	4.6 to 6.9	6	10 to 16

Restrictive Features: strongly contrasting textural stratification at 41 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Sitka alder-mixed willow scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with Sitka alder-mixed willow scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sitka alder-mixed willow scrub	89	21	30	40	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sitka alder-mixed willow scrub	WISE2	Viola selkirkii

Characteristics of Sitka alder-mixed willow scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	7.0	7	7	20	12
SM-ST	SABA3	Salix barclayi	15.0	38	50	80	55
ST	ALSI3	Alnus sinuata	0.1	24	60	80	44
SM-ST	SAAL	Salix alaxensis	4.0	14	35	80	33
SM-ST	SAPU15	Salix pulchra	5.0	25	45	40	32
SM-ST	SACO2	Salix commutata	2.0	24	45	40	31
ST	SAAR3	Salix arbusculoides	10.0	10	10	20	14
SM	SAGL	Salix glauca	5.0	5	5	20	10
SL	SHCA	Shepherdia canadensis	45.0	45	45	20	30
SD	SARE2	Salix reticulata	5.0	5	5	20	10
GT	CACA4	Calamagrostis canadensis	20.0	29	35	80	48
GM	FEAL	Festuca altaica	5.0	5	5	20	10
FM-FT	EPAN2	Epilobium angustifolium	0.1	6	10	80	22
FM-FT	MEPA	Mertensia paniculata	1.0	6	10	40	15
FM	GYDR	Gymnocarpium dryopteris	25.0	35	45	40	37
FD	VIEPR	Viola epipsila ssp. repens	10.0	12	15	40	22
FD	ANRI	Anemone richardsonii	2.0	6	10	60	19
FD	RUAR	Rubus arcticus	5.0	8	10	40	18
FD	RUST6	Rubus stellatus	1.0	8	15	40	18
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	10.0	22	40	100	47
M1	ZZMOSS	unknown-mosses	10.0	19	35	80	39
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	60.0	76	90	100	87
B	LITTER2	litter-woody debris >2.5 cm	2.0	11	25	100	33
B	SOIL	mineral-bare soil	0.1	2	5	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	2	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	18.0	18.0	18.0	m	1
Tree regeneration	TR	2.5	2.8	3.0	m	2
Tall shrubs	ST	3.0	3.4	3.7	m	5
Medium shrubs	SM	1.2	2.0	2.5	m	4
Low shrubs	SL	30.0	63.3	100.0	cm	3
Dwarf shrubs	SD	3.0	3.0	3.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	50.0	102.5	120.0	cm	4
Tall and medium forbs	FT, FM	25.0	64.6	110.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	3.8	8.0	cm	9

Map Unit Components**Common Name (Soils Name):**

Alpine-riparian scrub loamy flood plains, warm (Typic Cryofluvents, coarse-loamy over sandy-skeletal)

Subalpine-riparian scrub loamy diorite flood plains (Typic Cryofluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

13F22 Alpine Diorite Flood Plains and Wet Mountain Toeslopes

(Typic Cryorthents, sandy-skeletal-Riverwash-Typic Cryaquents, coarse-loamy over sandy-skeletal Complex, 0 to 6 percent slopes)

9V12 Alpine Fans and Flood Plains, High Elevation

(Typic Eutrocrypts, sandy-skeletal-Riverwash-Typic Eutrogelepts, sandy-skeletal Complex, 0 to 30 percent slopes)

Geographically Associated Landtypes**135A_152—Loamy Wet Flood Plains, High Elevation:**

This site occurs on poorly drained channels. The climax plant community is "Barclay willow-diamondleaf willow wet

135A_257—Gravelly Flood Plains, Cool:

This site occurs on lower flood plains. The climax plant community is "Feltleaf willow-Barclay willow-Sitka willow scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on lower flood plains. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes**135A_200—Gravelly Low Flood Plains:**

This site lacks a thick loamy surface mantle. The climax plant community is "Sitka alder-Barclay willow-Sitka willow

135A_500—Loamy Wet Flood Plains:

This site has drier soils. The climax plant community is "Thinleaf alder-mixed willow scrub."

135A_803—Moraines, Ice Cored:

This site has well drained soils on recent, unstable moraines. The climax plant community is "Moraine poplar/alder woodland."

Loamy Wet Flood Plains, High Elevation (135A_152)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

Elevation (meters): RV 551 Range 329 to 849
Slope Gradient (percent): 1 0 to 2
Aspect (clockwise direction): non-influencing
Landform: channels on flood plains

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	Occasional	Brief	May	Sep	
Ponding:	Occasional	Long	May	Jun	to

Climatic Features

Annual Precipitation (millimeters): RV 822 Range 678 to 989
Annual Air Temperature (°C): -0.1 -1.5 to 1.0
Frost Free Days: 80 70 to 100

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from diorite

Rooting Depth (cm): RV: 32 Range: 10 to 82

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4 to 9	moderately decomposed plant material	moderately rapid	.34	6.2 to 6.4		80
3 to 12	stratified fine sand to silt	moderate	.15	6.2 to 6.8		16 to 20
16 to 20	stratified sand to silt	moderate	.15	6.3 to 6.4		10 to 16

Restrictive Features: strongly contrasting textural stratification at 36 to 56 cm

Water Table (May to September): 0 to 10 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Barclay willow-diamondleaf willow wet scrub	Climax plant community
Beaver dam Sitka willow wet scrub	Beaver impacted site and vegetation

Ecological Status-Transition Description:

Two plant communities are identified within this flood prone site including a potential community with Barclay willow-diamondleaf willow wet scrub and a community associated with beaver activity with Sitka willow scrub, beaver dam in which the site conditions have been significantly altered and are now wetter due to beaver dam construction. Flooding and beaver activity are considered transitional pathways between community types.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Barclay willow-diamondleaf willow wet scrub	26	26	26	26	1
Beaver dam Sitka willow wet scrub	54	19	21	22	4

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Barclay willow-diamondleaf willow wet scrub	CAEN2	Carex enanderi
Beaver dam Sitka willow wet scrub	CAEL4	Carex eleusinoides

Characteristics of Barclay willow-diamondleaf willow wet scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM	SABA3	Salix barclayi	45.0	45	45	100	67
SM	SAPU15	Salix pulchra	45.0	45	45	100	67
GT	CACA4	Calamagrostis canadensis	5.0	5	5	100	22
FM	EQAR	Equisetum arvense	30.0	30	30	100	55
FM	RHIN11	Rhodiola integrifolia	10.0	10	10	100	32
FM	SAST11	Sanguisorba stipulata	10.0	10	10	100	32
FD	VIEPR	Viola epipsila ssp. repens	10.0	10	10	100	32
FD	ANRI	Anemone richardsonii	5.0	5	5	100	22
FD	ORSE	Orthilia secunda	5.0	5	5	100	22
FD	PYMI	Pyrola minor	5.0	5	5	100	22
FD	RUAR	Rubus arcticus	5.0	5	5	100	22
FD	RUST6	Rubus stellatus	5.0	5	5	100	22
FD	TREU	Trientalis europaea	5.0	5	5	100	22
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	20.0	20	20	100	45
M1	ZZMOSS	unknown-mosses	15.0	15	15	100	39
M1	CLDE70	Climacium dendroides	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	75.0	75	75	100	87
B	SOIL	mineral-bare soil	20.0	20	20	100	45
B	LITTER2	litter-woody debris >2.5 cm	5.0	5	5	100	22
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	2.7	2.7	2.7	m	1
Tall and medium grasses and grass-like	GT, GM	100.0	100.0	100.0	cm	1
Tall and medium forbs	FT, FM	25.0	25.0	25.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.0	2.0	cm	1

Characteristics of Beaver dam Sitka willow wet scrub

Ecological Status: Beaver impacted site and vegetation

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	5.0	5	5	25	11
SM-ST	SABA3	Salix barclayi	10.0	41	55	100	64
SM-ST	SASI2	Salix sitchensis	10.0	28	40	75	46
SM-ST	ALSI3	Alnus sinuata	5.0	12	20	75	30
ST	ALTE2	Alnus tenuifolia	5.0	10	15	50	22
SM	VIED	Viburnum edule	20.0	20	20	25	22
SM	SACO2	Salix commutata	10.0	10	10	25	16
SL	VAUL	Vaccinium uliginosum	5.0	5	5	25	11
GT	CACA4	Calamagrostis canadensis	0.1	12	25	100	35
GM-GT	CAAQ	Carex aquatilis	0.1	13	25	50	25
GT	CASAL2	Carex saxatilis ssp. laxa	25.0	25	25	25	25
GM	JUFI	Juncus filiformis	5.0	5	5	25	11
FM	EQAR	Equisetum arvense	1.0	11	20	100	33
FM	COPA28	Comarum palustre	1.0	6	10	50	17
FM	GYDR	Gymnocarpium dryopteris	10.0	10	10	25	16
FM	SAST11	Sanguisorba stipulata	5.0	5	5	25	11
FD	VIEPR	Viola epipsila ssp. repens	10.0	10	10	50	22
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	10.0	49	90	100	70
M1	ZZMOSS	unknown-mosses	10.0	30	45	75	47
M1	SPHAG2	Sphagnum	10.0	10	10	25	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	39	60	100	62
B	WATER	water	0.0	22	65	100	47
B	LITTER2	litter-woody debris >2.5 cm	0.1	9	20	100	30
B	SOIL	mineral-bare soil	0.0	6	10	100	24
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	15.0	15.0	15.0	m	1
Tall shrubs	ST	3.0	3.5	4.0	m	3
Medium shrubs	SM	1.5	1.6	1.6	m	2
Low shrubs	SL	20.0	20.0	20.0	cm	1
Tall and medium grasses and grass-like	GT, GM	140.0	160.0	180.0	cm	2
Tall and medium forbs	FT, FM	10.0	65.0	150.0	cm	6
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	2.9	5.0	cm	4

Map Unit Components**Common Name (Soils Name):**

Alpine-riparian scrub loamy diorite low flood plains, wet (Typic Cryaquents, coarse-loamy over sandy-skeletal)
Alpine-riparian scrub loamy wet flood plains, warm (Typic Cryaquents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13F21	Subalpine and Alpine Diorite Flood Plains (Oxyaquic Cryorthents, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Terric Cryofibrists, euc Complex)
13F22	Alpine Diorite Flood Plains and Wet Mountain Toeslopes (Typic Cryorthents, sandy-skeletal-Riverwash-Typic Cryaquents, coarse-loamy over sandy-skeletal Complex, 0 to 6 percent slopes)

Geographically Associated Landtypes

135A_150—Loamy Flood Plains, High Elevation:

This site occurs on higher bar positions with well-drained soils. The climax plant community is "Sitka alder-mixed willow scrub."

135A_257—Gravelly Flood Plains, Cool:

This site occurs on lower flood plains. The climax plant community is "Feltleaf willow-Barclay willow-Sitka willow scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on lower flood plains. The climax plant community is "Sparsely vegetated alluvium."

Loamy Wet High Flood Plains (135A_156)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

Elevation (meters): RV 168 Range 61 to 487

Slope Gradient (percent): 1 0 to 2

Aspect (clockwise direction): non-influencing

Landform: channels on flood plains

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Occasional	Brief	May	Sep

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 822 Range 678 to 989

Annual Air Temperature (°C): -0.1 -1.5 to 1.0

Frost Free Days: 80 70 to 100

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 33 Range: 22 to 50

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 4	slightly decomposed plant material; moderately decomposed plant material	moderately rapid	.34	6.4 to 6.8		80
18 to 31	stratified fine sand to silt	moderate	.15	6.8 to 7.9	1	20
11	stratified sand to silt	moderate	.15	6.4		20

Restrictive Features: strongly contrasting textural stratification at 86 cm

Water Table (May to September): 60 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Mixed white spruce-poplar/thinleaf alder forest	Climax plant community

Ecological Status-Transition Description:

A single plant community with mixed white spruce-poplar/thinleaf alder forest is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Mixed white spruce-poplar/thinleaf alder forest	49	33	36	38	2

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Mixed white spruce-poplar/thinleaf alder forest	GLSTS	Glyceria striata ssp. stricta

Characteristics of Mixed white spruce-poplar/thinleaf alder forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy			
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	15.0	15	15	100	39
TT	PIGL	Picea glauca	7.0	11	15	100	33
ST	ALTE2	Alnus tenuifolia	60.0	62	65	100	79
SM	ROAC	Rosa acicularis	15.0	20	25	100	45
SL-SM	VIED	Viburnum edule	5.0	20	35	100	45
SL-SM	RITR	Ribes triste	5.0	10	15	100	32
SM	SACO2	Salix commutata	10.0	10	10	50	22
SM	SABA3	Salix barclayi	5.0	5	5	50	16
GT	CACA4	Calamagrostis canadensis	2.0	14	25	100	37
FM	EQAR	Equisetum arvense	15.0	20	25	100	45
FM	GYDR	Gymnocarpium dryopteris	20.0	20	20	50	32
FD	ANRI	Anemone richardsonii	5.0	5	5	50	16
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	18	30	100	42
M1	ZZMOSS	unknown-mosses	4.0	12	20	100	35
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	60.0	75	90	100	87
B	LITTER2	litter-woody debris >2.5 cm	25.0	28	30	100	53
B	WATER	water	0.1	1	1	100	10
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	26.0	26.0	26.0	m	2
Tall shrubs	ST	5.0	5.2	5.5	m	2
Medium shrubs	SM	1.2	1.2	1.2	m	1
Tall and medium grasses and grass-likes	GT, GM	130.0	155.0	180.0	cm	2
Tall and medium forbs	FT, FM	60.0	90.0	120.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.5	3.0	cm	2

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	92	32.3	18.9	Min.	4	B
	116	32.9	21.9	Avg.		
	131	34.0	25.6	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
11.5	11.5	11.5	2

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested loamy wet flood plains, Cook Inlet (Aquic Cryofluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13FPW	Boreal Flood Plains and Terraces, Wet (Typic Cryaquents, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Terric Cryofibrists, euc Complex)
13FWW	Boreal Flood Plains, Very Wet (Terric Cryofibrists, euc-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes**135A_500—Loamy Wet Flood Plains:**

This site occurs on lower flood plains. The climax plant community is "Thinleaf alder-mixed willow scrub."

135A_501—Organic High Flood Plains, Very Wet:

This site occurs on broad flood plain depressions and soils are wetter with thick organic surface mats. The climax plant community is "Water horsetail-marsh five finger-buckbean wet meadow."

135A_502—Organic High Flood Plains:

This site occurs on broad flood plain depressions and soils are wetter with thick organic surface mats. The climax plant community is "Thinleaf alder/sweetgale/water horsetail scrub."

Similar Landtypes**135A_100—Loamy Flood Plains:**

This site has well drained soils. The climax plant community is "Poplar/alder forest."

Gravelly Low Flood Plains (135A_200)**Ecoregion Classification**

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

Elevation (meters):	RV 415	Range 91 to 882
Slope Gradient (percent):	1	0 to 2
Aspect (clockwise direction):	non-influencing	
Landform:	channels on flood plains	

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Frequent	Long	May	Sep
Ponding:	None			

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	822	678 to 989
Annual Air Temperature (°C):	-0.1	-1.5 to 1.0
Frost Free Days:	80	70 to 100

Soil Features

Parent Materials: sandy and gravelly alluvium
sandy and gravelly alluvium derived from diorite

Rooting Depth (cm): RV: 36 Range: 9 to 92

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
15 to 21	extremely cobbly coarse sand	rapid	.06	5.1 to 6.3	2	2

Water Table (May to September): 50 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Sitka alder-Barclay willow-Sitka willow scrub

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community with Sitka alder-Barclay willow-Sitka willow scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sitka alder-Barclay willow-Sitka willow scrub	92	12	22	33	10

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type

Sitka alder-Barclay willow-Sitka willow scrub

Symbol

POPA2

Scientific Name

Poa palustris

POPR

Poa pratensis

POPRP

Poa pratensis ssp. pratensis

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type

Sitka alder-Barclay willow-Sitka willow scrub

Symbol

OSDE

Scientific Name

Osmorhiza depauperata

POMA2

Poa macrocalyx

VESE

Veronica serpyllifolia

WISE2

Viola selkirkii

Characteristics of Sitka alder-Barclay willow-Sitka willow scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 10. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TR	POBA2	Populus balsamifera	3.0	9	15	40	19
SM-ST	ALSI3	Alnus sinuata	7.0	32	60	90	54
SM-ST	SASI2	Salix sitchensis	5.0	28	85	60	41
SM-ST	SABA3	Salix barclayi	2.0	26	45	60	39
SM-ST	ALTE2	Alnus tenuifolia	10.0	23	35	30	26
SM-ST	SAAL	Salix alaxensis	0.1	7	25	80	24
SL-SM	RITR	Ribes triste	0.1	7	10	30	14
SM	SACO2	Salix commutata	1.0	8	15	20	13
SL-SM	VIED	Viburnum edule	2.0	6	15	30	13
FM-FT	DRDI2	Dryopteris dilatata	0.1	10	20	20	14
FD	RUAR	Rubus arcticus	0.1	5	15	50	16
FD	GYDR	Gymnocarpium dryopteris	2.0	8	15	20	13
L	LICHEN	total lichens	0.0	7	50	100	26
L1	STERE2	Stereocaulon	0.1	7	15	40	17
L1	CLADI3	Cladina	0.1	5	10	20	10
M	MOSS	total bryophytes-mosses and liverworts	2.0	20	40	100	45
M1	ZZMOSS	unknown-mosses	7.0	16	30	80	36
M1	RACOM	Racomitrium	1.0	8	20	40	18
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	66	95	100	81
B	ROCK	mineral-surface rock fragments	0.0	9	35	100	30
B	LITTER2	litter-woody debris >2.5 cm	0.0	6	10	100	24
B	SOIL	mineral-bare soil	0.0	6	30	100	24
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	5.0	5.0	m	1
Tree regeneration	TR	1.5	2.4	4.0	m	4
Tall shrubs	ST	3.0	3.5	4.5	m	6
Medium shrubs	SM	1.5	2.2	3.0	m	8
Low shrubs	SL	80.0	80.0	80.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	80.0	112.0	130.0	cm	5
Tall and medium forbs	FT, FM	30.0	68.3	110.0	cm	6
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	2.6	10.0	cm	13

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian scrub gravelly flood plains, moderately wet and warm (Oxyaquic Cryorthents, sandy-skeletal)

Subalpine-riparian scrub gravelly diorite flood plains, moderately wet (Oxyaquic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13F21	Subalpine and Alpine Diorite Flood Plains (Oxyaquic Cryorthents, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Terric Cryofibrists, euic Complex)
13FP	Boreal Flood Plains (Typic Cryorthents-Oxyaquic Cryorthents, sandy-skeletal-Riverwash Complex)
13FP2	Boreal Flood Plains, Dry (Typic Cryorthents, sandy-skeletal-Riverwash-Oxyaquic Cryorthents, sandy-skeletal Complex)

Geographically Associated Landtypes

135A_100—Loamy Flood Plains:

This site occurs on higher flood plains and alluvial fans adjacent to flood plain with a thick loam surface layer. The climax plant community is "Poplar/alder forest."

135A_201—Gravelly Flood Plains:

This site occurs on higher positions with somewhat excessively drained soil. The climax plant community is "Poplar/soapberry forest."

135A_500—Loamy Wet Flood Plains:

This site occurs on wetter soils with a thicker loamy surface mantle. The climax plant community is "Thinleaf alder-mixed willow scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on recent barren alluvium on lower flood plains. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes

135A_150—Loamy Flood Plains, High Elevation:

This site has a thick loamy surface mantle. The climax plant community is "Sitka alder-mixed willow scrub."

135A_500—Loamy Wet Flood Plains:

This site has a thick loamy surface mantle and soils are poorly drained. The climax plant community is "Thinleaf alder-mixed willow scrub."

135A_803—Moraines, Ice Cored:

This site has well drained soils on recent, unstable moraines. The climax plant community is "Moraine poplar/alder woodland."

Gravelly Flood Plains (135A_201)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

	<i>RV</i>	<i>Range</i>		
Elevation (meters):	370	90 to 969		
Slope Gradient (percent):	2	0 to 8		
Aspect (clockwise direction):	southeast to west			
Landform:	channels on flood plains; flood plains on alluvial fans			
	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Occasional	Brief	May	Sep
Ponding:	None			

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,112	408 to 3,051
Annual Air Temperature (°C):	-1.8	-6.9 to 1.0
Frost Free Days:	75	60 to 100

Soil Features

Parent Materials: sandy and gravelly alluvium

Rooting Depth (cm): *RV:* 21 *Range:* 9 to 42

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
1	moderately decomposed plant material	moderately rapid	.34	6.4		80
6 to 14	extremely cobbly coarse sand	rapid	.06	7.5 to 7.8		2

Water Table (May to September): none

Drainage Class: excessively drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Poplar/soapberry forest	Climax plant community
Drummond mountain avens dwarf scrub	Early stage of primary succession on flood plains
Poplar/Drummond mountain avens woodland	Mid stage of primary succession on flood plains

Ecological Status-Transition Description:

Three plant communities are identified within this flood prone site. The potential community is a poplar/soapberry forest, with a mid-successional community of poplar/Drummond mountain avens woodland and an early-successional community of Drummond mountain avens dwarf scrub, each on successively lower flood plain positions. Flooding is considered a transitional pathway between seral communities within this site as well as between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Poplar/soapberry forest	44	44	44	44	1
Drummond mountain avens dwarf scrub	18	6	11	16	2
Poplar/Drummond mountain avens woodland	26	7	10	13	6

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Poplar/soapberry forest	POPA2	Poa palustris

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Poplar/soapberry forest	AGGE2	Agrostis geminata
Drummond mountain avens dwarf scrub	SASE4	Salix setchelliana
Poplar/Drummond mountain avens woodland	SASE4	Salix setchelliana

Characteristics of Poplar/soapberry forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	POBA2	Populus balsamifera	60.0	60	60	100	77
SM	SHCA	Shepherdia canadensis	75.0	75	75	100	87
SD	DRDR	Dryas drummondii	7.0	7	7	100	26
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	40.0	40	40	100	63
M1	ZZMOSS	unknown-mosses	20.0	20	20	100	45
M1	PLSC70	Pleurozium schreberi	15.0	15	15	100	39
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	70.0	70	70	100	84

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	LITTER2	litter-woody debris >2.5 cm	1.0	1	1	100	10
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.1	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	8.0	8.0	8.0	m	1
Medium shrubs	SM	1.5	1.5	1.5	m	1
Dwarf shrubs	SD	19.0	19.0	19.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.0	2.0	cm	1

Characteristics of Drummond mountain avens dwarf scrub

Ecological Status: Early stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	DRDR	Dryas drummondii	45.0	48	50	100	69
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	12	20	100	35
M1	ZZMOSS	unknown-mosses	2.0	14	25	100	37
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	45.0	50	55	100	71
B	ROCK	mineral-surface rock fragments	20.0	28	35	100	53
B	SOIL	mineral-bare soil	5.0	10	15	100	32
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.1	0.2	0.2	m	2
Medium shrubs	SM	1.5	2.2	3.0	m	2
Dwarf shrubs	SD	7.0	15.0	20.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.3	0.7	1.0	cm	2

Characteristics of Poplar/Drummond mountain avens woodland

Ecological Status: Mid stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TR	POBA2	Populus balsamifera	10.0	20	45	100	45
SL-SM	SHCA	Shepherdia canadensis	0.1	8	25	67	23
SD	DRDR	Dryas drummondii	20.0	39	65	83	57
L	LICHEN	total lichens	0.1	28	60	100	53
L1	STERE2	Stereocaulon	0.1	14	30	100	37
L1	CLADO3	Cladonia	0.1	14	30	83	34
L2	ZZCRUST	unknown-crustose and soil crust lichens	7.0	7	7	17	11
M	MOSS	total bryophytes-mosses and liverworts	3.0	16	45	100	40
M1	ZZMOSS	unknown-mosses	3.0	13	20	100	36
M1	POPI10	Polytrichum piliferum	15.0	15	15	17	16

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	4.0	49	90	100	70
B	ROCK	mineral-surface rock fragments	2.0	15	55	100	39
B	SOIL	mineral-bare soil	0.1	4	10	100	20
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	1	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	6.5	7.5	m	3
Tree regeneration	TR	1.0	2.2	4.0	m	6
Medium shrubs	SM	1.0	2.0	3.0	m	3
Low shrubs	SL	70.0	85.0	100.0	cm	2
Dwarf shrubs	SD	3.0	12.3	20.0	cm	7
Tall and medium forbs	FT, FM	60.0	60.0	60.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.3	1.3	3.0	cm	9

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested hardwood gravelly flood plains (Typic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13FP2	Boreal Flood Plains, Dry (Typic Cryorthents, sandy-skeletal-Riverwash-Oxyaquic Cryorthents, sandy-skeletal Complex)
9AF2	Boreal Fans (Typic Cryorthents, sandy-skeletal-Spodic Dystrocrepts, sandy-skeletal Association, 2 to 10 percent slopes)

Geographically Associated Landtypes**135A_100—Loamy Flood Plains:**

This site occurs on soils with a thicker loamy surface layer. The climax plant community is "Poplar/alder forest."

135A_200—Gravelly Low Flood Plains:

This site occurs on wetter soils. The climax plant community is "Sitka alder-Barclay willow-Sitka willow scrub."

135A_500—Loamy Wet Flood Plains:

This site occurs on lower positions with a thicker loam surface mantle with wetter soils. The climax plant community is "Thinleaf alder-mixed willow scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium on lower flood plains. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes**135A_100—Loamy Flood Plains:**

This site has a thick loamy surface mantle. The climax plant community is "Poplar/alder forest."

Gravelly Flood Plains, Cool (135A_257)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

Elevation (meters): RV 566 Range 385 to 782

Slope Gradient (percent): 4 2 to 6

Aspect (clockwise direction): non-influencing

Landform: channels on flood plains

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Occasional	Brief	May	Sep

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 822 Range 678 to 989

Annual Air Temperature (°C): -0.1 -1.5 to 1.0

Frost Free Days: 80 70 to 100

Soil Features

Parent Materials: sandy and gravelly alluvium
sandy and gravelly alluvium derived from diorite

Rooting Depth (cm): RV: 21 Range: 1 to 51

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
8 to 13	extremely cobbly coarse sand	rapid	.06	5.4 to 7.8	2	2

Water Table (May to September): none

Drainage Class: somewhat excessively drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Feltleaf willow-Barclay willow-Sitka willow scrub

Open willow scrub

Ecological Status

Climax plant community

Early stage of primary succession on flood plains

Ecological Status-Transition Description:

Two plant communities are identified within this flood prone site including a potential community with feltleaf willow-Barclay willow-Sitka willow scrub and an early-successional community with willow scrub on successively lower flood plain positions. Flooding is considered a transitional pathway between seral communities within this site as well as between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Feltleaf willow-Barclay willow-Sitka willow scrub	81	13	26	46	5
Open willow scrub	44	10	26	41	2

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Open willow scrub	POLE2	Poa leptocoma
	SASE4	Salix setchelliana

Characteristics of Feltleaf willow-Barclay willow-Sitka willow scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	SAAL	Salix alaxensis	7.0	38	85	80	55
SM-ST	SABA3	Salix barclayi	0.1	23	45	80	43
SM-ST	SASI2	Salix sitchensis	0.1	18	40	80	38
SM	SACO2	Salix commutata	0.1	7	10	60	20
SD	EMNI	Empetrum nigrum	5.0	5	5	20	10
FM-FT	EPLA	Epilobium latifolium	0.1	8	20	80	25
FM	GYDR	Gymnocarpium dryopteris	5.0	5	5	20	10
FD	ANRI	Anemone richardsonii	10.0	22	35	40	30
FD	SIPR	Sibbaldia procumbens	15.0	15	15	20	17
FD	RUAR	Rubus arcticus	7.0	7	7	20	12
FD	PEFR5	Petasites frigidus	5.0	5	5	20	10
L	LICHEN	total lichens	0.1	15	25	100	39
L1	STERE2	Stereocaulon	10.0	13	15	60	28
L1	CLADO3	Cladonia	5.0	7	10	60	20
L2	ZZCRUST	unknown-crustose and soil crust lichens	7.0	11	15	40	21
M	MOSS	total bryophytes-mosses and liverworts	15.0	43	60	100	66
M1	ZZMOSS	unknown-mosses	10.0	28	50	100	53
M1	RACOM	Racomitrium	10.0	10	10	40	20
M1	RALA70	Racomitrium lanuginosum	20.0	20	20	20	20
M1	CLDE70	Climacium dendroides	3.0	6	10	40	15
M1	PLSC70	Pleurozium schreberi	5.0	5	5	20	10
M1	POLYT5	Polytrichum	5.0	5	5	20	10
M1	POPI10	Polytrichum piliferum	5.0	5	5	20	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	41	90	100	64
B	ROCK	mineral-surface rock fragments	0.0	15	40	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.1	6	15	100	24
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	2.5	2.8	3.0	m	2
Tall shrubs	ST	3.0	3.2	3.5	m	2
Medium shrubs	SM	2.0	2.4	3.0	m	3
Tall and medium grasses and grass-like	GT, GM	90.0	100.0	110.0	cm	2
Tall and medium forbs	FT, FM	15.0	51.2	70.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.8	7.0	cm	9

Characteristics of Open willow scrub

Ecological Status: Early stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM	SAAL	Salix alaxensis	2.0	18	35	100	42
SM	SASI2	Salix sitchensis	20.0	20	20	50	32
FM-FT	EPLA	Epilobium latifolium	4.0	12	20	100	35
FM	EQVA	Equisetum variegatum	10.0	10	10	50	22
L	LICHEN	total lichens	0.1	15	30	100	39
L1	CLADO3	Cladonia	10.0	10	10	50	22
L1	STERE2	Stereocaulon	0.1	5	10	100	22
L2	ZZCRUST	unknown-crustose and soil crust lichens	0.1	5	10	100	22
M	MOSS	total bryophytes-mosses and liverworts	7.0	8	10	100	28
M1	ZZMOSS	unknown-mosses	4.0	6	7	100	24
B	ROCK	mineral-surface rock fragments	70.0	75	80	100	87
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	10	15	100	32
B	SOIL	mineral-bare soil	5.0	8	10	100	28
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.9	2.0	2.0	m	2
Tall and medium forbs	FT, FM	70.0	90.0	110.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.3	1.1	2.0	cm	3

Map Unit Components**Common Name (Soils Name):**

Alpine-riparian scrub gravelly diorite flood plains (Typic Cryorthents, sandy-skeletal)
Alpine-riparian scrub gravelly flood plains, warm (Typic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13F22 Alpine Diorite Flood Plains and Wet Mountain Toeslopes
(Typic Cryorthents, sandy-skeletal-Riverwash-Typic Cryaquents, coarse-loamy over sandy-skeletal Complex, 0 to 6 percent slopes)

Geographically Associated Landtypes**135A_150—Loamy Flood Plains, High Elevation:**

This site occurs on higher positions and soils have a thicker loamy surface. The climax plant community is "Sitka alder-mixed willow scrub."

135A_152—Loamy Wet Flood Plains, High Elevation:

This site occurs in channels where hydrology and plant communities have been altered by beaver dams. The climax plant community is "Barclay willow-diamondleaf willow wet scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium adjacent to streams. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes**Gravelly Flood Plains (135A_201):**

This site has is found at lower elevation. The climax plant community is "Poplar/soapberry forest."

Till Slopes (135A_359)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)
Glaciated Lowlands (135A.G1)

Physiographic Features

	RV	Range
Elevation (meters):	337	63 to 969

Slope Gradient (percent):	8	2 to 30
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Aspect (clockwise direction): east to west

Landform: fan terraces on alluvial fans on mountains; hills; mountains; till plains

Landform Positions: backslopes; shoulders

	Frequency	Duration	Beginning Month	Ending Month
Flooding: None or Rare			Jan	Dec

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,286	408 to 3,051

Annual Air Temperature (°C):	-2.0	-6.9 to 1.0
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Frost Free Days:	77	60 to 100
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Soil Features

Parent Materials: silty volcanic ash and/or loess over sandy and gravelly alluvium
silty volcanic ash and/or loess over gravelly till

Rooting Depth (cm): RV: 29 Range: 5 to 84

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4 to 10	slightly decomposed plant material	moderately rapid	.34	3.1 to 4.4	30	
4 to 8	silt loam	moderate	.15 to .34	3.1 to 4.3	25	
4 to 11	very cobbly sandy loam; very fine sandy loam; silt loam	moderate to rapid	.03 to .34	4.0 to 5.0	3 to 25	

Restrictive Features: strongly contrasting textural stratification at 18 to 24 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Mixed paper birch-white spruce forest	Climax plant community

Ecological Status-Transition Description:

A single plant community with mixed paper birch-white spruce forest is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Mixed paper birch-white spruce forest	78	15	27	37	14

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Mixed paper birch-white spruce forest	CIAL	Circaea alpina
	OSDE	Osmorhiza depauperata
	WISE2	Viola selkirkii

Characteristics of Mixed paper birch-white spruce forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 14. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Percent Constancy	Importance Value
			Canopy Cover	Min.	Avg.		
TT	BENE4	Betula neoalaskana	3.0	16	30	100	40
TT	PIGL	Picea glauca	1.0	8	35	86	26
SM-ST	ALSI3	Alnus sinuata	0.1	26	65	93	49
SM	OPHO	Oplopanax horridus	2.0	25	65	64	40
SL-SM	VIED	Viburnum edule	0.1	13	30	79	32
SL-SM	VAOV	Vaccinium ovalifolium	1.0	9	30	64	24
SL-SM	SPST3	Spiraea stevenii	0.1	8	20	64	23
SL-SM	RUID	Rubus idaeus	0.1	6	15	43	16
SD	LIBO3	Linnaea borealis	0.1	5	10	29	12
GT	CACA4	Calamagrostis canadensis	4.0	19	50	100	44
FT	DRDI2	Dryopteris dilatata	5.0	32	65	100	57
FD-FT	ATFIC	Athyrium filix-femina ssp. cyclosorum	0.1	5	15	57	17
FD-FT	VEVIE2	Veratrum viride ssp. eschscholtzii	0.1	6	25	50	17
FM-FT	EQAR	Equisetum arvense	0.1	6	20	29	13
FD-FM	GYDR	Gymnocarpium dryopteris	10.0	29	65	100	54
FD-FM	COCA13	Cornus canadensis	5.0	24	60	57	37
FD-FM	THPH	Thelypteris phegopteris	0.1	12	25	64	28
FM	EQSY	Equisetum sylvaticum	1.0	10	25	50	22
FD	RUPE	Rubus pedatus	7.0	17	30	50	29
FD	TREU	Trientalis europaea	0.1	5	15	100	22
L	LICHEN	total lichens	0.1	1	7	100	10
M	MOSS	total bryophytes-mosses and liverworts	0.1	13	50	100	36
M1	ZZMOSS	unknown-mosses	3.0	8	20	79	25
M1	PLSC70	Pleurozium schreberi	1.0	5	10	50	16
M1	DICRA8	Dicranum	1.0	5	10	29	12
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	60.0	89	95	100	94
B	LITTER2	litter-woody debris >2.5 cm	2.0	10	20	100	32
B	ROCK	mineral-surface rock fragments	0.0	1	7	100	10
B	SOIL	mineral-bare soil	0.0	0	1	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	13.0	22.9	37.0	m	18
Tree regeneration	TR	1.8	3.0	4.5	m	5
Tall shrubs	ST	3.0	4.1	5.5	m	11
Medium shrubs	SM	1.3	1.8	3.0	m	11
Low shrubs	SL	30.0	70.0	100.0	cm	4

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Dwarf shrubs	SD	3.0	3.5	4.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	100.0	142.1	170.0	cm	14
Tall and medium forbs	FT, FM	12.0	96.0	220.0	cm	26
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	5.3	20.0	cm	26

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	65	30.5	16.5	Min.	18	B
	114	39.5	22.3	Avg.		
	148	56.4	28.7	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
-----	m ² / ha	-----	of Stands
5.8	11.3	20.7	7

Map Unit Components

Common Name (Soils Name):

Boreal-forested gravelly fan terraces (Spodic Dystrocryepts, sandy-skeletal)

Boreal-forested silty till slopes, ash influenced, warm (Andic Humicryods, medial over loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

12HS2	Boreal Glaciated Hills and Plains (Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal-Typic Cryofibrists, dysic Association, 0 to 20 percent slopes)
9AF2	Boreal Fans (Typic Cryorthents, sandy-skeletal-Spodic Dystrocryepts, sandy-skeletal Association, 2 to 10 percent slopes)
9TMF	Boreal and Subalpine Lower Mountain Slopes (Andic Humicryods, medial over loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal Complex, 2 to 30 percent slopes)

Geographically Associated Landtypes

135A_362 --Till Slopes, Wet:

This site occurs on depressions and swales with wetter soils. The climax plant community is "Mixed white spruce-paper birch/Sitka alder forest."

135A_534 --Organic Depressions, Very Wet:

This site occurs on broad depressions with thick organic surface layers and soils are wetter. The climax plant community is "Tufted bulrush-few-flowered sedge wet meadow."

Similar Landtypes

135A_362 --Till Slopes, Wet:

This site has drier soils. The climax plant community is "Mixed white spruce-paper birch/Sitka alder forest."

Till Slopes, Wet (135A_362)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Glaciated Lowlands (135A.G1)

Physiographic Features

	RV	Range
Elevation (meters):	309	76 to 757
Slope Gradient (percent):	10	5 to 20

Aspect (clockwise direction): east to southwest

Landform: depressions on hills; depressions on mountains; depressions on till plains; swales on hills; swales on till plains

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,053	536 to 2,174
Annual Air Temperature (°C):	0.8	-1.0 to 1.0

Frost Free Days:	90	70 to 100
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Soil Features

Parent Materials: volcanic ash and/or silty loess over loamy drift and/or gravelly till

Rooting Depth (cm): RV: 35 Range: 20 to 44

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4	slightly decomposed plant material	moderately rapid	.34	5.5	30	
31	silt loam	moderate	.35	5.8	30	

Restrictive Features: strongly contrasting textural stratification at 78 cm

Water Table (May to September): 0 to 25 cm

Drainage Class: poorly drained or very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Mixed white spruce-paper birch/Sitka alder forest	Climax plant community

Ecological Status-Transition Description:

A single plant community with mixed paper birch-white spruce/Sitka alder forest is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Mixed white spruce-paper birch/Sitka alder forest	67	23	28	33	6

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Mixed white spruce-paper birch/Sitka alder forest	CIAL	Circaea alpina
	GOREO2	Goodyera repens var. ophioides
	WISE2	Viola selkirkii

Characteristics of Mixed white spruce-paper birch/Sitka alder forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	5.0	14	25	100	37
TT	BENE4	Betula neoalaskana	10.0	14	20	67	31
ST	ALSI3	Alnus sinuata	10.0	33	50	100	57
ST	ALTE2	Alnus tenuifolia	50.0	50	50	17	29
SL-SM	SPST3	Spiraea stevenii	3.0	12	20	100	35
SM	SAPU15	Salix pulchra	0.1	10	30	67	26
SL-SM	VAOV	Vaccinium ovalifolium	2.0	8	15	83	26
SM	VIED	Viburnum edule	10.0	18	25	33	24
SM	B EGL	Betula glandulosa	1.0	6	10	33	14
SM	OPHO	Oplopanax horridus	5.0	5	5	33	13
SL	VAUL	Vaccinium uliginosum	7.0	7	7	17	11
SD	EMNI	Empetrum nigrum	5.0	5	5	17	9
GT	CACA4	Calamagrostis canadensis	10.0	28	55	100	53
GM	CAREX	Carex	5.0	5	5	17	9
FT	DRDI2	Dryopteris dilatata	2.0	20	40	100	45
FT	ATFIC	Athyrium filix-femina ssp. cyclosorum	5.0	5	5	17	9
FD-FM	GYDR	Gymnocarpium dryopteris	0.1	11	25	83	30
FD-FM	THPH	Thelypteris phegopteris	10.0	17	20	50	29
FD-FM	COCA13	Cornus canadensis	5.0	12	30	67	28
FD-FM	EQAR	Equisetum arvense	2.0	16	35	50	28
FM	EQSY	Equisetum sylvaticum	1.0	7	25	100	26
FD-FM	RUCH	Rubus chamaemorus	0.1	7	15	50	19
FM	SAST11	Sanguisorba stipulata	0.1	5	10	67	18
FD	RUPE	Rubus pedatus	5.0	14	25	67	31
FD	VIEPR	Viola epipsila ssp. repens	1.0	10	20	67	26
FD	COSU4	Cornus suecica	5.0	12	20	33	20
FD	RUAR	Rubus arcticus	5.0	5	5	33	13
FD	CIAL	Circaea alpina	5.0	5	5	17	9
L	LICHEN	total lichens	0.1	1	4	100	10
M	MOSS	total bryophytes-mosses and liverworts	15.0	28	40	100	53
M1	ZZMOSS	unknown-mosses	2.0	11	30	100	33
M1	SPHAG2	Sphagnum	5.0	12	25	67	28
M1	PLSC70	Pleurozium schreberi	3.0	7	15	67	22
M1	CLDE70	Climacium dendroides	6.0	6	6	17	10
M1	HYSP70	Hylocomium splendens	5.0	5	5	17	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	65.0	81	90	100	90
B	LITTER2	litter-woody debris >2.5 cm	1.0	7	10	100	26
B	SOIL	mineral-bare soil	0.0	0	1	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	2	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	19.1	28.0	m	8
Tree regeneration	TR	3.0	3.0	3.0	m	1
Tall shrubs	ST	3.0	3.8	5.0	m	6
Medium shrubs	SM	1.3	1.8	2.5	m	5
Low shrubs	SL	70.0	85.0	100.0	cm	2
Dwarf shrubs	SD	8.0	8.0	8.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	140.0	160.0	180.0	cm	6
Tall and medium forbs	FT, FM	18.0	82.3	180.0	cm	12
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	5.1	10.0	cm	12

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	75	24.9	13.4	Min.	6	B
	109	28.7	15.9	Avg		
	153	35.8	18.6	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
----- m ² / ha -----			
9.2	13.4	20.7	3

Map Unit Components**Common Name (Soils Name):**

Boreal-forested silty wet till slopes, ash influenced (Thaptic Cryaquands, medial over loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

12HS2 Boreal Glaciated Hills and Plains
(Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal-Typic Cryofibrists, dysic Association, 0 to 20 percent slopes)

Geographically Associated Landtypes**135A_359 --Till Slopes:**

This site occurs on well drained soils. The climax plant community is "Mixed paper birch-white spruce forest."

135A_534 --Organic Depressions, Very Wet:

This site occurs on bogs and fens and soils are wetter with thick organic layers. The climax plant community is "Tufted bulrush-few-flowered sedge wet meadow."

135A_535 --Organic Depressions:

This site occurs on bogs and fens and soils are wetter with thick organic layers. The climax plant community is "Black spruce/few-flowered sedge woodland."

Similar Landtypes**135A_359 --Till Slopes:**

This site has well drained soils. The climax plant community is "Mixed paper birch-white spruce forest."

Loamy Wet Flood Plains (135A_500)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

Elevation (meters): RV 283 Range 61 to 849

Slope Gradient (percent): 0 0 to 2

Aspect (clockwise direction): non-influencing

Landform: channels on flood plains; cutoffs on flood plains; meander scrolls on flood plains

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	Occasional	Long	May	Sep	
Ponding:	Frequent	Long	May	Sep	to

Climatic Features

Annual Precipitation (millimeters): RV 822 Range 678 to 989

Annual Air Temperature (°C): -0.1 -1.5 to 1.0

Frost Free Days: 80 70 to 100

Soil Features

Parent Materials: grassy organic material over sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 38 Range: 8 to 89

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4 to 38	peat; moderately decomposed	moderately rapid plant material	.34	5.3 to 6.4	30	80
12 to 22	stratified sand to silt	moderate	.15	6.4 to 6.8		16

Restrictive Features: strongly contrasting textural stratification at 56 to 100 cm

Water Table (May to September): 0 to 25 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Thinleaf alder-mixed willow scrub
Water horsetail-beaked sedge wet meadow
Beaver dam wet sedge meadow/scrub

Ecological Status

Climax plant community
Climax plant community on wetter microsites
Beaver impacted site and vegetation

Ecological Status-Transition Description:

Three plant communities are identified within this flood prone site including a potential community with thinleaf alder-mixed willow scrub, a potential community where local conditions are slightly more moist with water horsetail-beaked sedge wet meadow, and a community associated with beaver activity with wet sedge meadow/scrub, beaver dam in which the site conditions have been significantly altered and are wetter due to beaver dam construction. Flooding and beaver activity are considered transitional pathways between community types.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Thinleaf alder-mixed willow scrub	82	15	28	38	5
Water horsetail-beaked sedge wet meadow	57	37	40	42	2
Beaver dam wet sedge meadow/scrub	120	10	25	34	11

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name	
Thinleaf alder-mixed willow scrub	CADI4	Carex diandra	
	CIAL	Circaea alpina	
	GLSTS	Glyceria striata ssp. stricta	
	RAMA2	Ranunculus macounii	
	SOLE8	Solidago lepida	
	SWST2	Swida stolonifera	
	UTMI	Utricularia minor	
	WISE2	Viola selkirkii	
	Water horsetail-beaked sedge wet meadow	GLSTS	Glyceria striata ssp. stricta
		CACH5	Carex chordorrhiza
CALY3		Carex lyngbyei	
Beaver dam wet sedge meadow/scrub	CIAL	Circaea alpina	
	DEBE2	Deschampsia beringensis	
	GLSTS	Glyceria striata ssp. stricta	
	SALUL	Salix lucida ssp. lasiandra	
	SASE4	Salix setchelliana	
	UTMI	Utricularia minor	

Characteristics of Thinleaf alder-mixed willow scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value
			Canopy Cover	Constancy	Importance	
			Min.	Avg.	Max.	
SM-ST	ALTE2	Alnus tenuifolia	30.0	53	65	73
SM-ST	SAAL	Salix alaxensis	0.1	7	20	26
SM-ST	SABA3	Salix barclayi	2.0	9	15	23
SM	SACO2	Salix commutata	1.0	20	40	28
SM	SAPU15	Salix pulchra	7.0	11	15	26
SL-SM	ROAC	Rosa acicularis	0.1	9	25	23
SM	OPHO	Oplopanax horridus	10.0	10	10	14
SM	SARI4	Salix richardsonii	10.0	10	10	14
SL	VAUL	Vaccinium uliginosum	80.0	80	80	40
GT	CACA4	Calamagrostis canadensis	1.0	9	25	30
GT	ARLA2	Arctagrostis latifolia	0.1	5	15	20
GT	CASAL2	Carex saxatilis ssp. laxa	5.0	5	5	10
FM-FT	EQAR	Equisetum arvense	2.0	30	65	49
FM-FT	EQFL	Equisetum fluviatile	0.1	30	60	35
FM-FT	COPA28	Comarum palustre	5.0	15	25	24
FM	CAPAA4	Caltha palustris ssp. arctica	10.0	10	10	14
FD	RUAR	Rubus arcticus	2.0	6	10	24
FD	VIEPR	Viola epipsila ssp. repens	7.0	11	15	21
FD	WISE2	Viola selkirkii	5.0	5	5	10
L	LICHEN	total lichens	0.1	0	0	0
M	MOSS	total bryophytes-mosses and liverworts	3.0	43	90	66
M1	ZZMOSS	unknown-mosses	3.0	14	25	37
M1	HYSP70	Hylocomium splendens	10.0	20	30	28

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M1	PLSC70	Pleurozium schreberi	10.0	20	30	40	28
M1	CALLI10	Calliergon	20.0	20	20	20	20
M1	PLAGI7	Plagiomnium	1.0	7	10	60	20
M1	PTCR70	Ptilium crista-castrensis	5.0	8	10	40	18
M1	DICRA8	Dicranum	5.0	5	5	40	14
M1	SPHAG2	Sphagnum	5.0	5	5	20	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	47	90	100	69
B	WATER	water	0.0	13	55	100	36
B	LITTER2	litter-woody debris >2.5 cm	4.0	7	15	100	26
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	14.5	22.0	m	4
Tree regeneration	TR	4.5	4.5	4.5	m	1
Tall shrubs	ST	4.0	4.6	5.5	m	4
Medium shrubs	SM	1.6	2.2	3.0	m	4
Low shrubs	SL	40.0	40.0	40.0	cm	1
Dwarf shrubs	SD	3.0	4.0	5.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	80.0	123.3	170.0	cm	3
Tall and medium forbs	FT, FM	20.0	61.4	150.0	cm	7
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.9	13.0	cm	8

Characteristics of Water horsetail-beaked sedge wet meadow

Ecological Status: Climax plant community on wetter microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GT	CAUT	Carex utriculata	25.0	28	30	100	53
GT	CAAQ	Carex aquatilis	2.0	11	20	100	33
GT	ERAN6	Eriophorum angustifolium	15.0	15	15	50	27
FT	EQFL	Equisetum fluviatile	60.0	60	60	100	77
FT	EPCIG	Epilobium ciliatum ssp. glandulosum	0.1	13	25	100	36
FM	COPA28	Comarum palustre	10.0	10	10	50	22
FD	SPHY	Sparganium hyperboreum	5.0	5	5	50	16
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	15.0	20	25	100	45
M1	ZZMOSS	unknown-mosses	7.0	16	25	100	40
M1	CALLI10	Calliergon	7.0	7	7	50	19
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	55.0	58	60	100	76
B	WATER	water	25.0	45	65	100	67
B	SOIL	mineral-bare soil	1.0	1	1	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	2.0	2.1	2.2	m	2
Tall and medium grasses and grass-likes	GT, GM	140.0	150.0	160.0	cm	2
Tall and medium forbs	FT, FM	60.0	123.3	160.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.3	5.0	cm	4

Characteristics of Beaver dam wet sedge meadow/scrub

Ecological Status: Beaver impacted site and vegetation

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 11. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Importance	
			Min.	Avg.	Max.	Constancy	Value
SM-ST	ALTE2	<i>Alnus tenuifolia</i>	0.1	31	90	55	41
SM	SACO2	<i>Salix commutata</i>	0.1	10	35	73	27
SM	SABA3	<i>Salix barclayi</i>	0.1	6	20	45	16
SM	SASI2	<i>Salix sitchensis</i>	0.1	8	20	27	15
SM	MYGA	<i>Myrica gale</i>	1.0	6	10	18	10
SM	ALSI3	<i>Alnus sinuata</i>	0.1	5	10	18	9
GM-GT	CAAQ	<i>Carex aquatilis</i>	0.1	23	80	91	46
GT	CACA4	<i>Calamagrostis canadensis</i>	0.1	12	40	82	31
GM-GT	CASAL2	<i>Carex saxatilis</i> ssp. <i>laxa</i>	0.1	14	70	45	25
GM-GT	ARFU2	<i>Arctophila fulva</i>	0.1	11	30	36	20
GT	CAUT	<i>Carex utriculata</i>	0.1	10	30	36	19
GM-GT	ERRU2	<i>Eriophorum russeolum</i>	4.0	12	20	18	15
GT	CARO6	<i>Carex rostrata</i>	1.0	7	15	27	14
FM-FT	EQFL	<i>Equisetum fluviatile</i>	5.0	19	40	55	32
FM-FT	COPA28	<i>Comarum palustre</i>	1.0	5	10	27	12
FM-FT	ATFIC	<i>Athyrium filix-femina</i> ssp. <i>cyclosorum</i>	0.1	5	10	18	9
FM	EQAR	<i>Equisetum arvense</i>	1.0	14	55	55	28
FM	EQVA	<i>Equisetum variegatum</i>	0.1	20	50	36	27
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	30	80	100	55
M1	ZZMOSS	unknown-mosses	5.0	14	30	36	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	43	90	100	66
B	WATER	water	0.0	20	60	100	45
B	SOIL	mineral-bare soil	0.0	13	65	100	36
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	20	100	22
B	ROCK	mineral-surface rock fragments	0.0	1	5	100	10

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	12.0	20.0	m	2
Tree regeneration	TR	1.0	2.0	3.0	m	4
Tall shrubs	ST	4.0	4.0	4.0	m	2
Medium shrubs	SM	1.2	1.9	2.7	m	8
Low shrubs	SL	90.0	90.0	90.0	cm	1
Dwarf shrubs	SD	5.0	5.5	6.0	cm	2
Tall and medium grasses and grass-like	GT, GM	17.0	97.3	150.0	cm	12
Tall and medium forbs	FT, FM	20.0	71.8	150.0	cm	11
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.3	3.0	10.0	cm	13

Map Unit Components

Common Name (Soils Name):

Boreal-riparian scrub loamy wet flood plains, Cook Inlet (Typic Cryaquents, coarse-loamy over sandy-skeletal)
Subalpine-riparian wet meadow organic depressions (Terric Cryofibrists, euic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 13F21 Subalpine and Alpine Diorite Flood Plains
(Oxyaquic Cryorthents, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Terric Cryofibrists, euic Complex)
- 13FPW Boreal Flood Plains and Terraces, Wet
(Typic Cryaquents, coarse-loamy over sandy-skeletal-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Terric Cryofibrists, euic Complex)

Geographically Associated Landtypes

135A_100 --Loamy Flood Plains:

This site occurs on higher flood plains and alluvial fans with well drained soils. The climax plant community is "Poplar/alder forest."

135A_156 --Loamy Wet High Flood Plains:

This site occurs on slightly drier soils. The climax plant community is "Mixed white spruce-poplar/thinleaf alder forest."

135A_200 --Gravelly Low Flood Plains:

This site occurs on very shallow to sandy and gravelly material. The climax plant community is "Sitka alder-Barclay willow-Sitka willow scrub."

135A_201 --Gravelly Flood Plains:

This site occurs on very shallow to sandy and gravelly material. The climax plant community is "Poplar/soapberry forest."

Similar Landtypes

135A_150 --Loamy Flood Plains, High Elevation:

This site has well drained soils. The climax plant community is "Sitka alder-mixed willow scrub."

135A_200 --Gravelly Low Flood Plains:

This site lacks a thick loamy surface mantle and soils are somewhat poorly drained. The climax plant community is "Sitka alder-Barclay willow-Sitka willow scrub."

135A_501 --Organic High Flood Plains, Very Wet:

This site has wetter soils with thick organic mats. The climax plant community is "Water horsetail-marsh five finger-buckbean wet meadow."

135A_534 --Organic Depressions, Very Wet:

This site occurs in uplands and is not flooded. The climax plant community is "Tufted bulrush-few-flowered sedge wet meadow."

135A_803 --Moraines, Ice Cored:

This site has well drained soils on recent, unstable moraines. The climax plant community is "Moraine poplar/alder woodland."

Organic High Flood Plains, Very Wet (135A_501)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

	<i>RV</i>	<i>Range</i>	
Elevation (meters):	179	61 to 380	
Slope Gradient (percent):	0	0 to 0	
Aspect (clockwise direction): non-influencing			
Landform: cutoffs on flood plains; meander scrolls on flood plains			

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	Occasional	Long	May	Sep	
Ponding:	Frequent	Very long	May	Sep	5 to 25

Climatic Features

	<i>RV</i>	<i>Range</i>	
Annual Precipitation (millimeters):	822	678 to 989	
Annual Air Temperature (°C):	-0.1	-1.5 to 1.0	
Frost Free Days:	80	70 to 100	

Soil Features

Parent Materials: grassy organic material over sandy and silty alluvium

Rooting Depth (cm): *RV:* 100 *Range:* 59 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
63	peat	moderately rapid	.34	5.7		80
37	stratified fine sand to silt	moderate	.18	5.8		16

Restrictive Features: strongly contrasting textural stratification at 63 cm

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Water horsetail-marsh five finger-buckbean wet meadow	Climax plant community

Ecological Status-Transition Description:

A single plant community of water horsetail-marsh five finger-buckbean wet meadow is identified on this site. Flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		<i>Min.</i>	<i>Avg.</i>	<i>Max.</i>	
Water horsetail-marsh five finger-buckbean wet meadow	52	17	22	24	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Water horsetail-marsh five finger-buckbean wet meadow	ASJU	Aster junciformis
	CACH5	Carex chordorrhiza
	CADI4	Carex diandra
	CAIN11	Carex interior
	CIBU	Cicuta bulbifera
	PEMA	Pedicularis macrodonta

Characteristics of Water horsetail-marsh five finger-buckbean wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy	Importance		
			Min.	Avg.	Max.		
SL-SM	MYGA	Myrica gale	3.0	12	20	80	31
SL	SAFU	Salix fuscescens	15.0	15	15	20	17
GM-GT	CAAQ	Carex aquatilis	0.1	7	20	80	24
GM-GT	CADI4	Carex diandra	2.0	11	20	40	21
GT	CACA4	Calamagrostis canadensis	0.1	5	15	60	17
GT	CAUT	Carex utriculata	10.0	10	10	20	14
GM	CACH5	Carex chordorrhiza	0.1	16	45	60	31
GM	CALI7	Carex limosa	5.0	10	15	40	20
GM	ERANS2	Eriophorum angustifolium ssp. subarcticum	5.0	10	15	40	20
FM-FT	EQFL	Equisetum fluviatile	30.0	44	65	100	66
FM-FT	COPA28	Comarum palustre	4.0	19	50	100	44
FT	PESA5	Petasites sagittatus	5.0	5	5	20	10
FM	METR3	Menyanthes trifoliata	3.0	14	30	100	37
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	35.0	66	90	100	81
M1	ZZMOSS	unknown-mosses	1.0	36	80	100	60
M1	SPHAG2	Sphagnum	0.1	32	90	60	44
M1	CALLI10	Calliergon	30.0	30	30	20	24
M1	TONI70	Tomentypnum nitens	15.0	15	15	20	17
B	WATER	water	6.0	24	70	100	49
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	21	40	100	46
B	SOIL	mineral-bare soil	0.0	2	10	100	14
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.7	1.8	2.0	m	3
Low shrubs	SL	20.0	42.5	70.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	20.0	40.0	60.0	cm	4
Tall and medium forbs	FT, FM	20.0	60.0	130.0	cm	10
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.1	1.7	3.0	cm	5

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian wet meadow organic flood plains, Cook Inlet (Terric Cryofibrists, euic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13FWW Boreal Flood Plains, Very Wet
(Terric Cryofibrists, euic-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes

135A_156—Loamy Wet High Flood Plains:

This site occurs on drier soils that lack thick organic mats. The climax plant community is "Mixed white spruce-poplar/thinleaf alder forest."

135A_200—Gravelly Low Flood Plains:

This site occurs on lower positions. The climax plant community is "Sitka alder-Barclay willow-Sitka willow scrub."

135A_502—Organic High Flood Plains:

This site occurs on slightly drier and higher positions. The climax plant community is "Thinleaf alder/sweetgale/water horsetail scrub."

Similar Landtypes

135A_500—Loamy Wet Flood Plains:

This site has drier soils with a thick loamy surface mantle. The climax plant community is "Thinleaf alder-mixed willow scrub."

135A_534—Organic Depressions, Very Wet:

This site occurs in uplands and is not flooded. The climax plant community is "Tufted bulrush-few-flowered sedge wet meadow."

Organic High Flood Plains (135A_502)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

	<i>RV</i>	<i>Range</i>			
Elevation (meters):	179	61 to 380			
Slope Gradient (percent):	0	0 to 0			
Aspect (clockwise direction):	non-influencing				
Landform:	cutoffs on flood plains; meander scrolls on flood plains				

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	Occasional	Long	May	Sep	
Ponding:	Frequent	Very long	May	Sep	0 to 10

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	822	678 to 989
Annual Air Temperature (°C):	-0.1	-1.5 to 1.0
Frost Free Days:	80	70 to 100

Soil Features

Parent Materials: grassy organic material over sandy and silty alluvium

Rooting Depth (cm): *RV:* 72 *Range:* 21 to 116

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
63	peat	moderately rapid	.34	5.7		80
9	silt loam	moderate	.18	5.8		16

Restrictive Features: strongly contrasting textural stratification at 63 cm

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Thinleaf alder/sweetgale/water horsetail scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with thinleaf alder/sweetgale/water horsetail scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Thinleaf alder/sweetgale/water horsetail scrub	45	11	18	27	4

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Thinleaf alder/sweetgale/water horsetail scrub	CIAL	Circaea alpina
	SOLE8	Solidago lepidota

Characteristics of Thinleaf alder/sweetgale/water horsetail scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	Picea glauca	7.0	7	7	25	13
SM-ST	ALTE2	Alnus tenuifolia	25.0	42	60	100	65
SM	MYGA	Myrica gale	5.0	22	60	100	47
SM	SABA3	Salix barclayi	3.0	13	20	75	31
SM	SARI4	Salix richardsonii	1.0	7	15	75	23
SM	BEGL	Betula glandulosa	5.0	5	5	25	11
SL	VAUL	Vaccinium uliginosum	15.0	15	15	25	19
SL	SAFU	Salix fuscescens	5.0	5	5	25	11
GT	CACA4	Calamagrostis canadensis	30.0	45	60	75	58
FM-FT	EQFL	Equisetum fluviatile	10.0	32	60	100	57
FM-FT	COPA28	Comarum palustre	5.0	21	40	100	46
FD-FM	VACA3	Valeriana capitata	1.0	8	15	50	20
FM	GATR2	Galium trifidum	5.0	5	5	25	11
FM	GATR3	Galium triflorum	5.0	5	5	25	11
FM	METR3	Menyanthes trifoliata	5.0	5	5	25	11
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	7.0	48	95	100	69
M1	SPHAG2	Sphagnum	1.0	33	90	75	50
M1	ZZMOSS	unknown-mosses	5.0	16	45	100	40
M1	CALL10	Calliergon	25.0	25	25	25	25
M1	PLAGI7	Plagiomnium	5.0	8	10	50	20

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	44	95	100	66
B	WATER	water	0.1	18	40	100	42
B	LITTER2	litter-woody debris >2.5 cm	0.1	4	15	100	20
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	8.0	8.0	8.0	m	1
Tree regeneration	TR	0.2	2.6	5.0	m	2
Tall shrubs	ST	3.0	3.0	3.0	m	1
Medium shrubs	SM	1.2	1.9	3.0	m	9
Low shrubs	SL	40.0	70.0	100.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	120.0	136.7	150.0	cm	3
Tall and medium forbs	FT, FM	25.0	61.2	120.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.8	4.0	cm	4

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian scrub organic flood plains, wet (Terric Cryofibrists, euic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

13FWW Boreal Flood Plains, Very Wet
(Terric Cryofibrists, euic-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes**135A_156—Loamy Wet High Flood Plains:**

This site occurs on drier soils that lack thick organic mats. The climax plant community is "Mixed white spruce-poplar/thinleaf alder forest."

135A_200—Gravelly Low Flood Plains:

This site occurs on lower positions. The climax plant community is "Sitka alder-Barclay willow-Sitka willow scrub."

135A_501—Organic High Flood Plains, Very Wet:

This site occurs on slightly wetter and lower positions. The climax plant community is "Water horsetail-marsh five finger-buckbean wet meadow."

Organic Depressions, Very Wet (135A_534)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Glaciated Lowlands (135A.G1)

Physiographic Features

	<i>RV</i>	<i>Range</i>			
Elevation (meters):	274	76 to 757			
Slope Gradient (percent):	6	0 to 15			
Aspect (clockwise direction):	non-influencing				
Landform:	bogs on hills; bogs on mountains; bogs on till plains				
Landform Positions:	footslopes				
	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	None				
Ponding:	Frequent	Very long	May	Sep	to

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,053	536 to 2,174
Annual Air Temperature (°C):	0.8	-1.0 to 1.0
Frost Free Days:	90	70 to 100

Soil Features

Parent Materials: mossy organic material and/or grassy organic material

Rooting Depth (cm): RV: 112 Range: 53 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
42 to 70	peat	moderately rapid	.34	3.3	30	

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Tufted bulrush-few-flowered sedge wet meadow	Climax plant community

Ecological Status-Transition Description:

A single plant community with tufted bulrush-few-flowered sedge wet meadow is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Tufted bulrush-few-flowered sedge wet meadow	103	29	38	69	7

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Tufted bulrush-few-flowered sedge wet meadow	CACH5	Carex chordorrhiza
	CAECP	Carex echinata ssp. phyllomanica
	CAHE4	Carex heleonastes
	ERV19	Eriophorum viridicarinum
	GEDO	Gentiana douglasiana
	JUSTA	Juncus stygius ssp. americanus
	SCPAA	Scheuchzeria palustris ssp. americana
	TOGLB	Tofieldia glutinosa ssp. brevistyla

Characteristics of Tufted bulrush-few-flowered sedge wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GM	TRCE3	Trichophorum cespitosum	30.0	50	70	100	71
GM	CAPA19	Carex pauciflora	10.0	21	30	86	42
GM	CALI7	Carex limosa	1.0	5	15	57	17
GM	CARO7	Carex rotundata	1.0	5	10	57	17
GM	TRAL7	Trichophorum alpinum	0.1	5	10	29	12
FD	COCA13	Cornus canadensis	2.0	7	15	43	17
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	85.0	91	100	100	95
M1	SPHAG2	Sphagnum	70.0	85	95	100	92
M1	ZZMOSS	unknown-mosses	0.1	5	10	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	36	70	100	60
B	WATER	water	1.0	8	15	100	28
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	30.0	40.0	50.0	cm	2
Dwarf shrubs	SD	3.0	10.3	20.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	16.0	31.0	70.0	cm	6
Tall and medium forbs	FT, FM	20.0	45.0	70.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	5.5	30.0	cm	10

Map Unit Components**Common Name (Soils Name):**

Boreal-sedge bog organic depressions (Typic Cryofibrists, dysic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

12B	Boreal Bogs (Typic Cryofibrists, dysic-Fluvaquentic Cryohemists, dysic Complex, 0 to 2 percent slopes)
12HS2	Boreal Glaciated Hills and Plains (Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal-Typic Cryofibrists, dysic Association, 0 to 20 percent slopes)

Geographically Associated Landtypes

135A_359—Till Slopes:

This site occurs on well drained soils. The climax plant community is "Mixed paper birch-white spruce forest."

135A_362—Till Slopes, Wet:

This site occurs on adjacent uplands. The climax plant community is "Mixed white spruce-paper birch/Sitka alder forest."

135A_535—Organic Depressions:

This site occurs on slightly higher positions. The climax plant community is "Black spruce/few-flowered sedge woodland."

Similar Landtypes

135A_500—Loamy Wet Flood Plains:

This site has a thick loamy surface mantle. The climax plant community is "Thinleaf alder-mixed willow scrub."

135A_501—Organic High Flood Plains, Very Wet:

This site occurs on flood plains. The climax plant community is "Water horsetail-marsh five finger-buckbean wet

Organic Depressions (135A_535)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Glaciated Lowlands (135A.G1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	238	187 to 361
Slope Gradient (percent):	0	0 to 2
Aspect (clockwise direction):	non-influencing	
Landform:	bogs on till plains	

	<i>Frequency</i>
Flooding:	None
Ponding:	None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,053	536 to 2,174
Annual Air Temperature (°C):	0.8	-1.0 to 1.0
Frost Free Days:	90	70 to 100

Soil Features

Parent Materials: mossy organic material and/or grassy organic material

Rooting Depth (cm): *RV:* 89 *Range:* 63 to 110

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
28 to 61	peat; mucky peat	moderately rapid	.34	3.3	30	

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Black spruce/few-flowered sedge woodland	Climax plant community

Ecological Status-Transition Description:

A single plant community with black spruce/few-flowered sedge woodland is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/few-flowered sedge woodland	29	16	19	21	3

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Black spruce/few-flowered sedge woodland	COTR2	Coptis trifolia
	GEDO	Gentiana douglasiana

Characteristics of Black spruce/few-flowered sedge woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	Picea mariana	7.0	7	7	67	22
TS	PIMA	Picea mariana	10.0	10	10	33	18
SL	CHCA2	Chamaedaphne calyculata	25.0	28	30	67	43
SD-SL	LEPAD	Ledum palustre ssp. decumbens	5.0	13	20	100	36
SD-SL	BEGL	Betula glandulosa	5.0	6	7	100	24
SL	MYGA	Myrica gale	0.1	5	10	67	18
SD	ANPO	Andromeda polifolia	1.0	7	15	100	26
SD	EMNI	Empetrum nigrum	2.0	5	10	100	22
GM	CAPA19	Carex pauciflora	10.0	25	35	100	50
GM	CARO7	Carex rotundata	5.0	22	40	67	38
GM	TRCE3	Trichophorum cespitosum	5.0	18	30	67	35
GM	CAAQ	Carex aquatilis	5.0	5	5	33	13
FD	RUCH	Rubus chamaemorus	2.0	17	25	100	41
L	LICHEN	total lichens	0.1	3	7	100	17
M	MOSS	total bryophytes-mosses and liverworts	85.0	90	95	100	95
M1	SPHAG2	Sphagnum	45.0	67	90	100	82
M1	PLSC70	Pleurozium schreberi	10.0	22	35	67	38
M1	ZZMOSS	unknown-mosses	5.0	7	10	100	26
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	28	35	100	53
B	LITTER2	litter-woody debris >2.5 cm	0.1	1	2	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.2	4.9	6.5	m	3
Tree regeneration	TR	1.0	1.0	1.0	m	1
Low shrubs	SL	20.0	30.0	40.0	cm	2
Dwarf shrubs	SD	2.0	6.0	10.0	cm	2

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall and medium grasses and grass-likes	GT, GM	9.0	19.5	30.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.7	6.0	cm	6

Map Unit Components

Common Name (Soils Name):

Boreal-woodland bog organic depressions (Fluvaquentic Cryohemists, dysic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

12B Boreal Bogs
(Typic Cryofibrists, dysic-Fluvaquentic Cryohemists, dysic Complex, 0 to 2 percent slopes)

Geographically Associated Landtypes

135A_359—Till Slopes:

This site occurs on well drained soils. The climax plant community is "Mixed paper birch-white spruce forest."

135A_362—Till Slopes, Wet:

This site occurs on adjacent uplands. The climax plant community is "Mixed white spruce-paper birch/Sitka alder forest."

135A_534—Organic Depressions, Very Wet:

This site occurs on slightly lower positions. The climax plant community is "Tufted bulrush-few-flowered sedge wet meadow."

Moraines, Ice Cored (135A_803)

Ecoregion Classification

Section: Cook Inlet Lowlands (135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (135A.V1)

Physiographic Features

	RV	Range
Elevation (meters):	562	183 to 1,320
Slope Gradient (percent):	26	10 to 45

Aspect (clockwise direction): non-influencing

Landform: moraines

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,403	408 to 3,051
Annual Air Temperature (°C):	-3.4	-6.9 to 0.7
Frost Free Days:	70	60 to 90

Soil Features

Parent Materials: gravelly ablation till
silty eolian deposits over gravelly ablation till

Rooting Depth (cm): RV: 35 Range: 9 to 62

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 5	slightly decomposed plant material	moderately rapid	.34	3.0 to 7.6	30	80
4 to 23	very cobbly sandy loam; silt loam	moderate or moderately rapid	.10 to .40	3.2 to 7.8	12	6
10 to 23	very cobbly sandy loam	moderately rapid	.10	4.7 to 7.8	6	6

Restrictive Features: strongly contrasting textural stratification at 9 cm in some components

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Moraine poplar/alder woodland	Climax plant community
Moraine forest	Post climax plant community
Sitka alder-feltleaf willow scrub	Mid stage of primary succession on moraines

Ecological Status-Transition Description:

Three plant communities are identified on this site including a potential community with poplar/alder woodland, moraine on more extensive meta-stable moraines, a mid-successional community with Sitka alder-feltleaf willow scrub on recent, unstable moraine deposits, and a post potential community with forest, moraine on extensive and relatively stable moraines.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Moraine poplar/alder woodland	22	15	15	15	2
Moraine forest	46	20	24	32	3
Sitka alder-feltleaf willow scrub	63	12	24	34	4

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Moraine forest	OSDE	Osmorhiza depauperata
	WISE2	Viola selkirkii
Sitka alder-feltleaf willow scrub	PHAL4	Phyllodoce aleutica

Characteristics of Moraine poplar/alder woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	POBA2	Populus balsamifera	10.0	38	65	100	62
ST	ALSI3	Alnus sinuata	60.0	62	65	100	79
SM	OPHO	Oplopanax horridus	35.0	35	35	50	42
SL-SM	RITR	Ribes triste	10.0	12	15	100	35
SM	SAPU15	Salix pulchra	10.0	10	10	50	22
SM	VIED	Viburnum edule	10.0	10	10	50	22
SM	SHCA	Shepherdia canadensis	5.0	5	5	50	16
SL	RILA3	Ribes laxiflorum	20.0	20	20	50	32
SL	RUID	Rubus idaeus	7.0	7	7	50	19
GT	CACA4	Calamagrostis canadensis	5.0	5	5	50	16

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
FT	DRDI2	Dryopteris dilatata	5.0	6	7	100	24
L	LICHEN	total lichens	0.1	1	1	100	10
M	MOSS	total bryophytes-mosses and liverworts	20.0	22	25	100	47
M1	ZZMOSS	unknown-mosses	15.0	18	20	100	42
M1	DICRA8	Dicranum	5.0	5	5	50	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	80.0	80	80	100	89
B	LITTER2	litter-woody debris >2.5 cm	6.0	8	10	100	28
B	ROCK	mineral-surface rock fragments	0.1	3	6	100	17
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	10.5	11.0	m	2
Tall shrubs	ST	4.0	4.2	4.5	m	2
Medium shrubs	SM	1.0	1.2	1.5	m	2
Low shrubs	SL	100.0	100.0	100.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	130.0	130.0	130.0	cm	1
Tall and medium forbs	FT, FM	12.0	74.0	110.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.7	6.0	cm	3

Characteristics of Moraine forest

Ecological Status: Post climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	45.0	52	60	67	59
TT	PIGL	Picea glauca	20.0	20	20	33	26
ST	ALSI3	Alnus sinuata	20.0	52	70	100	72
SM	OPHO	Oplopanax horridus	1.0	13	35	100	36
SM	SAPU15	Salix pulchra	5.0	5	5	33	13
SL	RILA3	Ribes laxiflorum	5.0	5	5	33	13
FT	STAM2	Streptopus amplexifolius	10.0	10	10	33	18
FD	LYAN2	Lycopodium annotinum	5.0	5	5	33	13
L	LICHEN	total lichens	0.1	2	5	100	14
M	MOSS	total bryophytes-mosses and liverworts	5.0	38	85	100	62
M1	PLSC70	Pleurozium schreberi	50.0	50	50	33	41
M1	ZZMOSS	unknown-mosses	10.0	18	25	67	35
M1	HYSP70	Hylocomium splendens	1.0	6	10	67	20
M1	POCO38	Polytrichum commune	0.1	5	10	67	18
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	65	95	100	81
B	LITTER2	litter-woody debris >2.5 cm	4.0	7	10	100	26
B	ROCK	mineral-surface rock fragments	0.1	1	1	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	15.0	18.3	22.0	m	3
Tree regeneration	TR	4.5	4.5	4.5	m	1
Tall shrubs	ST	3.0	4.5	6.0	m	3
Medium shrubs	SM	1.5	1.6	1.8	m	2

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	80.0	80.0	80.0	cm	1
Dwarf shrubs	SD	2.0	2.0	2.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	100.0	115.0	130.0	cm	2
Tall and medium forbs	FT, FM	80.0	95.0	110.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.8	8.0	cm	5

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	100	31.8	16.8		
	131	35.3	19.2		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
9.2	9.2	9.2	1

Characteristics of Sitka alder-feltleaf willow scrub

Ecological Status: Mid stage of primary succession on moraines

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	POBA2	Populus balsamifera	5.0	10	15	50	22
ST	ALS13	Alnus sinuata	45.0	75	90	75	75
SM-ST	SAAL	Salix alaxensis	0.1	11	25	100	33
SM	SHCA	Shepherdia canadensis	30.0	30	30	25	27
SL	SPST3	Spiraea stevenii	0.1	5	10	50	16
SL	VAOV	Vaccinium ovalifolium	10.0	10	10	25	16
SD	DRDR	Dryas drummondii	5.0	5	5	25	11
FD	GYDR	Gymnocarpium dryopteris	5.0	5	5	25	11
L	LICHEN	total lichens	0.1	20	50	100	45
L2	ZZCRUST	unknown-crustose and soil crust lichens	0.1	22	40	75	41
M	MOSS	total bryophytes-mosses and liverworts	3.0	8	15	100	28
M1	ZZMOSS	unknown-mosses	2.0	6	10	75	21
M1	RACOM	Racomitrium	1.0	5	10	75	19
M1	POCO38	Polytrichum commune	5.0	5	5	25	11
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	55	85	100	74
B	ROCK	mineral-surface rock fragments	5.0	38	80	100	62
B	LITTER2	litter-woody debris >2.5 cm	0.1	3	7	100	17
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	6.5	8.0	m	2
Tall shrubs	ST	3.0	3.8	5.0	m	6
Medium shrubs	SM	1.2	2.1	3.0	m	2
Low shrubs	SL	70.0	70.0	70.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	120.0	120.0	120.0	cm	1
Tall and medium forbs	FT, FM	100.0	110.0	120.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	1.4	4.0	cm	8

Map Unit Components

Common Name (Soils Name):

Boreal-woodland gravelly moraines (Typic Eutrocryepts, loamy-skeletal)
Subalpine-scrub gravelly moraines (Typic Cryorthents, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9CE Alpine, Subalpine, and Boreal Recent Moraines
(Typic Cryorthents-Nonvegetated Drift-Typic Eutrocryepts, loamy-skeletal Association, 0 to 65 percent slopes)

Geographically Associated Landtypes

M135S_ROC—South Central Rock and Ice, Nonvegetated:

This site occurs on recent nonvegetated moraines. The climax plant community is "Sparsely vegetated mountain slopes, South Central."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes

135A_200—Gravelly Low Flood Plains:

This site is on flood plains. The climax plant community is "Sitka alder-Barclay willow-Sitka willow scrub."

135A_500—Loamy Wet Flood Plains:

This site occurs on flood plains and soils have a thick loamy surface mantle. The climax plant community is "Thinleaf alder-mixed willow scrub."

Gravelly Frozen Slopes, Wet (M131B_179)

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection(s): Alpine Low Mountains (M131B.M1A)

Physiographic Features

Elevation (meters): RV 488 Range 197 to 632

Slope Gradient (percent): 3 0 to 8

Aspect (clockwise direction): non-influencing

Landform: turf hummocks on mountains

Landform Positions: summits

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	None				
Ponding:	Frequent	Long	May	Jun	to

Climatic Features

Annual Precipitation (millimeters): RV 465 Range 356 to 549

Annual Air Temperature (°C): -2.8 -2.9 to -2.0

Frost Free Days: 60 50 to 70

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist

Rooting Depth (cm): RV: 60 Range: 58 to 62

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
31	peat	moderately rapid	.34	3.3	30	
29	silt loam, muck	moderate	.19	5.3	15	

Restrictive Features: permafrost at 61 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Tussock cottongrass/mixed ericaceous shrub meadow2	Climax plant community

Ecological Status-Transition Description:

A single plant community with tussock cottongrass/mixed ericaceous shrub woodland is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand			Number of Stands
	Total	Min.	Avg. Max.	
Tussock cottongrass/mixed ericaceous shrub meadow2	16	12	12 13	2

Characteristics of Tussock cottongrass/mixed ericaceous shrub meadow2

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	BEGL	Betula glandulosa	0.1	5	10	100	22
SD	LEPAD	Ledum palustre ssp. decumbens	15.0	15	15	100	39
SD	VAUL	Vaccinium uliginosum	10.0	12	15	100	35
SD	EMNI	Empetrum nigrum	5.0	10	15	100	32
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	10	15	100	32
SD	ARAL13	Arctous alpina	0.1	8	15	100	28
GM	ERBR6	Eriophorum brachyantherum	30.0	40	50	100	63
GM	CABI5	Carex bigelowii	5.0	12	20	100	35
L	LICHEN	total lichens	15.0	30	45	100	55
L1	FLCU	Flavocetraria cucullata	4.0	17	30	100	41
L1	CLMU60	Cladonia multiformis	5.0	5	5	50	16
L1	STERE2	Stereocaulon	5.0	5	5	50	16
M	MOSS	total bryophytes-mosses and liverworts	35.0	50	65	100	71
M1	SPHAG2	Sphagnum	30.0	30	30	100	55
M1	ZZMOSS	unknown-mosses	5.0	15	25	100	39
M1	PLSC70	Pleurozium schreberi	10.0	10	10	50	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	35.0	38	40	100	62
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	30.0	30.0	30.0	cm	1
Dwarf shrubs	SD	3.0	6.5	10.0	cm	2
Tall and medium grasses and grass-like	GT, GM	20.0	20.0	20.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.2	5.0	cm	5

Map Unit Components**Common Name (Soils Name):**

Alpine-tussock-scrub mica rich silty slopes, Kuskokwim Mountains (Typic Histoturbels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

4S1 Alpine Low Schist Mountain Summits with Continuous Permafrost
(Ruptic-Histic Aquiturbels, loamy-skeletal-Typic Histoturbels, coarse-silty-Typic Histoturbels, loamy-skeletal Association, 0 to 16 percent slopes)

Geographically Associated Landtypes**M131B_355—Silty Slopes, Cool:**

This site occurs on lower slopes with soils that are well drained and moderately deep or deep over bedrock. The climax plant community is "Black spruce/mixed ericaceous shrub woodland."

M131B_415—Loamy Frozen Slopes, High Elevation:

This site occurs on non-sorted circles. The climax plant community is "Mixed ericaceous shrub-shrub birch scrub."

Similar Landtypes**M131B_403—Loamy Frozen Slopes, Very Wet:**

This site occurs within the boreal biome at lower elevation. The climax plant community is "Tussock cottongrass/mixed ericaceous shrub meadow3."

Silty Slopes (M131B_349)**Ecoregion Classification**

Section: Kuskokwim Mountains (M131B)

Subsection(s): Boreal Low Mountains (M131B.M1)

Physiographic Features

Elevation (meters): RV 321 Range 193 to 579

Slope Gradient (percent): 18 10 to 30

Aspect (clockwise direction): non-influencing

Landform: mountains

Landform Positions: backslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	423	345 to 549
Annual Air Temperature (°C):	-2.5	-2.9 to -1.2
Frost Free Days:	80	60 to 100

Soil Features

Parent Materials: loamy eolian deposits over gravelly colluvium derived from schist

Rooting Depth (cm): RV: 41 Range: 20 to 51

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
6	slightly decomposed plant material	moderately rapid	.34	3.5	30	
3	silt loam	moderate	.26	3.6	12	
32	very fine sandy loam	moderate	.26	4.9	12	

Restrictive Features: bedrock (paralithic) at 141 to 150 cm or more

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Paper birch-white spruce forest	Climax plant community
Paper birch/green alder forest	Mid stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with paper birch-white spruce forest and a mid-seral community with paper birch/green alder forest. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Paper birch-white spruce forest	31	13	16	21	6
Paper birch/green alder forest	28	10	14	21	4

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Paper birch-white spruce forest	GOREO2	Goodyera repens var. ophioides

Characteristics of Paper birch-white spruce forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	BENE4	Betula neoalaskana	40.0	56	75	83	68
TT	PIGL	Picea glauca	3.0	5	7	83	20
TM	BENE4	Betula neoalaskana	50.0	50	50	17	29
TM	PIMA	Picea mariana	10.0	10	10	17	13
ST	ALVIC	Alnus viridis ssp. crispa	10.0	26	45	100	51
SL-SM	LEGR	Ledum groenlandicum	0.1	8	25	83	26

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	ROAC	Rosa acicularis	1.0	5	10	100	22
SM	SPST3	Spiraea stevenii	0.1	10	30	50	22
SM	VIED	Viburnum edule	5.0	5	5	33	13
SL	VAUL	Vaccinium uliginosum	6.0	6	6	17	10
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	2.0	17	35	100	41
SD	LIBO3	Linnaea borealis	1.0	16	35	83	36
GT	CACA4	Calamagrostis canadensis	0.1	10	40	100	32
FM	EQPR	Equisetum pratense	1.0	30	60	33	31
FD	COCA13	Cornus canadensis	1.0	16	45	100	40
L	LICHEN	total lichens	0.1	1	5	100	10
M	MOSS	total bryophytes-mosses and liverworts	15.0	44	85	100	66
M1	HYSP70	Hylocomium splendens	0.1	33	55	100	57
M1	ZZMOSS	unknown-mosses	2.0	5	10	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	25.0	64	90	100	80
B	LITTER2	litter-woody debris >2.5 cm	5.0	7	10	100	26
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	11.0	16.9	24.0	m	7
Tall shrubs	ST	4.0	5.2	6.0	m	6
Medium shrubs	SM	1.2	1.6	2.5	m	4
Low shrubs	SL	60.0	83.3	100.0	cm	3
Dwarf shrubs	SD	2.0	10.5	17.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	110.0	116.7	130.0	cm	3
Tall and medium forbs	FT, FM	40.0	40.0	40.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.2	8.0	cm	11

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	98	35.6	21.9	4	B
	113	38.5	23.5		
	132	40.6	25.0		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
----- m ² / ha -----			
10.4	11.5	12.6	2

Characteristics of Paper birch/green alder forest

Ecological Status: Mid-stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	BENE4	Betula neoalaskana	45.0	60	75	75	67
TM	BENE4	Betula neoalaskana	75.0	75	75	25	43
ST	ALVIC	Alnus viridis ssp. crispa	35.0	48	60	100	69
SM	ROAC	Rosa acicularis	5.0	13	30	75	31
SM	SPST3	Spiraea stevenii	5.0	12	20	50	24

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	LEGR	Ledum groenlandicum	3.0	14	25	50	26
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	15.0	22	30	100	47
SD	LIBO3	Linnaea borealis	3.0	6	10	100	24
GT	CACA4	Calamagrostis canadensis	0.1	20	55	75	39
FM	EQPR	Equisetum pratense	55.0	55	55	25	37
FM	EQSY	Equisetum sylvaticum	0.1	8	15	50	20
FD	COCA13	Cornus canadensis	1.0	12	25	100	35
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	7.0	20	50	100	45
M1	HYS70	Hylocomium splendens	2.0	14	40	100	37
M1	ZZMOSS	unknown-mosses	3.0	5	10	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	65.0	85	95	100	92
B	LITTER2	litter-woody debris >2.5 cm	5.0	10	15	100	32
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	15.2	18.0	m	4
Tall shrubs	ST	4.5	5.1	5.5	m	4
Medium shrubs	SM	1.3	1.3	1.3	m	2
Low shrubs	SL	20.0	32.5	50.0	cm	4
Dwarf shrubs	SD	10.0	13.3	15.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	130.0	130.0	130.0	cm	2
Tall and medium forbs	FT, FM	30.0	46.7	70.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.3	9.0	cm	7

Map Unit Components**Common Name (Soils Name):**

Boreal-forested mica-rich silty loess slopes (Typic Eutrocryepts, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

4BSS Boreal Mica-Rich Low Mountains
(Typic Eutrocryepts, coarse-silty, 8 to 30 percent slopes)

Geographically Associated Landtypes**M131B_355—Silty Slopes, Cool:**

This site occurs on higher slopes with soils that are well drained and moderately deep over bedrock. The climax plant community is "Black spruce/mixed ericaceous shrub woodland."

M131B_400—Loamy Frozen Slopes:

This site occurs on lower slopes with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

M131B_415—Loamy Frozen Slopes, High Elevation:

This site occurs on non-sorted circles on higher slopes. The climax plant community is "Mixed ericaceous shrub-shrub birch scrub."

Silty Slopes, Cool (M131B_355)

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection(s): Boreal Low Mountains (M131B.M1)

Physiographic Features

	RV	Range
Elevation (meters):	329	194 to 611

Slope Gradient (percent):	15	15 to 25
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Aspect (clockwise direction): non-influencing

Landform: mountains

Landform Positions: backslopes

	Frequency
Flooding:	None

Ponding:	None
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Climatic Features

	RV	Range
Annual Precipitation (millimeters):	423	345 to 549

Annual Air Temperature (°C):	-2.5	-2.9 to -1.2
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Frost Free Days:	80	60 to 100
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Soil Features

Parent Materials: silty eolian deposits over gravelly colluvium derived from schist

Rooting Depth (cm): RV: 30 Range: 19 to 44

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
10	slightly decomposed plant material	moderately rapid	.34	3.3	30	
9	silt loam	moderate	.26	4.1	12	
11	very channery silt loam	moderately rapid	.12	4.7	6	

Restrictive Features: bedrock (paralithic) at 84 to 150 cm or more
strongly contrasting textural stratification at 19 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Black spruce/mixed ericaceous shrub woodland

Black spruce-paper birch/lingonberry woodland

Ecological Status

Climax plant community

Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with black spruce/mixed ericaceous shrub woodland and a late-seral community with black spruce- paper birch/lingonberry woodland. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/mixed ericaceous shrub woodland	17	13	14	14	2
Black spruce-paper birch/lingonberry woodland	24	11	15	19	3

Characteristics of Black spruce/mixed ericaceous shrub woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TM	PIMA	<i>Picea mariana</i>	20.0	22	25	100	47
SM	B EGL	<i>Betula glandulosa</i>	10.0	12	15	100	35
SM	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	5.0	6	7	100	24
SM	SAPU15	<i>Salix pulchra</i>	5.0	5	5	50	16
SM	SPST3	<i>Spiraea stevenii</i>	5.0	5	5	50	16
SL	VAUL	<i>Vaccinium uliginosum</i>	40.0	42	45	100	65
SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	20.0	22	25	100	47
SD	EMNI	<i>Empetrum nigrum</i>	25.0	25	25	50	35
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	5.0	10	15	100	32
L	LICHEN	total lichens	10.0	22	35	100	47
L1	CLMI61	<i>Cladina mitis</i> group	10.0	10	10	50	22
L1	CLRA61	<i>Cladina rangiferina</i> group	10.0	10	10	50	22
L1	CLADO3	<i>Cladonia</i>	5.0	5	5	50	16
L1	CLCO19	<i>Cladonia cornuta</i>	5.0	5	5	50	16
L1	CLMU60	<i>Cladonia multiformis</i>	5.0	5	5	50	16
M	MOSS	total bryophytes-mosses and liverworts	65.0	68	70	100	82
M1	HYSP70	<i>Hylocomium splendens</i>	20.0	28	35	100	53
M1	PLSC70	<i>Pleurozium schreberi</i>	25.0	28	30	100	53
M1	ZZMOSS	unknown-mosses	5.0	10	15	100	32
M1	SPHAG2	<i>Sphagnum</i>	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	18	25	100	42
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.5	5.8	6.0	m	2
Medium shrubs	SM	1.2	1.8	2.5	m	4
Low shrubs	SL	30.0	30.0	30.0	cm	1
Dwarf shrubs	SD	10.0	10.0	10.0	cm	1
Tall and medium forbs	FT, FM	25.0	25.0	25.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	3.5	5.0	cm	4

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
<i>Picea mariana</i>	66	9.1	5.8	1	G
	66	9.1	5.8		
	66	9.1	5.8		

Characteristics of Black spruce-paper birch/lingonberry woodland

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIMA	<i>Picea mariana</i>	20.0	20	20	33	26
TT	BENE4	<i>Betula neoalaskana</i>	15.0	15	15	33	22
TM	PIMA	<i>Picea mariana</i>	65.0	65	65	33	46
TM	BENE4	<i>Betula neoalaskana</i>	5.0	8	10	67	23
TR	PIMA	<i>Picea mariana</i>	15.0	15	15	33	22
ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	5.0	20	40	100	45
SL-SM	LEGR	<i>Ledum groenlandicum</i>	15.0	27	40	100	52
SL-SM	SPST3	<i>Spiraea stevenii</i>	1.0	8	15	67	23
SL	VAUL	<i>Vaccinium uliginosum</i>	5.0	9	15	100	30
SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	5.0	5	5	33	13
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	30.0	37	45	100	61
FM	EQSY	<i>Equisetum sylvaticum</i>	0.1	9	25	100	30
FD	GELI2	<i>Geocaulon lividum</i>	25.0	25	25	33	29
FD	COCA13	<i>Cornus canadensis</i>	5.0	5	5	33	13
L	LICHEN	total lichens	0.1	23	40	100	48
L1	CLADO3	<i>Cladonia</i>	0.1	7	15	100	26
L1	PEAP61	<i>Peltigera apthosa</i> group	0.1	7	20	100	26
L1	CLADI3	<i>Cladina</i>	2.0	8	15	67	23
L1	CLRA61	<i>Cladina rangiferina</i> group	5.0	5	5	33	13
M	MOSS	total bryophytes-mosses and liverworts	40.0	63	80	100	79
M1	HYSP70	<i>Hylocomium splendens</i>	5.0	27	45	100	52
M1	ZZMOSS	unknown-mosses	10.0	15	25	100	39
M1	PLSC70	<i>Pleurozium schreberi</i>	5.0	12	15	100	35
M1	POCO38	<i>Polytrichum commune</i>	0.1	7	20	100	26
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	22	30	100	47
B	LITTER2	litter-woody debris >2.5 cm	7.0	8	10	100	28
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	7.0	8.3	10.0	m	3
Tree regeneration	TR	4.5	4.5	4.5	m	1
Tall shrubs	ST	3.5	3.5	3.5	m	2
Medium shrubs	SM	1.0	1.0	1.0	m	1
Low shrubs	SL	40.0	60.0	80.0	cm	2
Dwarf shrubs	SD	12.0	16.3	20.0	cm	3
Tall and medium forbs	FT, FM	30.0	35.0	40.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.3	8.0	cm	7

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age	Diameter	Height	Number of Trees	Height of Measurements
	(years)	(cm)	(m)		
<i>Picea mariana</i>	68	16.5	11.3	2	B
	73	18.5	12.8		
	78	20.6	14.3		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
m ² / ha			of Stands
25.3	25.3	25.3	1

Map Unit Components**Common Name (Soils Name):**

Boreal-taiga mica rich silt loess slopes (Typic Dystrocryepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

4BS Boreal Schist Mountain Backslopes with Discontinuous Permafrost
(Typic Dystrocryepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 8 to 25 percent slopes)

Geographically Associated Landtypes**M131B_349—Silty Slopes:**

This site occurs on lower slopes with well drained deep or very deep soils over bedrock. The climax plant community is "Paper birch-white spruce forest."

M131B_400—Loamy Frozen Slopes:

This site occurs on lower slopes with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

M131B_415—Loamy Frozen Slopes, High Elevation:

This site occurs on non-sorted circles on higher slopes. The climax plant community is "Mixed ericaceous shrub-shrub birch scrub."

Similar Landtypes**M131B_400—Loamy Frozen Slopes:**

This site occurs on lower slopes with wetter soils that have permafrost at moderate depths. The climax plant community is "Black spruce/Labrador tea woodland."

Loamy Frozen Slopes (M131B_400)**Ecoregion Classification**

Section: Kuskokwim Mountains (M131B)

Subsection(s): Boreal Low Mountains (M131B.M1)

Physiographic Features

Elevation (meters): RV 282 Range 177 to 611

Slope Gradient (percent): 9 2 to 25

Aspect (clockwise direction): non-influencing

Landform: mountains

Landform Positions: toeslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	423	345 to 549
Annual Air Temperature (°C):	-2.5	-2.9 to -1.2
Frost Free Days:	80	60 to 100

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty colluvium derived from schist
 mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Rooting Depth (cm): *RV:* 37 *Range:* 21 to 80

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
23 to 25	peat	moderately rapid	.34	3.7 to 4.8	30	
2 to 14	silt loam	moderate	.22 to .26	5.2 to 6.2	15	16
2 to 12	silt loam	moderate	.22 to .26	5.5 to 6.2	15	16

Restrictive Features: bedrock (paralithic) at 84 to 150 cm or more
 permafrost at 35 to 58 cm
 strongly contrasting textural stratification at 35 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Black spruce/Labrador tea woodland	Climax plant community
Black spruce/shrub birch woodland	Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with black spruce/Labrador tea woodland and a late-seral community with black spruce/shrub birch woodland. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		<i>Min.</i>	<i>Avg.</i>	<i>Max.</i>	
Black spruce/Labrador tea woodland	43	12	17	23	13
Black spruce/shrub birch woodland	17	15	16	16	2

Characteristics of Black spruce/Labrador tea woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 13. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent			Percent Constancy	Importance Value
			<i>Canopy Cover</i>	<i>Min.</i>	<i>Avg.</i>		
TM	PIMA	Picea mariana	15.0	23	40	69	40
TS	PIMA	Picea mariana	7.0	23	55	31	27
TS	LALA	Larix laricina	0.1	5	10	23	11
SD-SM	LEPAD	Ledum palustre ssp. decumbens	10.0	24	55	85	45
SL-SM	BEGL	Betula glandulosa	0.1	8	15	92	27
SD-SL	VAUL	Vaccinium uliginosum	2.0	13	50	92	35

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	LEGR	Ledum groenlandicum	0.1	12	45	38	21
SL	CHCA2	Chamaedaphne calyculata	0.1	5	20	46	15
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	12	20	100	35
SD	EMNI	Empetrum nigrum	2.0	11	35	46	22
GM	ERBR6	Eriophorum brachyantherum	0.1	5	20	54	16
FD-FM	EQSY	Equisetum sylvaticum	0.1	14	45	69	31
FD	RUCH	Rubus chamaemorus	0.1	15	40	100	39
L	LICHEN	total lichens	0.1	17	40	100	41
L1	CLRA61	Cladina rangiferina group	0.1	6	15	77	21
L1	CLADI3	Cladina	0.1	5	10	77	20
L1	CLMI61	Cladina mitis group	5.0	5	5	15	9
M	MOSS	total bryophytes-mosses and liverworts	60.0	79	95	100	89
M1	SPHAG2	Sphagnum	0.1	31	55	100	56
M1	PLSC70	Pleurozium schreberi	1.0	26	55	92	49
M1	HYSP70	Hylocomium splendens	5.0	24	50	62	39
M1	ZZMOSS	unknown-mosses	0.1	8	15	100	28
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	12	45	100	35
B	LITTER2	litter-woody debris >2.5 cm	0.0	3	7	100	17
B	SOIL	mineral-bare soil	0.0	0	3	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.0	5.6	9.0	m	17
Tree regeneration	TR	0.8	1.0	1.1	m	5
Tall shrubs	ST	3.0	3.0	3.0	m	1
Medium shrubs	SM	1.1	1.6	2.0	m	11
Low shrubs	SL	20.0	51.7	90.0	cm	12
Dwarf shrubs	SD	5.0	11.0	20.0	cm	8
Tall and medium grasses and grass-likes	GT, GM	30.0	53.3	100.0	cm	6
Tall and medium forbs	FT, FM	20.0	40.0	60.0	cm	9
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.9	9.0	cm	31

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Larix laricina	23	7.9	5.5	Min.	1	G
	23	7.9	5.5	Avg.		
	23	7.9	5.5	Max.		
Picea mariana	68	8.9	4.9	Min.	3	G
	98	10.0	7.1	Avg.		
	134	11.9	9.1	Max.		

Characteristics of Black spruce/shrub birch woodland

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	Picea mariana	15.0	18	20	100	42
TM	LALA	Larix laricina	0.1	5	10	100	22

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM	BEGL	Betula glandulosa	15.0	18	20	100	42
SM	ALVIC	Alnus viridis ssp. crispa	1.0	10	20	100	32
SM	SAPU15	Salix pulchra	0.1	5	10	100	22
SL	LEPAD	Ledum palustre ssp. decumbens	20.0	20	20	100	45
SL	VAUL	Vaccinium uliginosum	10.0	20	30	100	45
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	10.0	12	15	100	35
SD	EMNI	Empetrum nigrum	2.0	6	10	100	24
FD	RUCH	Rubus chamaemorus	10.0	15	20	100	39
L	LICHEN	total lichens	0.1	10	20	100	32
L1	CLMI61	Cladina mitis group	7.0	7	7	50	19
L1	CLMU60	Cladonia multiformis	5.0	5	5	50	16
M	MOSS	total bryophytes-mosses and liverworts	75.0	85	95	100	92
M1	SPHAG2	Sphagnum	35.0	42	50	100	65
M1	HYSP70	Hylocomium splendens	10.0	15	20	100	39
M1	PLSC70	Pleurozium schreberi	10.0	12	15	100	35
M1	ZZMOSS	unknown-mosses	5.0	10	15	100	32
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	12	15	100	35
B	LITTER2	litter-woody debris >2.5 cm	0.1	3	5	100	17
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.1	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.5	7.0	7.5	m	2
Tree regeneration	TR	0.5	0.5	0.5	m	1
Medium shrubs	SM	1.3	2.0	2.5	m	4
Low shrubs	SL	30.0	30.0	30.0	cm	1
Tall and medium forbs	FT, FM	30.0	30.0	30.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	6.7	12.0	cm	3

Map Unit Components

Common Name (Soils Name):

Boreal-taiga mica-rich silty frozen colluvial slopes, Kuskokwim Mountains (Typic Historthels, coarse-silty)

Boreal-taiga silty schist slopes, frozen (Typic Historthels, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

4BS	Boreal Schist Mountain Backslopes with Discontinuous Permafrost (Typic Dystrocryepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 8 to 25 percent slopes)
4FS	Boreal Mica-Rich Low Mountain Footslopes with Continuous Permafrost (Typic Historthels, coarse-silty, 2 to 10 percent slopes)
4TS	Boreal Mica-Rich Mountain Toeslopes with Continuous Permafrost (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 5 percent slopes)

Geographically Associated Landtypes

M131B_355—Silty Slopes, Cool:

This site occurs on higher slopes with soils that are well drained and moderately deep over bedrock. The climax plant community is "Black spruce/mixed ericaceous shrub woodland."

M131B_403—Loamy Frozen Slopes, Very Wet:

This site occurs on lower toeslope positions with wetter soils that are moderately deep over permafrost. The climax plant community is "Tussock cottongrass/mixed ericaceous shrub meadow3."

M131B_504—Silty Drainages, Frozen:

This site occurs on narrow drainages with wetter, flooded soils. The climax plant community is "Diamondleaf willow-green alder-leatherleaf scrub."

Similar Landtypes**M131B_355—Silty Slopes, Cool:**

This site occurs on soils that are moderately deep over bedrock and well drained. The climax plant community is "Black spruce/mixed ericaceous shrub woodland."

Loamy Frozen Slopes, Very Wet (M131B_403)**Ecoregion Classification**

Section: Kuskokwim Mountains (M131B)

Subsection(s): Boreal Low Mountains (M131B.M1)

Physiographic Features

	<i>RV</i>	<i>Range</i>			
Elevation (meters):	200	193 to 242			
Slope Gradient (percent):	2	0 to 6			
Aspect (clockwise direction):	non-influencing				
Landform:	turf hummocks on mountains				
Landform Positions:	toeslopes				
	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	None				
Ponding:	Frequent	Long	May	Jun	to

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	423	345 to 549
Annual Air Temperature (°C):	-2.5	-2.9 to -1.2
Frost Free Days:	80	60 to 100

Soil Features

Parent Materials: grassy organic material over silty cryoturbate derived from schist

Rooting Depth (cm): *RV:* 50 *Range:* 38 to 62

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
40	peat	moderately rapid	.34	3.3	30	
10	silt loam, muck	moderate	.19	5.3	16	

Restrictive Features: permafrost at 77 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Tussock cottongrass/mixed ericaceous shrub meadow3	Climax plant community

Ecological Status-Transition Description:

A single plant community with tussock cottongrass/mixed ericaceous shrub meadow3 is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Tussock cottongrass/mixed ericaceous shrub meadow3	17	13	15	17	2

Characteristics of Tussock cottongrass/mixed ericaceous shrub meadow3

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	LEPAD	Ledum palustre ssp. decumbens	25.0	35	45	100	59
SL	B EGL	Betula glandulosa	20.0	22	25	100	47
SD-SL	VAUL	Vaccinium uliginosum	15.0	18	20	100	42
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	22	40	100	47
GM	ERBR6	Eriophorum brachyantherum	65.0	70	75	100	84
FD	RUCH	Rubus chamaemorus	5.0	12	20	100	35
L	LICHEN	total lichens	0.1	1	1	100	10
M	MOSS	total bryophytes-mosses and liverworts	30.0	32	35	100	57
M1	SPHAG2	Sphagnum	20.0	22	25	100	47
M1	ZZMOSS	unknown-mosses	5.0	8	10	100	28
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	80.0	82	85	100	91
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.7	1.0	1.5	m	3
Medium shrubs	SM	2.0	2.0	2.0	m	1
Low shrubs	SL	20.0	30.0	40.0	cm	2
Dwarf shrubs	SD	5.0	8.5	12.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	30.0	35.0	40.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	4.0	7.0	cm	5

Map Unit Components**Common Name (Soils Name):**

Boreal-tussock-scrub mica rich silty loess slopes, frozen (Typic Histoturbels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

4TS Boreal Mica-Rich Mountain Toeslopes with Continuous Permafrost
(Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 5 percent slopes)

Geographically Associated Landtypes**M131B_504—Silty Drainages, Frozen:**

This site occurs on narrow drainages with wetter, flooded soils. The climax plant community is "Diamondleaf willow-green alder-leatherleaf scrub."

Similar Landtypes

M131B_179—Gravelly Frozen Slopes, Wet:

This site occurs within the alpine biome at higher elevation. The climax plant community is "Tussock cottongrass/mixed ericaceous shrub meadow2."

M131B_400—Loamy Frozen Slopes:

This site occurs on wetter soils that are moderately deep over permafrost. The climax plant community is "Black spruce/Labrador tea woodland."

Loamy Frozen Slopes, High Elevation (M131B_415)

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection(s): Alpine Low Mountains (M131B.M1A)
Boreal Low Mountains (M131B.M1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	488	197 to 632
Slope Gradient (percent):	10	4 to 16
Aspect (clockwise direction):	non-influencing	
Landform:	hummocks on mountains; nonsorted circles on mountains	
Landform Positions:	backslopes; shoulders; summits	
	<i>Frequency</i>	
Flooding:	None	
Ponding:	None	

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	465	356 to 549
Annual Air Temperature (°C):	-2.8	-2.9 to -2.0
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist
silty eolian deposits over gravelly cryoturbate derived from schist

Rooting Depth (cm): *RV:* 36 *Range:* 28 to 45

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
1 to 20	peat; slightly decomposed plant material	moderately rapid	.34	3.9 to 4.6	30	
2 to 14	silt loam, muck; silt loam	moderate	.26	4.4 to 5.3	12 to 15	
2 to 25	very channery silt loam; very channery loam	moderately rapid	.12	4.4 to 5.7	5 to 6	6

Restrictive Features: bedrock (paralithic) at 88 to 150 cm or more
permafrost at 42 to 150 cm
strongly contrasting textural stratification at 1 to 34 cm

Water Table (May to September): 0 to 120 cm

Drainage Class: moderately well drained to poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Mixed ericaceous shrub-shrub birch scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with mixed ericaceous shrub-shrub birch scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand				Number of Stands
	Total	Min.	Avg.	Max.	
Mixed ericaceous shrub-shrub birch scrub	26	10	14	16	5

Characteristics of Mixed ericaceous shrub-shrub birch scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			<i>Min.</i>	<i>Avg.</i>	<i>Max.</i>		
SD-SM	BEGL	Betula glandulosa	0.1	16	40	100	40
SD-SL	LEPAD	Ledum palustre ssp. decumbens	15.0	21	30	100	46
SD-SL	VAUL	Vaccinium uliginosum	10.0	21	45	100	46
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	15	20	100	39
SD	ARAL13	Arctous alpina	1.0	7	20	80	24
SD	EMNI	Empetrum nigrum	3.0	10	20	60	24
GM	CABI5	Carex bigelowii	0.1	13	35	80	32
GM	ERBR6	Eriophorum brachyantherum	0.1	7	15	60	20
FD	RUCH	Rubus chamaemorus	0.1	7	15	60	20
L	LICHEN	total lichens	5.0	38	65	100	62
L1	CLADI3	Cladina	3.0	11	25	100	33
L1	FLCU	Flavocetraria cucullata	5.0	12	20	80	31
L1	CLRA61	Cladina rangiferina group	5.0	9	15	60	23
L1	CLMU60	Cladonia multiformis	5.0	8	10	40	18
L1	STERE2	Stereocaulon	5.0	5	5	40	14
L1	CLMI61	Cladina mitis group	5.0	5	5	20	10
M	MOSS	total bryophytes-mosses and liverworts	15.0	42	70	100	65
M1	PLSC70	Pleurozium schreberi	5.0	13	20	100	36
M1	HYSP70	Hylocomium splendens	0.1	9	20	100	30
M1	ZZMOSS	unknown-mosses	2.0	9	20	100	30
M1	SPHAG2	Sphagnum	0.1	6	15	100	24
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	28	55	100	53
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		<i>Min.</i>	<i>Avg.</i>	<i>Max.</i>		
Trees	TT, TM, TS	2.0	3.8	5.8	m	5
Tree regeneration	TR	2.5	2.5	2.5	m	1
Medium shrubs	SM	1.2	1.7	2.0	m	3

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	30.0	47.5	80.0	cm	4
Dwarf shrubs	SD	7.0	13.4	20.0	cm	5
Tall and medium grasses and grass-likes	GT, GM	30.0	42.5	50.0	cm	4
Tall and medium forbs	FT, FM	90.0	90.0	90.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.4	5.0	cm	12

Map Unit Components

Common Name (Soils Name):

Alpine-scrub gravelly schist circles, Kuskokwim Mountains (Ruptic-Histic Aquiturbels, loamy-skeletal)

Alpine-scrub-sedge gravelly schist hummocks, frozen (Typic Histoturbels, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

4S1 Alpine Low Schist Mountain Summits with Continuous Permafrost
(Ruptic-Histic Aquiturbels, loamy-skeletal-Typic Histoturbels, coarse-silty-Typic Histoturbels, loamy-skeletal Association, 0 to 16 percent slopes)

Geographically Associated Landtypes

M131B_179—Gravelly Frozen Slopes, Wet:

This site occurs on slightly higher positions on low mountain summits with wetter moderately deep soils over permafrost. The climax plant community is "Tussock cottongrass/mixed ericaceous shrub meadow2."

M131B_355—Silty Slopes, Cool:

This site occurs on lower slopes with soils that are well drained and moderately deep or deep over bedrock. The climax plant community is "Black spruce/mixed ericaceous shrub woodland."

Silty Drainages, Frozen (M131B_504)

Ecoregion Classification

Section: Kuskokwim Mountains (M131B)

Subsection(s): Boreal Low Mountains (M131B.M1)

Soil Features

Parent Materials: woody organic material and/or silty alluvium over silty alluvium

Rooting Depth (cm): RV: 61 Range: 37 to 100

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
24	mucky peat	moderately rapid	.34	3.6	30	
37	silt loam, mucky peat	moderate	.19	5.3	25	

Restrictive Features: permafrost at 99 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Diamondleaf willow-green alder-leatherleaf scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with diamondleaf willow-green alder-leatherleaf scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Diamondleaf willow-green alder-leatherleaf scrub	42	12	16	22	7

Characteristics of Diamondleaf willow-green alder-leatherleaf scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	<i>Picea mariana</i>	5.0	12	20	29	19
SM-ST	SAPU15	<i>Salix pulchra</i>	10.0	31	55	100	56
SM-ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	0.1	33	65	57	43
ST	ALTE2	<i>Alnus tenuifolia</i>	5.0	10	15	29	17
SL-SM	B EGL	<i>Betula glandulosa</i>	0.1	9	15	100	30
SL-SM	LEGR	<i>Ledum groenlandicum</i>	0.1	12	25	71	29
SL-SM	SPST3	<i>Spiraea stevenii</i>	0.1	5	10	57	17
SL	CHCA2	<i>Chamaedaphne calyculata</i>	0.1	17	35	86	38
SL	VAUL	<i>Vaccinium uliginosum</i>	0.1	7	25	100	26
GT	CACA4	<i>Calamagrostis canadensis</i>	10.0	34	70	57	44
GT	ARLA2	<i>Arctagrostis latifolia</i>	3.0	48	92	29	37
GM-GT	ARFU2	<i>Arctophila fulva</i>	1.0	14	20	43	25
FM-FT	COPA28	<i>Comarum palustre</i>	0.1	18	35	71	36
FD-FM	EQSY	<i>Equisetum sylvaticum</i>	0.1	13	25	57	27
FD	RUCH	<i>Rubus chamaemorus</i>	10.0	12	15	43	23
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	20.0	46	80	100	68
M1	SPHAG2	<i>Sphagnum</i>	0.1	34	55	86	54
M1	ZZMOSS	unknown-mosses	5.0	15	20	86	36
M1	PLSC70	<i>Pleurozium schreberi</i>	0.1	8	15	29	15
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	49	85	100	70
B	SOIL	mineral-bare soil	0.0	7	15	100	26
B	WATER	water	0.0	7	15	100	26
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	15	100	22
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.5	7.6	12.0	m	6
Tall shrubs	ST	3.0	4.0	5.0	m	4
Medium shrubs	SM	1.1	1.5	1.8	m	5
Low shrubs	SL	30.0	56.7	80.0	cm	6
Dwarf shrubs	SD	3.0	3.0	3.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	40.0	107.5	130.0	cm	4

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall and medium forbs	FT, FM	15.0	49.2	80.0	cm	6
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	4.3	10.0	cm	12

Map Unit Components

Common Name (Soils Name):

Boreal-riparian scrub mica rich silty drains, frozen (Fluvaquentic Historthels, coarse-silty)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

4BSS	Boreal Mica-Rich Low Mountains (Typic Eutrocryepts, coarse-silty, 8 to 30 percent slopes)
4FS	Boreal Mica-Rich Low Mountain Footslopes with Continuous Permafrost (Typic Historthels, coarse-silty, 2 to 10 percent slopes)
4TS	Boreal Mica-Rich Mountain Toeslopes with Continuous Permafrost (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 5 percent slopes)

Geographically Associated Landtypes

M131B_355—Silty Slopes, Cool:

This site occurs on higher slopes with soils that are well drained and moderately deep over bedrock. The climax plant community is "Black spruce/mixed ericaceous shrub woodland."

M131B_400—Loamy Frozen Slopes:

This site occurs on adjacent slopes with wetter soils that are moderately deep over permafrost. The climax plant community is "Black spruce/Labrador tea woodland."

M131B_403—Loamy Frozen Slopes, Very Wet:

This site occurs on toeslope positions with wetter soils that are moderately deep over permafrost. The climax plant community is "Tussock cottongrass/mixed ericaceous shrub meadow3."

Loamy Flood Plains (M135A_100)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Physiographic Features

Elevation (meters): RV 637 Range 421 to 960

Slope Gradient (percent): 1 0 to 2

Aspect (clockwise direction): non-influencing

Landform: flood plains

Flooding: Frequency Occasional Duration Brief Beginning Month May Ending Month Sep

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 589 Range 344 to 923

Annual Air Temperature (°C): -3.1 -6.0 to -2.1

Frost Free Days: 70 60 to 80

Soil Features

Parent Materials: loamy alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 33 Range: 16 to 51

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
5	slightly decomposed plant material	moderately rapid	.34	5.4	30	
8 to 20	stratified fine sand to silt	moderate	.15	6.9 to 7.0		10 to 20

Restrictive Features: strongly contrasting textural stratification at 92 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Poplar-feltleaf willow scrub	Climax plant community
Beaver dam alder-willow scrub	Beaver impacted site and vegetation
Alder scrub	Mid stage of primary succession on flood plains

Ecological Status-Transition Description:

Three plant communities are identified on this flood prone site including a potential community with poplar-feltleaf willow scrub, a mid-seral community on lower and slightly more flood prone positions with alder scrub, and a community associated with beaver activity with alder-willow scrub, beaver dam in which the site conditions have been significantly altered and are now wetter due to beaver dam construction. Flooding and beaver activity are considered transitional pathways between community types.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Poplar-feltleaf willow scrub					0
Beaver dam alder-willow scrub	26	26	26	26	1
Alder scrub	13	13	13	13	1

Characteristics of Poplar-feltleaf willow scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TM	POBA2	Populus balsamifera	35.0	35	35	50	42
TS	POBA2	Populus balsamifera	25.0	25	25	50	35
ST	SAAL	Salix alaxensis	55.0	55	55	50	52
ST	SAAR3	Salix arbusculoides	20.0	20	20	50	32
ST	SAPU15	Salix pulchra	5.0	5	5	50	16
SM	ALSI3	Alnus sinuata	10.0	10	10	50	22
SM	ALVIC	Alnus viridis ssp. crispa	10.0	10	10	50	22
GM-GT	CACA4	Calamagrostis canadensis	5.0	8	10	100	28
FM	EQFL	Equisetum fluviatile	85.0	85	85	50	65
FM	EPAN2	Epilobium angustifolium	5.0	5	5	50	16
FM	LUAR2	Lupinus arcticus	5.0	5	5	50	16
FM	OXCA4	Oxytropis campestris	5.0	5	5	50	16
L	LICHEN	total lichens	0.0	10	19	100	32

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M	MOSS	total bryophytes-mosses and liverworts	20.0	25	30	100	50
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	38	55	100	62
B	SOIL	mineral-bare soil	15.0	20	25	100	45
B	ROCK	mineral-surface rock fragments	0.0	12	25	100	35
B	LITTER2	litter-woody debris >2.5 cm	2.0	8	15	100	28
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.0	4.5	6.0	m	2
Tree regeneration	TR	2.0	3.0	4.0	m	2
Tall shrubs	ST	3.0	3.4	4.0	m	3
Medium shrubs	SM	2.0	2.5	3.0	m	2
Low shrubs	SL	70.0	70.0	70.0	cm	1

Characteristics of Beaver dam alder-willow scrub

Ecological Status: Beaver impacted site and vegetation

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	POBA2	Populus balsamifera	7.0	7	7	100	26
ST	ALTE2	Alnus tenuifolia	60.0	60	60	100	77
ST	SAAL	Salix alaxensis	20.0	20	20	100	45
SL	VIED	Viburnum edule	10.0	10	10	100	32
SL	ROAC	Rosa acicularis	6.0	6	6	100	24
SD	ARRU6	Arctous rubra	5.0	5	5	100	22
GT	CACA4	Calamagrostis canadensis	15.0	15	15	100	39
FM	EQAR	Equisetum arvense	20.0	20	20	100	45
FD	RUAR	Rubus arcticus	20.0	20	20	100	45
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	40.0	40	40	100	63
M1	ZZMOSS	unknown-mosses	30.0	30	30	100	55
M1	CLDE70	Climacium dendroides	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	50.0	50	50	100	71
B	LITTER2	litter-woody debris >2.5 cm	20.0	20	20	100	45
B	WATER	water	1.0	1	1	100	10
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.1	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.5	5.5	5.5	m	1
Tree regeneration	TR	1.5	1.8	2.2	m	2
Tall shrubs	ST	4.0	4.0	4.0	m	1
Low shrubs	SL	90.0	90.0	90.0	cm	1
Dwarf shrubs	SD	10.0	10.0	10.0	cm	1
Tall and medium grasses and grass-like	GT, GM	70.0	70.0	70.0	cm	1
Tall and medium forbs	FT, FM	40.0	60.0	80.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.0	3.0	cm	2

Characteristics of Alder scrub

Ecological Status: Mid stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Importance	
			Min.	Avg.	Max.	Constancy	Value
ST	ALSI3	Alnus sinuata	80.0	80	80	33	51
ST	SAAL	Salix alaxensis	40.0	40	40	33	36
SM-ST	SAPU15	Salix pulchra	10.0	12	15	67	28
SM	ALVIC	Alnus viridis ssp. crispa	65.0	70	75	67	68
SL	SPST3	Spiraea stevenii	2.0	8	15	67	23
SL	BEGL	Betula glandulosa	5.0	5	5	33	13
SL	VAUL	Vaccinium uliginosum	5.0	5	5	33	13
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	5	5	33	13
GM-GT	CACA4	Calamagrostis canadensis	0.1	18	40	100	42
FM-FT	ARTI	Artemisia tilesii	5.0	12	20	67	28
FT	POAL5	Polygonum alaskanum	7.0	7	7	33	15
FM	MEPA	Mertensia paniculata	0.1	8	15	67	23
FM	ACDE2	Aconitum delphiniifolium	5.0	5	5	33	13
FM	EQUIS	Equisetum	5.0	5	5	33	13
FD	COCA13	Cornus canadensis	35.0	35	35	33	34
FD	LYAN2	Lycopodium annotinum	10.0	10	10	33	18
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	17	40	100	41
M1	POCO38	Polytrichum commune	20.0	20	20	33	26
M1	ZZMOSS	unknown-mosses	10.0	10	10	33	18
M1	HYSP70	Hylocomium splendens	5.0	5	5	33	13
M1	PLSC70	Pleurozium schreberi	5.0	5	5	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	60.0	77	90	100	88
B	LITTER2	litter-woody debris >2.5 cm	5.0	8	10	100	28
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.2	0.5	0.8	m	2
Tall shrubs	ST	3.0	4.0	6.0	m	3
Medium shrubs	SM	1.5	2.3	2.8	m	3
Low shrubs	SL	40.0	66.7	100.0	cm	3
Dwarf shrubs	SD	8.0	8.0	8.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	20.0	43.3	60.0	cm	3
Tall and medium forbs	FT, FM	20.0	39.0	60.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	4.0	7.0	10.0	cm	2

Map Unit Components

Common Name (Soils Name):

Boreal-riparian scrub loamy flood plains (Typic Cryofluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7FP1 Boreal Flood Plains and Terraces
(Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)

Geographically Associated Landtypes

M135A_151—Loamy High Flood Plains:

This site occurs on higher flood positions. The climax plant community is "White spruce/bog blueberry/feathermoss

M135A_204—Gravelly Flood Plains:

This site occurs on lower positions with soils that have are very shallow to sandy and gravelly material. The climax plant community is "White spruce-poplar/soapberry forest."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Loamy Frozen Terraces (M135A_104)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)
Alpine Flood Plains & Terraces & Fans (M135A.V1)
Toklat Basin Lowlands (M135A.M7)
Glaciated Lowlands (M135A.G1L)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	553	333 to 919
Slope Gradient (percent):	1	0 to 2
Aspect (clockwise direction):	non-influencing	
Landform:	fan terraces on alluvial fans; outwash plains; stream terraces	

	<i>Frequency</i>
Flooding:	None
Ponding:	None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	606	344 to 1,229
Annual Air Temperature (°C):	-3.1	-8.3 to -2.1
Frost Free Days:	68	50 to 80

Soil Features

Parent Materials: mossy organic material and/or woody organic material over sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): *RV:* 28 *Range:* 17 to 39

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
27	peat	moderately rapid	.34	4.9	30	
1	stratified gravelly sand to silt	moderately rapid	.14	7.0		20

Restrictive Features: permafrost at 72 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Spruce/shrub birch-bog blueberry woodland	Climax plant community
Mixed willow scrub	Mid stage of fire induced secondary succession
Spruce-shrub birch-willow woodland	Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant communities are identified on this fire influenced site including a potential community with spruce/shrub birch-bog blueberry woodland, a mid-seral community with mixed willow scrub and a late-seral community with spruce-shrub birch-willow woodland. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Spruce/shrub birch-bog blueberry woodland	26	11	14	18	4
Mixed willow scrub	57	31	40	50	2
Spruce-shrub birch-willow woodland	19	19	19	19	1

Characteristics of Spruce/shrub birch-bog blueberry woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 11. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	<i>Picea glauca</i>	20.0	22	25	27	24
TM	PIMA	<i>Picea mariana</i>	7.0	12	15	36	21
TR	PIMA	<i>Picea mariana</i>	5.0	5	5	27	12
SL-SM	BEGL	<i>Betula glandulosa</i>	0.1	14	60	100	37
SL	VAUL	<i>Vaccinium uliginosum</i>	10.0	21	40	100	46
SD-SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	0.1	12	25	91	33
SL	CHCA2	<i>Chamaedaphne calyculata</i>	0.1	13	25	18	15
SD	EMNI	<i>Empetrum nigrum</i>	3.0	12	25	64	28
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	0.1	9	20	73	26
SD	ARRU6	<i>Arctous rubra</i>	0.1	5	10	36	13
GM	CAREX	<i>Carex</i>	0.1	9	20	55	22
L	LICHEN	total lichens	0.0	11	40	100	33
L1	CLST60	<i>Cladina stellaris</i>	7.0	8	10	18	12
M	MOSS	total bryophytes-mosses and liverworts	60.0	81	95	100	90
M1	SPHAG2	<i>Sphagnum</i>	0.1	23	50	45	32
M1	PLSC70	<i>Pleurozium schreberi</i>	0.1	22	40	45	31
M1	ZZMOSS	unknown-mosses	5.0	9	15	36	18
M1	POLYT5	<i>Polytrichum</i>	0.1	8	15	27	15
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	4	20	100	20
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	5	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	1	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	8.2	13.0	m	13
Tree regeneration	TR	0.3	1.4	2.0	m	9
Medium shrubs	SM	1.1	1.7	2.5	m	6
Low shrubs	SL	30.0	57.1	100.0	cm	31
Dwarf shrubs	SD	5.0	11.0	20.0	cm	23
Tall and medium grasses and grass-like	GT, GM	20.0	43.3	130.0	cm	6
Tall and medium forbs	FT, FM	20.0	24.4	30.0	cm	9
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	7.6	10.0	cm	22

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	155	17.1	9.4	Min.	1	B
	155	17.1	9.4	Avg		
	155	17.1	9.4	Max.		
Picea mariana	128	15.0	9.8	Min.	1	B
	128	15.0	9.8	Avg		
	128	15.0	9.8	Max.		
Picea mariana	113	4.8	3.7	Min.	3	G
	140	8.3	4.5	Avg		
	159	10.7	5.2	Max.		

Characteristics of Mixed willow scrub

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	SAPU15	Salix pulchra	5.0	12	20	100	35
SM	SARI4	Salix richardsonii	10.0	12	15	100	35
SL	VAUL	Vaccinium uliginosum	20.0	20	20	100	45
SL	B EGL	Betula glandulosa	5.0	12	20	100	35
SL	LEPAD	Ledum palustre ssp. decumbens	10.0	10	10	100	32
SD	ARRU6	Arctous rubra	0.1	5	10	100	22
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	5	5	50	16
GT	ARLA2	Arctagrostis latifolia	0.1	5	10	100	22
GM	CABI5	Carex bigelowii	2.0	6	10	100	24
GM	ERBR6	Eriophorum brachyantherum	5.0	5	5	50	16
GM	ERVA4	Eriophorum vaginatum	5.0	5	5	50	16
FD	EQFL	Equisetum fluviatile	5.0	5	5	50	16
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	40.0	50	60	100	71
M1	ZZMOSS	unknown-mosses	10.0	20	30	100	45
M1	PLSC70	Pleurozium schreberi	5.0	10	15	100	32
M1	SPHAG2	Sphagnum	5.0	8	10	100	28
M1	POCO38	Polytrichum commune	15.0	15	15	50	27
M1	HYSP70	Hylocomium splendens	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	30.0	40	50	100	63
B	LITTER2	litter-woody debris >2.5 cm	3.0	4	5	100	20
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	1.0	2.1	4.0	m	3
Tall shrubs	ST	4.0	4.0	4.0	m	1
Medium shrubs	SM	1.2	1.4	1.6	m	3
Low shrubs	SL	30.0	40.0	50.0	cm	2
Dwarf shrubs	SD	5.0	5.0	5.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	3.5	4.0	cm	2

Characteristics of Spruce-shrub birch-willow woodland

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
TM	PICEA	Picea	10.0	10	10	50	22
TR	PIMA	Picea mariana	10.0	10	10	50	22
TR	PICEA	Picea	5.0	5	5	50	16
TR	PIGL	Picea glauca	5.0	5	5	50	16
SL-SM	BEGL	Betula glandulosa	15.0	35	55	100	59
SL-SM	SAPU15	Salix pulchra	10.0	12	15	100	35
SM	ALVIC	Alnus viridis ssp. crispa	15.0	15	15	50	27
SL	LEPAD	Ledum palustre ssp. decumbens	10.0	10	10	100	32
SL	VAUL	Vaccinium uliginosum	15.0	15	15	50	27
SL	CHCA2	Chamaedaphne calyculata	10.0	10	10	50	22
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	10.0	18	25	100	42
SD	SAFU	Salix fuscescens	5.0	5	5	50	16
GM	ERIOP	Eriophorum	0.1	15	30	100	39
FD	RUCH	Rubus chamaemorus	5.0	5	5	100	22
L	LICHEN	total lichens	0.1	3	5	100	17
M	MOSS	total bryophytes-mosses and liverworts	50.0	62	75	100	79
M1	SPHAG2	Sphagnum	10.0	42	75	100	65
M1	POCO38	Polytrichum commune	15.0	15	15	50	27
M1	ZZMOSS	unknown-mosses	15.0	15	15	50	27
M1	HYSP70	Hylocomium splendens	10.0	10	10	50	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	40	60	100	63
B	LITTER2	litter-woody debris >2.5 cm	0.1	1	2	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	10.0	10.0	m	1
Tree regeneration	TR	2.0	3.2	4.5	m	2
Medium shrubs	SM	1.7	1.8	2.0	m	2
Low shrubs	SL	30.0	65.0	100.0	cm	4
Dwarf shrubs	SD	10.0	10.0	10.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	30.0	30.0	30.0	cm	1
Tall and medium forbs	FT, FM	10.0	15.0	20.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	4.0	4.0	4.0	cm	1

Map Unit Components

Common Name (Soils Name):

Boreal-taiga high elevation loamy terraces, frozen (Typic Historthels, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- | | |
|------|---|
| 10V2 | Boreal Terraces and Plateau Toeslopes with Continuous Permafrost
(Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association, 0 to 2 percent slopes) |
| 11ST | Boreal Terraces and High Flood Plains with Discontinuous Permafrost
(Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Association, 0 to 2 percent slopes) |
| 7AFF | Boreal Outwash Plains and Fans with Discontinuous Permafrost
(Typic Eutrocryepts, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy Association, 0 to 5 percent slopes) |
| 7P6 | Boreal Outwash Plains with Continuous Permafrost
(Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 10 percent slopes) |
| 7STF | Alpine Terraces and Outwash Plains with Continuous Permafrost
(Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association, 0 to 3 percent slopes) |

Geographically Associated Landtypes

M135A_105—Loamy Frozen Terraces, Wet:

This site occurs on similar positions has wetter soils. The climax plant community is "Black spruce/tussock cottongrass woodland."

M135A_151—Loamy High Flood Plains:

This site occurs on slightly lower positions with deep, well drained soils. The climax plant community is "White spruce/bog blueberry/feathermoss forest."

M135A_156—Loamy Wet High Flood Plains:

This site occurs on flood plains. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

M135A_350—Gravelly and Sandy Slopes:

This site occurs on very deep, well drained gravelly soils. The climax plant community is "White spruce/shrub birch woodland."

Similar Landtypes

M135A_350—Gravelly and Sandy Slopes:

This site has somewhat excessively drained soils that are very deep. The climax plant community is "White spruce/shrub birch woodland."

Loamy Frozen Terraces, Wet (M135A_105)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)
 Alpine Flood Plains & Terraces & Fans (M135A.V1)
 Toklat Basin Lowlands (M135A.M7)
 Teklanika Boreal Mountains & Plateaus (M135A.M6L)
 Boreal Outer Range & Kantishna Hills (M135A.M1L)
 Glaciated Lowlands (M135A.G1L)

Physiographic Features

Elevation (meters): RV Range
 520 211 to 919

Slope Gradient (percent): 3 0 to 12

Aspect (clockwise direction): southwest to west

Landform: turf hummocks on mountains; turf hummocks on outwash plains; turf hummocks on plateaus; turf hummocks on stream terraces

Landform Positions: summits; toeslopes

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	None				
Ponding:	Frequent	Long	May	Jun	20 cm

Climatic Features

Annual Precipitation (millimeters): RV Range
 538 344 to 1,229

Annual Air Temperature (°C): -2.9 -8.3 to -2.1

Frost Free Days: 69 50 to 80

Soil Features

Parent Materials: grassy organic material over silty cryoturbate over silty eolian deposits derived from schist
 grassy organic material over silty cryoturbate over silty alluvium
 grassy organic material over silty cryoturbate over silty eolian deposits

Rooting Depth (cm): RV: 41 Range: 28 to 61

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
22 to 40	peat	moderately rapid	.34	3.6 to 4.9	30	
1 to 8	mucky silt loam	moderate	.19 to .40	5.3 to 5.9	15	20
11	silt loam, muck	moderate	.19	6.6		25

Restrictive Features: permafrost at 52 to 77 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Black spruce/tussock cottongrass woodland
 Cottongrass-fireweed-bluejoint meadow
 Shrub birch-tussock cottongrass scrub2

Ecological Status

Climax plant community
 Early stage of fire induced secondary succession
 Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant communities are identified on this fire-influenced site including a potential community with black spruce/tussock cottongrass woodland, an early-seral community with cottongrass-fireweed-bluejoint meadow and a late-seral community with shrub birch-tussock cottongrass scrub2. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/tussock cottongrass woodland	14	14	14	14	1
Cottongrass-fireweed-bluejoint meadow					0
Shrub birch-tussock cottongrass scrub2	18	18	18	18	1

Characteristics of Black spruce/tussock cottongrass woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 10. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy	Importance		
			Min.	Avg.	Max.		
TR	PIGL	<i>Picea glauca</i>	0.1	5	10	40	14
SL-SM	BEGL	<i>Betula glandulosa</i>	5.0	16	35	100	40
SD-SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	10.0	21	35	100	46
SD-SL	VAUL	<i>Vaccinium uliginosum</i>	0.1	13	30	90	34
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	0.1	6	15	90	23
SD	EMNI	<i>Empetrum nigrum</i>	0.1	9	20	40	19
GM	ERIOP	<i>Eriophorum</i>	15.0	59	80	50	54
GM	ERBR6	<i>Eriophorum brachyantherum</i>	45.0	59	80	40	49
GM	CABI5	<i>Carex bigelowii</i>	7.0	18	30	20	19
L	LICHEN	total lichens	0.0	4	20	100	20
M	MOSS	total bryophytes-mosses and liverworts	10.0	40	90	100	63
M1	SPHAG2	<i>Sphagnum</i>	5.0	34	90	50	41
M1	PLSC70	<i>Pleurozium schreberi</i>	15.0	18	20	20	19
M1	HYSP70	<i>Hylocomium splendens</i>	10.0	15	20	20	17
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	34	90	100	58
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	2.5	6.0	m	11
Tree regeneration	TR	0.5	1.4	2.0	m	6
Medium shrubs	SM	2.5	2.5	2.5	m	1
Low shrubs	SL	20.0	54.8	100.0	cm	25
Dwarf shrubs	SD	10.0	13.7	20.0	cm	15
Tall and medium grasses and grass-like	GT, GM	30.0	36.0	50.0	cm	10
Tall and medium forbs	FT, FM	10.0	15.0	20.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	8.0	10.0	cm	8

Characteristics of Cottongrass-fireweed-bluejoint meadow

Ecological Status: Early stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	Picea glauca	10.0	10	10	33	18
SL	BEGL	Betula glandulosa	10.0	18	25	67	35
SD-SL	LEPAD	Ledum palustre ssp. decumbens	10.0	10	10	67	26
SL	SALIX	Salix	20.0	20	20	33	26
SL	SAPU15	Salix pulchra	0.1	5	10	67	18
GM-GT	CACA4	Calamagrostis canadensis	5.0	12	20	100	35
GM	ERIOP	Eriophorum	25.0	40	50	100	63
FM	EPAN2	Epilobium angustifolium	15.0	18	20	67	35
FM	EQPR	Equisetum pratense	15.0	15	15	33	22
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	15.0	38	80	100	62
M1	POLYT5	Polytrichum	20.0	20	20	33	26
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	32	80	100	57
B	SOIL	mineral-bare soil	0.0	17	40	100	41
B	LITTER2	litter-woody debris >2.5 cm	0.1	5	10	100	22
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	6.0	6.0	m	1
Tree regeneration	TR	2.0	2.0	2.0	m	1
Low shrubs	SL	30.0	51.7	100.0	cm	6
Tall and medium grasses and grass-likes	GT, GM	20.0	51.7	100.0	cm	6
Tall and medium forbs	FT, FM	50.0	50.0	50.0	cm	1

Characteristics of Shrub birch-tussock cottongrass scrub2

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM	ALVIC	Alnus viridis ssp. crispa	5.0	5	5	17	9
SL	BEGL	Betula glandulosa	10.0	27	65	100	52
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	13	30	83	33
SL	SAPU15	Salix pulchra	0.1	10	15	100	32
SD-SL	VAUL	Vaccinium uliginosum	5.0	11	20	67	27
SL	SAGL	Salix glauca	0.1	5	10	50	16
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	10	25	67	26
GM	ERIOP	Eriophorum	60.0	75	80	83	79
GM	ERBR6	Eriophorum brachyantherum	25.0	25	25	17	21
GM	CAREX	Carex	0.1	7	15	50	19
GM	CABI5	Carex bigelowii	15.0	15	15	17	16
FD	RUCH	Rubus chamaemorus	0.1	5	15	50	16
L	LICHEN	total lichens	0.0	2	5	100	14
M	MOSS	total bryophytes-mosses and liverworts	0.1	33	70	100	57
M1	SPHAG2	Sphagnum	25.0	28	30	33	30
M1	PLSC70	Pleurozium schreberi	15.0	15	15	17	16
M1	ZZMOSS	unknown-mosses	15.0	15	15	17	16
M1	HYSP70	Hylocomium splendens	10.0	10	10	17	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	38	80	100	62

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	SOIL	mineral-bare soil	0.0	6	15	100	24
B	WATER	water	0.0	6	20	100	24
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	6.0	6.0	m	1
Tree regeneration	TR	0.5	1.2	2.0	m	2
Medium shrubs	SM	2.0	2.0	2.0	m	1
Low shrubs	SL	30.0	58.7	100.0	cm	15
Dwarf shrubs	SD	5.0	11.7	20.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	30.0	35.0	50.0	cm	8
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.0	2.0	cm	2

Map Unit Components**Common Name (Soils Name):**

Boreal-taiga/tussock silty frozen loess slopes, Alaska Mountains (Typic Histoturbels, coarse-silty)

Boreal-taiga/tussock mica rich silty loess slopes, frozen (Typic Histoturbels, coarse-silty)

Boreal-taiga/tussock silty frozen terraces, Alaska Mountains (Typic Histoturbels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

10P3	Boreal Dissected Plateaus with Discontinuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 0 to 20 percent slopes)
10TS	Boreal Plateaus with Continuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 20 percent slopes)
10TS1	Boreal Mountain Toeslopes with Discontinuous Permafrost, Nenana Gravels (Typic Historthels, loamy-skeletal-Typic Histoturbels, coarse-silty Association, 0 to 14 percent slopes)
10V2	Boreal Terraces and Plateau Toeslopes with Continuous Permafrost (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association, 0 to 2 percent slopes)
11ST	Boreal Terraces and High Flood Plains with Discontinuous Permafrost (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Association, 0 to 2 percent slopes)
7STF	Alpine Terraces and Outwash Plains with Continuous Permafrost (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association, 0 to 3 percent slopes)
8LMF	Boreal Lower Mountain Slopes, Thermokarsted (Typic Umbrorthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 40 percent slopes)

Geographically Associated Landtypes**M135A_104—Loamy Frozen Terraces:**

This site occurs on similar positions with slightly drier soils. The climax plant community is "Spruce/shrub birch-bog blueberry woodland."

M135A_151—Loamy High Flood Plains:

This site occurs on slightly lower positions with deep, well drained soils. The climax plant community is "White spruce/bog blueberry/feathermoss forest."

M135A_156—Loamy Wet High Flood Plains:

This site occurs on flood plains. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

M135A_350—Gravelly and Sandy Slopes:

This site occurs on very deep, well drained gravelly soils. The climax plant community is "White spruce/shrub birch woodland."

Similar Landtypes

M135A_400—Loamy Frozen Slopes:

This site has drier soils. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

Peat Mounds (M135A_112)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Toklat Basin Lowlands (M135A.M7)

Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Physiographic Features

Elevation (meters): RV 548 Range 448 to 788

Slope Gradient (percent): 1 0 to 3

Aspect (clockwise direction): non-influencing

Landform: mounds on basin floors

Frequency

Flooding: None

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 488 Range 452 to 577

Annual Air Temperature (°C): -2.4 -2.8 to -2.2

Frost Free Days: 70 60 to 80

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty alluvium

Rooting Depth (cm): RV: 54 Range: 51 to 57

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
45	peat	moderately rapid	.34	4.7	30	

Restrictive Features: permafrost at 45 cm

Water Table (May to September): 80 cm

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Cloudberry/sphagnum moss wet meadow

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community with cloudberry/sphagnum moss wet meadow is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Cloudberry/sphagnum moss wet meadow	18	18	18	18	1

Characteristics of Cloudberry/sphagnum moss wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	BEGL	Betula glandulosa	5.0	5	5	100	22
SD	EMNI	Empetrum nigrum	5.0	6	7	100	24
SD	LEPAD	Ledum palustre ssp. decumbens	3.0	5	7	100	22
SD	VAUL	Vaccinium uliginosum	5.0	5	5	100	22
SD	ANPO	Andromeda polifolia	5.0	5	5	50	16
GM	ERVA4	Eriophorum vaginatum	20.0	20	20	50	32
GM	CARO7	Carex rotundata	10.0	10	10	50	22
FD	RUCH	Rubus chamaemorus	10.0	18	25	100	42
L	LICHEN	total lichens	3.0	16	30	100	40
L1	FLCU	Flavocetraria cucullata	15.0	15	15	50	27
L1	CLADO3	Cladonia	5.0	5	5	50	16
L1	CLMU60	Cladonia multiformis	5.0	5	5	50	16
L2	L2ALL	total lichens-crustose and soil crust	20.0	20	20	50	32
M	MOSS	total bryophytes-mosses and liverworts	50.0	72	95	100	85
M1	SPHAG2	Sphagnum	40.0	68	95	100	82
M1	ZZMOSS	unknown-mosses	10.0	10	10	50	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	28	55	100	53
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	40.0	40.0	40.0	cm	1
Dwarf shrubs	SD	10.0	16.0	20.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	6.0	10.0	cm	2

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub organic mounds, frozen (Glacic Folistels, dysic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

11P1 Alpine Plains and Drainages with Continuous Permafrost
(Typic Histoturbels, coarse-silty-Glacic Folistels, dysic-Terric Fibrilstels, loamy Association, 0 to 5 percent slopes)

Geographically Associated Landtypes**M135A_175—Loamy Frozen Wet Terraces, High Elevation:**

This site occurs on adjacent, unrounded basin floors. The climax plant community is "Tussock cottongrass/mixed ericaceous shrub meadow."

M135A_530—Organic Depressions, Bogs:

This site occurs on drainages and micro-lows surrounding peat mounds. The climax plant community is "Sedge/sphagnum bog."

Loamy Frozen Slopes, Ice Cored (M135A_113)**Ecoregion Classification**

Section: Alaska Mountains (M135A)

Subsection(s): Teklanika Boreal Mountains & Plateaus (M135A.M6L)
Boreal Outer Range & Kantishna Hills (M135A.M1L)

Physiographic Features

	RV	Range
Elevation (meters):	466	211 to 648
Slope Gradient (percent):	15	5 to 22
Aspect (clockwise direction):	southwest to northeast	
Landform:	mountains	
Landform Positions:	summits; toeslopes	

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	489	358 to 776
Annual Air Temperature (°C):	-2.6	-4.0 to -2.2
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty eolian deposits derived from schist

Rooting Depth (cm): RV: 33 Range: 10 to 48

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
23	moderately decomposed plant material	moderately rapid	.34	4.8	30	
10	silt loam	moderate	.26	5.5	15	

Restrictive Features: permafrost at 46 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type
Black spruce/green alder woodland
Paper birch/green alder forest, frozen
Mixed paper birch-spruce forest

Ecological Status
Climax plant community
Mid stage of fire induced secondary succession
Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant communities are identified on this fire influenced site including a potential community with black spruce/green alder woodland, a mid-seral community with paper birch/green alder forest, frozen and a late-seral community with mixed paper birch-spruce forest. Fire is considered a transitional pathway between seral communities.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/green alder woodland					0
Paper birch/green alder forest, frozen	21	21	21	21	1
Mixed paper birch-spruce forest					0

Characteristics of Black spruce/green alder woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIMA	<i>Picea mariana</i>	10.0	19	25	100	44
TM	PIGL	<i>Picea glauca</i>	5.0	5	5	20	10
TR	PIMA	<i>Picea mariana</i>	0.1	6	10	80	22
SM-ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	0.1	28	75	60	41
SM	SABE2	<i>Salix bebbiana</i>	0.1	10	20	40	20
SL	LEGR	<i>Ledum groenlandicum</i>	5.0	20	40	80	40
SL	VAUL	<i>Vaccinium uliginosum</i>	3.0	20	60	80	40
SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	5.0	10	15	40	20
SL	ROAC	<i>Rosa acicularis</i>	10.0	10	10	20	14
FM	EQSY	<i>Equisetum sylvaticum</i>	0.1	11	25	80	30
L	LICHEN	total lichens	0.0	7	30	100	26
L1	CLADI3	<i>Cladina</i>	5.0	18	30	40	27
M	MOSS	total bryophytes-mosses and liverworts	5.0	66	90	100	81
M1	HYSP70	<i>Hylocomium splendens</i>	0.1	45	90	40	42
M1	PLSC70	<i>Pleurozium schreberi</i>	60.0	60	60	20	35
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	25	80	100	50
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	5	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	6.4	12.0	m	10
Tree regeneration	TR	0.5	1.5	2.5	m	4
Tall shrubs	ST	3.0	3.0	3.0	m	3
Medium shrubs	SM	1.5	1.7	2.0	m	5
Low shrubs	SL	20.0	46.5	100.0	cm	17
Dwarf shrubs	SD	10.0	10.0	10.0	cm	6
Tall and medium forbs	FT, FM	20.0	46.2	100.0	cm	8
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	10.0	10.0	10.0	cm	8

Characteristics of Paper birch/green alder forest, frozen

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	BENE4	Betula neoalaskana	10.0	35	75	57	45
TT	PIGL	Picea glauca	5.0	12	20	43	23
TM	BENE4	Betula neoalaskana	5.0	58	85	43	50
TM	PIGL	Picea glauca	10.0	10	10	29	17
ST	ALVIC	Alnus viridis ssp. crispa	3.0	22	80	86	43
ST	SABE2	Salix bebbiana	5.0	17	40	43	27
SL-SM	ROAC	Rosa acicularis	0.1	11	35	86	31
SL	LEGR	Ledum groenlandicum	5.0	32	60	29	30
GM-GT	CACA4	Calamagrostis canadensis	15.0	32	65	57	43
GM-GT	ARLA2	Arctagrostis latifolia	0.1	20	40	29	24
GM-GT	ZZGRASS	unknown-grasses	5.0	6	7	29	13
FM	EQSY	Equisetum sylvaticum	5.0	21	60	86	42
L	LICHEN	total lichens	0.0	0	3	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	22	90	100	47
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	53	70	100	73
B	LITTER2	litter-woody debris >2.5 cm	5.0	7	15	100	26
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	12.9	18.0	m	10
Tree regeneration	TR	0.6	1.2	2.0	m	3
Tall shrubs	ST	3.0	4.1	7.0	m	12
Medium shrubs	SM	1.5	1.6	2.0	m	4
Low shrubs	SL	30.0	70.0	100.0	cm	10
Dwarf shrubs	SD	5.0	7.5	10.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	70.0	85.0	100.0	cm	2
Tall and medium forbs	FT, FM	10.0	57.7	150.0	cm	13
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	7.9	10.0	cm	8

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	84	40.6	20.1	1	B
	84	40.6	20.1		
	84	40.6	20.1		

Characteristics of Mixed paper birch-spruce forest

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	7.0	14	20	40	24
TT	PIMA	Picea mariana	5.0	5	5	20	10
TM	PIMA	Picea mariana	3.0	13	20	60	28
TM	BENE4	Betula neoalaskana	3.0	9	15	80	27

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	<i>Picea glauca</i>	10.0	10	10	20	14
TR	PIGL	<i>Picea glauca</i>	10.0	10	10	20	14
TR	PIMA	<i>Picea mariana</i>	0.1	5	10	40	14
SM-ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	2.0	34	80	100	58
SM-ST	SAGL	<i>Salix glauca</i>	5.0	12	20	40	22
ST	SAPU15	<i>Salix pulchra</i>	20.0	20	20	20	20
SL	B EGL	<i>Betula glandulosa</i>	35.0	35	35	20	26
SL	LEGR	<i>Ledum groenlandicum</i>	3.0	8	15	80	25
SL	VAUL	<i>Vaccinium uliginosum</i>	3.0	9	15	40	19
GM	CACA4	<i>Calamagrostis canadensis</i>	40.0	40	40	20	28
GM	ZZGRAM	unknown-graminoids	10.0	20	30	40	28
GM	ZZGRASS	unknown-grasses	15.0	15	15	20	17
FM	EQSY	<i>Equisetum sylvaticum</i>	5.0	10	20	80	28
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	45	80	100	67
M1	HYSP70	<i>Hylocomium splendens</i>	80.0	80	80	20	40
M1	SPHAG2	Sphagnum	50.0	50	50	20	32
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	26	60	100	51
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	10	100	20
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	WATER	water	0.0	1	5	100	10
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	10.1	14.0	m	11
Tree regeneration	TR	0.5	2.5	4.0	m	3
Tall shrubs	ST	3.0	3.5	4.0	m	6
Medium shrubs	SM	1.0	1.6	2.5	m	4
Low shrubs	SL	30.0	64.3	100.0	cm	14
Dwarf shrubs	SD	10.0	13.3	20.0	cm	3
Tall and medium forbs	FT, FM	20.0	48.6	100.0	cm	7
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	10.0	10.0	10.0	cm	5

Map Unit Components**Common Name (Soils Name):**

Boreal-taiga high elevation silty mica-rich loess hills, frozen (Typic Umbrorthels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

10P3	Boreal Dissected Plateaus with Discontinuous Permafrost (Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 0 to 20 percent slopes)
8LMF	Boreal Lower Mountain Slopes, Thermokarsted (Typic Umbrorthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 40 percent slopes)

Geographically Associated Landtypes

M135A_400—Loamy Frozen Slopes:

This site occurs on adjacent lesser slopes with soils that are wetter. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

M135A_800—Escarpments:

This site occurs on steeper escarpment slopes with very deep, well drained soils. The climax plant community is "White spruce forest."

Similar Landtypes

M135A_400—Loamy Frozen Slopes:

This site has wetter soils. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

Loamy Flood Plains, High Elevation (M135A_150)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)

Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 30 Range: 12 to 62

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 9	slightly decomposed plant material	moderately rapid	.34	5.3 to 5.4	30	
5 to 18	stratified sand to silt	moderate	.15 to .20	5.7 to 6.8		12 to 20

Restrictive Features: strongly contrasting textural stratification at 66 to 96 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Riparian low diamondleaf willow-feltleaf willow scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with low diamondleaf willow-feltleaf willow scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Riparian low diamondleaf willow-feltleaf willow scrub	76	20	38	52	3

Characteristics of Riparian low diamondleaf willow-feltleaf willow scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 8. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy			
			Min.	Avg.	Max.		
SM-ST	SAAL	Salix alaxensis	5.0	24	60	50	35
SL-SM	SAPU15	Salix pulchra	20.0	61	100	88	73
SM	SAGL	Salix glauca	10.0	32	50	38	35
SM	SABA3	Salix barclayi	2.0	21	40	38	28
SD-SM	VAUL	Vaccinium uliginosum	0.1	9	20	62	24
SL-SM	BEGL	Betula glandulosa	0.1	6	25	62	19
SD	EMNI	Empetrum nigrum	5.0	8	10	25	14
SD	ARRU6	Arctous rubra	3.0	6	10	25	12
GM-GT	CACA4	Calamagrostis canadensis	0.1	18	60	88	40
GM	FEAL	Festuca altaica	0.1	8	20	62	22
GM	CAPO	Carex podocarpa	0.1	5	10	38	14
GM	POAR2	Poa arctica	5.0	6	7	25	12
FD-FM	PEFR5	Petasites frigidus	0.1	6	25	88	23
FD-FM	EQPR	Equisetum pratense	0.1	7	15	38	16
FM	HEAL	Hedysarum alpinum	1.0	6	15	38	15
FD	COCA13	Cornus canadensis	7.0	16	25	25	20
FD	RUAR	Rubus arcticus	2.0	10	20	38	19
FD	ANRI	Anemone richardsonii	2.0	6	10	25	12
L	LICHEN	total lichens	0.0	0	2	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	44	70	100	66
M1	ZZMOSS	unknown-mosses	35.0	42	50	38	40
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	44	80	100	66
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	20	100	22
B	ROCK	mineral-surface rock fragments	0.0	1	5	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	WATER	water	0.0	0	3	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	1.2	1.2	1.2	m	1
Medium shrubs	SM	1.0	1.6	2.1	m	10
Low shrubs	SL	20.0	60.0	100.0	cm	4
Dwarf shrubs	SD	5.0	8.7	15.0	cm	3
Tall and medium grasses and grass-like	GT, GM	30.0	45.0	70.0	cm	4
Tall and medium forbs	FT, FM	18.0	28.5	60.0	cm	8
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.2	6.0	cm	5

Map Unit Components

Common Name (Soils Name):

Alpine-riparian scrub loamy flood plains (Typic Gelifluvents, coarse-loamy over sandy-skeletal)

Alpine-riparian scrub loamy schist flood plains (Typic Gelifluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

5SA2 Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Cool (Ruptic-Histic Aquiturbels, loamy-skeletal-Oxyaquic Eutrocrypts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 12 to 36 percent slopes)

- 5V1 Alpine Schist Alluvial Fans with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy-Typic Gelorthents, loamy- skeletal Association, 2 to 15 percent slopes)
- 7FP2 Alpine Flood Plains
(Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Riverwash Complex)
- 7V11 Alpine Fans
(Typic Gelorthents, sandy-skeletal-Riverwash-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes)

Geographically Associated Landtypes

M135A_152—Loamy Wet Flood Plains, High Elevation:

This site occurs on slightly lower positions and has wetter soils. The climax plant community is "Diamondleaf willow/horsetail-fragile sedge scrub."

M135A_258—Gravelly Flood Plains, Cool:

This site occurs on lower positions. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs on higher terrace positions. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Loamy High Flood Plains (M135A_151)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Toklat Basin Lowlands (M135A.M7)

Physiographic Features

Elevation (meters): RV 616 Range 280 to 1,145

Slope Gradient (percent): 4 0 to 16

Aspect (clockwise direction): southeast to southwest

Landform: flood plains; flood plains on alluvial fans on mountains

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Occasional	Brief	May	Sep

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 569 Range 344 to 923

Annual Air Temperature (°C): -3.0 -6.0 to -2.1

Frost Free Days: 70 60 to 80

Soil Features

Parent Materials: sandy and gravelly alluvium derived from schist
sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 26 Range: 5 to 71

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3 to 7	slightly decomposed plant material; moderately decomposed plant material	moderately rapid	.34	5.2 to 6.2	30	80
9 to 23	stratified fine sand to silt; extremely cobbly loamy sand	moderate to rapid	.08 to .15	5.8 to 7.6		2 to 15
9 to 10	stratified fine sand to silt	moderate	.15	5.8 to 6.6		15

Restrictive Features: strongly contrasting textural stratification at 43 cm in some components

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
White spruce/bog blueberry/feathermoss forest	Climax plant community
White spruce/diamondleaf willow/bog blueberry woodland	Late stage of primary succession on flood plains

Ecological Status-Transition Description:

Two plant communities are identified within this flood prone site including a potential community with white spruce/bog blueberry/feathermoss forest and a late-successional community with white spruce/diamondleaf willow/bog blueberry woodland. Flooding is considered a transitional pathway between seral communities within this site as well as between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand			Number of Stands	
	Total	Min.	Avg.		Max.
White spruce/bog blueberry/feathermoss forest	44	28	30	31	2
White spruce/diamondleaf willow/bog blueberry woodland	25	25	25	25	1

Characteristics of White spruce/bog blueberry/feathermoss forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 9. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy	Cover	Constancy		
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	15.0	37	60	67	50
TM	PIGL	Picea glauca	5.0	28	50	33	30
TR	PIGL	Picea glauca	0.1	5	10	44	15
SL-SM	SAPU15	Salix pulchra	0.1	10	25	67	26
SL-SM	BEGL	Betula glandulosa	0.1	8	15	44	19
SM	SALIX	Salix	0.1	5	10	22	10
SD-SL	VAUL	Vaccinium uliginosum	3.0	25	55	78	44
SL	PEFL15	Pentaphylloides floribunda	3.0	6	10	44	16
SD	EMNI	Empetrum nigrum	0.1	22	70	89	44
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	11	25	56	25
GM-GT	CACA4	Calamagrostis canadensis	0.1	8	20	44	19
GM-GT	FEAL	Festuca altaica	0.1	6	20	44	16
FM	EQAR	Equisetum arvense	5.0	30	80	33	31
FD-FM	GELI2	Geocaulon lividum	0.1	5	10	22	10
FD	COCA13	Cornus canadensis	0.1	8	20	33	16
L	LICHEN	total lichens	0.0	1	7	100	10

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M	MOSS	total bryophytes-mosses and liverworts	40.0	72	95	100	85
M1	HYSP70	Hylocomium splendens	20.0	62	90	67	64
M1	PLSC70	Pleurozium schreberi	15.0	18	20	22	20
M1	ZZMOSS	unknown-mosses	5.0	8	10	22	13
M1	PTCR70	Ptilium crista-castrensis	5.0	5	5	22	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	13	30	100	36
B	LITTER2	litter-woody debris >2.5 cm	0.0	6	15	100	24
B	SOIL	mineral-bare soil	0.0	2	20	100	14
B	ROCK	mineral-surface rock fragments	0.0	1	5	100	10
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	13.5	25.0	m	10
Tree regeneration	TR	0.5	1.6	3.0	m	5
Tall shrubs	ST	4.5	4.5	4.5	m	1
Medium shrubs	SM	1.0	1.7	2.5	m	17
Low shrubs	SL	20.0	55.3	100.0	cm	15
Dwarf shrubs	SD	8.0	10.6	20.0	cm	15
Tall and medium grasses and grass-likes	GT, GM	30.0	65.0	100.0	cm	4
Tall and medium forbs	FT, FM	20.0	30.0	70.0	cm	14
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	9.2	10.0	cm	24

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	122	19.3	12.8	7	B
	162	27.2	16.0		
	273	31.8	19.8		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
11.5	21.8	32.2	2

Characteristics of White spruce/diamondleaf willow/bog blueberry woodland

Ecological Status: Late stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 15. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	5.0	22	40	67	38
TM	PIGL	Picea glauca	5.0	12	35	60	27
TR	PIGL	Picea glauca	0.1	7	15	87	25
SL-ST	SAPU15	Salix pulchra	0.1	18	50	80	38
SL-ST	SALIX	Salix	10.0	34	50	27	30
SM-ST	SAAL	Salix alaxensis	0.1	8	20	47	19
SL-SM	BEGL	Betula glandulosa	10.0	13	20	20	16
SL-SM	PEFL15	Pentaphylloides floribunda	0.1	5	10	47	15
SL-SM	SAGL	Salix glauca	0.1	5	15	27	12
SD-SL	VAUL	Vaccinium uliginosum	0.1	15	30	67	32
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	14	40	33	21
SD	EMNI	Empetrum nigrum	0.1	14	30	67	31

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	1.0	11	30	60	26
GM-GT	CACA4	Calamagrostis canadensis	0.1	11	20	47	23
GM	CAREX	Carex	5.0	15	25	27	20
GM	ZZGRASS	unknown-grasses	3.0	12	20	27	18
FM	EQAR	Equisetum arvense	1.0	14	30	27	19
FD-FM	PEFR5	Petasites frigidus	0.1	5	15	27	12
L	LICHEN	total lichens	0.0	5	15	100	22
M	MOSS	total bryophytes-mosses and liverworts	20.0	69	95	100	83
M1	HYSP70	Hylocomium splendens	0.1	50	90	33	41
M1	ZZMOSS	unknown-mosses	0.1	8	25	20	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	15	35	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.0	6	15	100	24
B	SOIL	mineral-bare soil	0.0	1	10	100	10
B	ROCK	mineral-surface rock fragments	0.0	1	20	100	10
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	11.1	17.0	m	21
Tree regeneration	TR	0.5	1.8	4.7	m	15
Tall shrubs	ST	3.0	4.7	12.0	m	8
Medium shrubs	SM	1.0	1.8	3.0	m	14
Low shrubs	SL	20.0	46.7	100.0	cm	27
Dwarf shrubs	SD	3.0	10.7	20.0	cm	11
Tall and medium grasses and grass-likes	GT, GM	30.0	51.4	100.0	cm	7
Tall and medium forbs	FT, FM	10.0	24.3	50.0	cm	23
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	10.0	10.0	10.0	cm	15

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	97	26.4	10.7	5	B
	141	33.9	13.7		
	226	47.0	15.8		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
18.4	18.4	18.4	1

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested gravelly schist flood plains (Typic Cryorthents, sandy-skeletal)

Boreal-riparian forested loamy high flood plains (Typic Cryofluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

11FP	Boreal Flood Plains, High Elevation (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 0 to 3 percent slopes)
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- 11ST Boreal Terraces and High Flood Plains with Discontinuous Permafrost
(Typic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty Association, 0 to 2 percent slopes)
- 5V2 Boreal Schist Alluvial Fans
(Typic Haplocryods, loamy-skeletal-Typic Cryorthents, sandy-skeletal Association, 4 to 16 percent slopes)
- 7FP1 Boreal Flood Plains and Terraces
(Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)
- 8FP2 Boreal Schist Flood Plains and Terraces
(Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal-Typic Haplogelods, sandy-skeletal Complex)

Geographically Associated Landtypes

M135A_105—Loamy Frozen Terraces, Wet:

This site occurs on higher terrace positions with soils that are shallow over permafrost and wetter. The climax plant community is "Black spruce/tussock cottongrass woodland."

M135A_156—Loamy Wet High Flood Plains:

This site occurs on wetter soils. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

M135A_350—Gravelly and Sandy Slopes:

This site occurs on terraces with very deep, well drained soils with a thin loamy surface mantle over sand and gravel. The climax plant community is "White spruce/shrub birch woodland."

Similar Landtypes

M135A_104—Loamy Frozen Terraces:

This site occurs on terraces with wetter soils that are moderately deep over permafrost. The climax plant community is "Spruce/shrub birch-bog blueberry woodland."

M135A_355—Gravelly Mountains, Warm:

This site occurs in uplands and is not flooded. The climax plant community is "White spruce/green alder forest."

M135A_800—Escarpments:

This site occurs in uplands and is not flooded. The climax plant community is "White spruce forest."

Loamy Wet Flood Plains, High Elevation (M135A_152)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	824	729 to 955
Slope Gradient (percent):	1	0 to 2

Aspect (clockwise direction): non-influencing

Landform: channels on flood plains

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	Frequent	Long	May	Sep	
Ponding:	Frequent	Long	May	Sep	to

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	783	497 to 1,229
Annual Air Temperature (°C):	-4.3	-8.3 to -2.5
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from diorite
sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 35 Range: 19 to 53

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
9	slightly decomposed plant material	moderately rapid	.34	5.5 to 6.2	30	80
3 to 16	stratified highly decomposed plant material to sand to silt; stratified fine sand to silt; mucky silt loam	moderate	.15 to .20	5.9 to 6.2		16 to 20
10 to 23	stratified sand to silt	moderate	.15 to .18	5.9 to 6.3		10 to 16

Restrictive Features: strongly contrasting textural stratification at 36 to 66 cm

Water Table (May to September): 0 to 70 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Diamondleaf willow/horsetail-fragile sedge scrub	Climax plant community
Beaver dam feltleaf willow wet scrub	Beaver impacted site and vegetation

Ecological Status-Transition Description:

Two plant communities are identified within this flood prone site including a potential community with diamondleaf willow/horsetail-fragile sedge scrub and a community associated with beaver activity with feltleaf willow scrub in which the site conditions have been significantly altered and are now wetter due to beaver dam construction. Flooding and beaver activity are considered transitional pathways between community types.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Diamondleaf willow/horsetail-fragile sedge scrub	87	29	47	58	3
Beaver dam feltleaf willow wet scrub	55	28	32	37	2

Characteristics of Diamondleaf willow/horsetail-fragile sedge scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	SAPU15	Salix pulchra	20.0	38	70	100	62
SL	PEFL15	Pentaphylloides floribunda	5.0	15	25	50	27
SD-SL	VAUL	Vaccinium uliginosum	1.0	10	20	75	27
SL	SABA3	Salix barclayi	10.0	10	10	25	16
SD	SARE2	Salix reticulata	1.0	18	35	100	42
SD	SAPO	Salix polaris	10.0	10	10	25	16
GM	CAME4	Carex membranacea	5.0	16	35	75	35
GM	CAPO	Carex podocarpa	0.1	5	15	75	19
GM	CAREX	Carex	5.0	5	5	25	11
FM	EQAR	Equisetum arvense	15.0	42	75	75	56

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
FD	EQVA	Equisetum variegatum	10.0	10	10	25	16
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	60	85	100	77
M1	ZZMOSS	unknown-mosses	10.0	30	50	75	47
M1	PLSC70	Pleurozium schreberi	10.0	35	60	50	42
M1	SPHAG2	Sphagnum	0.1	12	35	75	30
M1	PASQ70	Paludella squarrosa	10.0	10	10	25	16
M1	AUTU70	Aulacomnium turgidum	5.0	5	5	25	11
M1	HYSP70	Hylocomium splendens	5.0	5	5	25	11
M1	RHTR70	Rhytidiadelphus triquetrus	5.0	5	5	25	11
M1	TONI70	Tomentypnum nitens	5.0	5	5	25	11
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	7.0	33	80	100	57
B	ROCK	mineral-surface rock fragments	0.1	4	7	100	20
B	WATER	water	1.0	4	7	100	20
B	LITTER2	litter-woody debris >2.5 cm	0.1	2	5	100	14
B	SOIL	mineral-bare soil	0.1	2	7	100	14

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.5	2.0	m	5
Low shrubs	SL	75.0	80.0	90.0	cm	3
Dwarf shrubs	SD	3.0	8.7	20.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	30.0	50.0	80.0	cm	3
Tall and medium forbs	FT, FM	35.0	35.0	35.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.5	7.0	cm	4

Characteristics of Beaver dam feltleaf willow wet scrub

Ecological Status: Beaver impacted site and vegetation

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	SAAL	Salix alaxensis	45.0	60	75	100	77
SM	SARI4	Salix richardsonii	35.0	35	35	50	42
SM	PEFL15	Pentaphylloides floribunda	15.0	15	15	50	27
SM	B EGL	Betula glandulosa	5.0	5	5	50	16
SM	SAGL	Salix glauca	5.0	5	5	50	16
SL	VAUL	Vaccinium uliginosum	35.0	35	35	50	42
SD	EMNI	Empetrum nigrum	10.0	10	10	50	22
GT	CACA4	Calamagrostis canadensis	5.0	25	45	100	50
GM	CAREX	Carex	5.0	5	5	50	16
FT	HELA4	Heracleum lanatum	5.0	5	5	50	16
FD-FM	EQAR	Equisetum arvense	10.0	22	35	100	47
FD	COCA13	Cornus canadensis	10.0	10	10	50	22
FD	RUAR	Rubus arcticus	7.0	7	7	50	19
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	35.0	48	60	100	69
M1	ZZMOSS	unknown-mosses	25.0	40	55	100	63
M1	PLSC70	Pleurozium schreberi	5.0	5	5	50	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	25.0	48	70	100	69
B	LITTER2	litter-woody debris >2.5 cm	15.0	18	20	100	42
B	WATER	water	10.0	10	10	100	32
B	SOIL	mineral-bare soil	1.0	2	3	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	2.0	2.0	2.0	m	1
Medium shrubs	SM	1.7	1.8	2.0	m	2
Low shrubs	SL	30.0	30.0	30.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	150.0	150.0	150.0	cm	1
Tall and medium forbs	FT, FM	40.0	60.0	80.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.3	8.0	cm	3

Map Unit Components**Common Name (Soils Name):**

Alpine-riparian scrub loamy flood plains, wet (Typic Gelaquents, coarse-loamy over sandy-skeletal)

Alpine-riparian scrub loamy schist flood plains, wet (Typic Gelaquents, coarse-loamy over sandy-skeletal)

Alpine-riparian scrub loamy wet diorite low flood plains, cool (Typic Gelaquents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

8FP1 Alpine Schist Flood Plains and Terraces

(Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Typic Gelaquents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes**M135A_150—Loamy Flood Plains, High Elevation:**

This site occurs on slightly higher positions with well drained soils. The climax plant community is "Riparian low diamondleaf willow-feltleaf willow scrub."

M135A_258—Gravelly Flood Plains, Cool:

This site occurs on lower positions. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs on higher terrace positions. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Loamy Wet Flood Plains (M135A_153)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Boreal Outer Range & Kantishna Hills (M135A.M1L)

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 44 Range: 21 to 78

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4 to 9	moderately decomposed plant material	moderately rapid	.34	5.5 to 6.4	30	80
12 to 29	stratified fine sand to silt; stratified highly decomposed plant material to sand to silt	moderate	.15 to .20	5.9 to 6.8		20
11 to 28	stratified sand to silt	moderate to rapid	.05 to .18	5.9 to 6.4		5 to 12

Restrictive Features: strongly contrasting textural stratification at 33 to 66 cm

Water Table (May to September): 0 to 70 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub	Climax plant community
Beaver dam wet willow/sedge meadow/scrub	Beaver impacted site and vegetation

Ecological Status-Transition Description:

Two plant communities are identified within this flood prone site including a potential community with feltleaf willow/shrubby cinquefoil/scouring rush scrub and a community associated with beaver activity with willow/sedge scrub in which the site conditions have been significantly altered and are now wetter due to beaver dam construction. Flooding and beaver activity are considered transitional pathways between community types.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub	54	23	32	42	2
Beaver dam wet willow/sedge meadow/scrub	74	32	36	42	3

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Beaver dam wet willow/sedge meadow/scrub	CASTS	Calamagrostis stricta ssp. stricta
	TYLA	Typha latifolia

Characteristics of Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TR	POBA2	Populus balsamifera	10.0	10	10	50	22
SM	SAAL	Salix alaxensis	5.0	10	15	100	32
SM	SARI4	Salix richardsonii	15.0	15	15	50	27
SM	ALTE2	Alnus tenuifolia	5.0	5	5	50	16
SL	SAPS	Salix pseudomonticola	20.0	20	20	50	32
SL	PEFL15	Pentaphylloides floribunda	2.0	8	15	100	28
SD	DRIN4	Dryas integrifolia	5.0	5	5	50	16
SD	SARE2	Salix reticulata	5.0	5	5	50	16
GM	CAME4	Carex membranacea	1.0	16	30	100	40
GM	CAAQ	Carex aquatilis	10.0	10	10	100	32
GM	ERAN6	Eriophorum angustifolium	5.0	5	5	50	16
FD-FM	EQVA	Equisetum variegatum	20.0	40	60	100	63
FM	EQAR	Equisetum arvense	5.0	5	5	50	16
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	45.0	58	70	100	76
M1	ZZMOSS	unknown-mosses	60.0	60	60	50	55
M1	TONI70	Tomentypnum nitens	5.0	5	5	50	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	35.0	35	35	100	59
B	ROCK	mineral-surface rock fragments	1.0	8	15	100	28
B	WATER	water	3.0	6	10	100	24
B	SOIL	mineral-bare soil	0.1	4	7	100	20
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.0	3.0	3.0	m	1
Tree regeneration	TR	0.7	0.7	0.7	m	1
Medium shrubs	SM	1.6	2.0	2.5	m	2
Low shrubs	SL	100.0	100.0	100.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	50.0	50.0	50.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	10.0	10.0	10.0	cm	1

Characteristics of Beaver dam wet willow/sedge meadow/scrub

Ecological Status: Beaver impacted site and vegetation

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	7.0	7	7	17	11
TM	POBA2	Populus balsamifera	5.0	5	5	17	9
ST	ALNUS	Alnus	35.0	35	35	17	24
SM	SAPU15	Salix pulchra	15.0	27	45	50	37
SL-SM	PEFL15	Pentaphylloides floribunda	0.1	6	15	83	22
SM	SAAL	Salix alaxensis	0.1	7	10	67	22
SM	SARI4	Salix richardsonii	0.1	15	30	33	22
SM	SALIX	Salix	0.1	7	20	50	19
SL	VAUL	Vaccinium uliginosum	15.0	18	25	50	30
GM-GT	CAAQ	Carex aquatilis	5.0	42	80	50	46
GT	CACA4	Calamagrostis canadensis	5.0	12	20	50	24
GT	ARLA2	Arctagrostis latifolia	0.1	5	10	50	16
GM	CAREX	Carex	80.0	82	85	33	52
GM	CAME4	Carex membranacea	1.0	9	15	50	21

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GM	CACA11	Carex canescens	0.1	8	15	33	16
GM	CAUT	Carex utriculata	15.0	15	15	17	16
GM	CABI5	Carex bigelowii	6.0	6	6	17	10
FT	EQFL	Equisetum fluviatile	2.0	14	25	67	31
FM	EQAR	Equisetum arvense	5.0	20	30	50	32
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	19	55	100	44
M1	SPHAG2	Sphagnum	10.0	12	15	33	20
M1	ZZMOSS	unknown-mosses	20.0	20	20	17	18
M1	TONI70	Tomentypnum nitens	7.0	7	7	17	11
M1	PASQ70	Paludella squarrosa	5.0	5	5	17	9
B	WATER	water	3.0	37	95	100	61
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	21	50	100	46
B	LITTER2	litter-woody debris >2.5 cm	0.0	15	45	100	39
B	SOIL	mineral-bare soil	0.0	7	25	100	26
B	ROCK	mineral-surface rock fragments	0.0	2	10	100	14

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	8.5	12.0	m	2
Tree regeneration	TR	2.5	2.5	2.5	m	1
Tall shrubs	ST	3.0	3.0	3.0	m	1
Medium shrubs	SM	1.0	1.6	2.8	m	14
Low shrubs	SL	30.0	42.5	50.0	cm	4
Dwarf shrubs	SD	8.0	9.3	10.0	cm	3
Tall and medium grasses and grass-like	GT, GM	30.0	87.5	130.0	cm	4
Tall and medium forbs	FT, FM	20.0	93.3	150.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	5.9	10.0	cm	6

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian scrub loamy schist flood plains, wet (Typic Cryaquents, coarse-loamy over sandy-skeletal)

Boreal-riparian scrub loamy wet flood plains (Typic Cryaquents, coarse-loamy over sandy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

11FP	Boreal Flood Plains, High Elevation (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 0 to 3 percent slopes)
7FP1	Boreal Flood Plains and Terraces (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)
7FP11	Boreal Diorite Flood Plains (Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)
8FP2	Boreal Schist Flood Plains and Terraces (Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal-Typic Haplogelods, sandy-skeletal Complex)
8MFS1	Boreal Schist Lower Mountain Slopes with Continuous Permafrost (Typic Historthels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, loamy-skeletal Association, 8 to 25 percent slopes)
G	Nonvegetated Alluvium, Alaska Mountains, Boreal (Riverwash, Alaska Mountains)

Geographically Associated Landtypes

M135A_100—Loamy Flood Plains:

This site occurs on slightly higher positions with well drained soils. The climax plant community is "Poplar-feltleaf willow scrub."

M135A_156—Loamy Wet High Flood Plains:

This site occurs on higher positions with lower flooding frequency. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes

M135A_203—Gravelly Low Flood Plains, Wet:

This site occurs on soils with a thin loamy surface mantle over sand and gravel. The climax plant community is "Entire mountain avens/sedge wet dwarf scrub."

M135A_250—Gravelly Low Flood Plains, Acid:

This site has soils that are very shallow to sand and gravel. The climax plant community is "Feltleaf willow-green alder scrub."

M135A_257—Gravelly Low Flood Plains, High Elevation:

This site has drier soils. The climax plant community is "Feltleaf willow scrub, cool."

M135A_258—Gravelly Flood Plains, Cool:

This site has soils that are very shallow to sand and gravel. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

Loamy Wet High Flood Plains (M135A_156)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Physiographic Features

	RV	Range
Elevation (meters):	636	493 to 865

Slope Gradient (percent):	1	0 to 4
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Aspect (clockwise direction): non-influencing

Landform: flood plains on alluvial fans

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Occasional	Brief	May	Sep

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	589	344 to 923

Annual Air Temperature (°C):	-3.1	-6.0 to -2.1
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Frost Free Days:	70	60 to 80
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Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 23 Range: 16 to 33

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4	moderately decomposed plant material	moderately rapid	.34	6.4	30	
19	stratified fine sand to silt	moderate	.15	6.8		20

Restrictive Features: strongly contrasting textural stratification at 33 cm

Water Table (May to September): 0 to 60 cm

Drainage Class: very poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
White spruce/Richardson willow/horsetail woodland	Climax plant community

Ecological Status-Transition Description:

A single plant community with white spruce/Richardson willow/horsetail woodland is identified on this site. Flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce/Richardson willow/horsetail woodland	85	37	52	67	2

Characteristics of White spruce/Richardson willow/horsetail woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	<i>Picea glauca</i>	20.0	20	20	33	26
TT	POBA2	<i>Populus balsamifera</i>	5.0	5	5	33	13
TM	PIGL	<i>Picea glauca</i>	5.0	10	15	67	26
TR	PIGL	<i>Picea glauca</i>	0.1	10	20	67	26
ST	SAAL	<i>Salix alaxensis</i>	3.0	9	15	67	25
SM-ST	SAGL	<i>Salix glauca</i>	0.1	5	10	67	18
SM	SARI4	<i>Salix richardsonii</i>	5.0	12	20	100	35
SL-SM	SAPS	<i>Salix pseudomonticola</i>	10.0	10	10	67	26
SM	SAPU15	<i>Salix pulchra</i>	10.0	10	10	33	18
SD-SL	VAUL	<i>Vaccinium uliginosum</i>	5.0	12	25	100	35
SL	BEGL	<i>Betula glandulosa</i>	15.0	15	15	33	22
SD	EMNI	<i>Empetrum nigrum</i>	0.1	6	15	100	24
SD	ARRU6	<i>Arctous rubra</i>	5.0	5	5	100	22
GM	CAREX	<i>Carex</i>	15.0	15	15	33	22
GM	CAME4	<i>Carex membranacea</i>	15.0	15	15	33	22
FD-FM	EQAR	<i>Equisetum arvense</i>	10.0	17	30	100	41
FD	ANRI	<i>Anemone richardsonii</i>	5.0	5	5	33	13
L	LICHEN	total lichens	1.0	9	25	100	30
LA	BRYOR2	<i>Bryoria</i>	7.0	7	7	33	15
LA	PARME2	<i>Parmelia</i>	5.0	5	5	33	13
M	MOSS	total bryophytes-mosses and liverworts	75.0	82	90	100	91
M1	PLSC70	<i>Pleurozium schreberi</i>	30.0	37	45	100	61
M1	HYSP70	<i>Hylocomium splendens</i>	15.0	28	40	67	43
M1	ZZMOSS	unknown-mosses	10.0	22	35	67	38
M1	THRE7	<i>Thuidium recognitum</i>	15.0	15	15	67	32

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M1	POCO38	Polytrichum commune	5.0	5	5	33	13
M1	PTCR70	Ptilium crista-castrensis	5.0	5	5	33	13
M1	RHTR70	Rhytidiadelphus triquetrus	5.0	5	5	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.1	6	10	100	24
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	7	100	20
B	WATER	water	0.0	2	5	100	14
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	11.7	15.0	m	3
Tree regeneration	TR	0.6	0.8	1.0	m	2
Tall shrubs	ST	4.2	4.7	5.5	m	3
Medium shrubs	SM	1.0	1.2	1.5	m	2
Low shrubs	SL	20.0	47.5	100.0	cm	4
Dwarf shrubs	SD	3.0	7.8	10.0	cm	6
Tall and medium grasses and grass-likes	GT, GM	20.0	20.0	20.0	cm	1
Tall and medium forbs	FT, FM	10.0	20.0	30.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	9.3	25.0	cm	6

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	132	22.5	11.5		
	223	27.4	14.6		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
m ² / ha			
11.5	12.0	12.4	2

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested loamy flood plains, very wet (Typic Cryaquents, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7AFF	Boreal Outwash Plains and Fans with Discontinuous Permafrost (Typic Eutrocryepts, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy Association, 0 to 5 percent slopes)
7FP11	Boreal Diorite Flood Plains (Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)

Geographically Associated Landtypes**M135A_100—Loamy Flood Plains:**

This site occurs on slightly higher positions with well drained soils. The climax plant community is "Poplar-feltleaf willow scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes**M135A_185—Gravelly High Flood Plains, High Elevation:**

This site has soils that are very shallow to sand and gravel. The climax plant community is "White spruce/willow forest."

M135A_203—Gravelly Low Flood Plains, Wet:

This site occurs on positions with a thin loamy surface mantle over sand and gravel. The climax plant community is "Entire mountain avens/sedge wet dwarf scrub."

M135A_354—Loamy Slopes, Wet:

This site occurs in uplands and is not flooded. The climax plant community is "White spruce/willow woodland, wet."

Loamy Frozen Wet Terraces, High Elevation (M135A_175)**Ecoregion Classification**

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)

Toklat Basin Lowlands (M135A.M7)

Teklanika Alpine Mountains & Plateaus (M135A.M6)

Boreal Outer Range & Kantishna Hills (M135A.M1L)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Glaciated Uplands (M135A.G1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	657	275 to 1,238

Slope Gradient (percent):	4	0 to 14
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Aspect (clockwise direction): southwest to northeast

Landform: turf hummocks on alluvial flats on basin floors; turf hummocks on fans on mountains; turf hummocks on mountains; turf hummocks on plateaus

Landform Positions: shoulders; summits; toeslopes

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	None			

Ponding:	Frequent	Long	May	Jun
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Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	590	358 to 1,229

Annual Air Temperature (°C):	-3.0	-8.3 to -2.0
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Frost Free Days:	64	50 to 80
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Soil Features

Parent Materials: woody organic material and/or grassy organic material over silty cryoturbate over gravelly cryoturbate derived from schist
woody organic material and/or grassy organic material over silty cryoturbate
woody organic material and/or grassy organic material over silty cryoturbate over silty eolian deposits

Rooting Depth (cm): RV: 43 Range: 28 to 72

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
20 to 31	peat	moderately rapid	.34	3.3 to 3.9	30	
8 to 14	silt loam, muck; mucky silt loam	moderate	.19 to .40	4.4 to 5.3	15	
8 to 13	silt loam, muck; very channery silt loam	moderate to moderately rapid	.12 to .19	4.4 to 5.4	6 to 15	

Restrictive Features: permafrost at 42 to 61 cm
strongly contrasting textural stratification at 34 cm in some components

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Tussock cottongrass/mixed ericaceous shrub meadow	Climax plant community

Ecological Status-Transition Description:

A single plant community with tussock cottongrass/mixed ericaceous shrub/sedge scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Tussock cottongrass/mixed ericaceous shrub meadow	31	11	14	17	8

Characteristics of Tussock cottongrass/mixed ericaceous shrub meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 16. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	BEGL	Betula glandulosa	0.1	14	50	100	37
SD-SL	VAUL	Vaccinium uliginosum	2.0	14	40	100	37
SD-SL	LEPAD	Ledum palustre ssp. decumbens	5.0	13	30	100	36
SD-SL	SAPU15	Salix pulchra	0.1	7	20	19	12
SD	EMNI	Empetrum nigrum	0.1	7	20	81	24
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	5	15	100	22
GM	ERVA4	Eriophorum vaginatum	40.0	56	70	44	50
GM	ERBR6	Eriophorum brachyantherum	0.1	43	75	50	46
GM	CABI5	Carex bigelowii	0.1	12	35	62	27
GM	CAREX	Carex	10.0	30	50	19	24
FD-FM	RUCH	Rubus chamaemorus	0.1	5	15	100	22
L	LICHEN	total lichens	0.0	9	35	100	30
M	MOSS	total bryophytes-mosses and liverworts	20.0	47	90	100	69
M1	SPHAG2	Sphagnum	7.0	38	90	88	58
M1	ZZMOSS	unknown-mosses	3.0	7	10	50	19
M1	PLSC70	Pleurozium schreberi	0.1	6	15	38	15
M1	HYSP70	Hylocomium splendens	3.0	11	15	19	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	37	85	100	61
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	5	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	3.7	6.0	m	6
Tree regeneration	TR	0.5	0.8	1.5	m	6
Low shrubs	SL	30.0	42.3	100.0	cm	13
Dwarf shrubs	SD	5.0	14.2	20.0	cm	45
Tall and medium grasses and grass-likes	GT, GM	20.0	35.0	50.0	cm	9
Tall and medium forbs	FT, FM	10.0	18.0	30.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	5.5	10.0	cm	30

Map Unit Components**Common Name (Soils Name):**

- Alpine-tussock-scrub gravelly schist slopes, frozen (Typic Histoturbels, loamy-skeletal)
- Alpine-tussock-scrub mica rich silty slopes, frozen (Typic Histoturbels, coarse-silty)
- Alpine-tussock-scrub silty loess slopes, frozen (Typic Histoturbels, coarse-silty)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

10SU	Boreal Plateaus with Continuous Permafrost, Wet (Typic Histoturbels, coarse-silty-Typic Historthels, loamy-skeletal Association, 0 to 10 percent slopes)
11P	Alpine Plains with Continuous Permafrost (Typic Histoturbels, coarse-silty, 0 to 5 percent slopes)
11P1	Alpine Plains and Drainages with Continuous Permafrost (Typic Histoturbels, coarse-silty-Glacial Folistels, dysic-Terric Fibristels, loamy Association, 0 to 5 percent slopes)
7FGA	Alpine Plains and Hills with Continuous Permafrost, Nenana Gravels (Typic Histoturbels, coarse-silty-Typic Historthels, loamy-skeletal Association, 0 to 15 percent slopes)
8LM	Alpine Low Loess Mountains with Discontinuous Permafrost (Typic Histoturbels, coarse-silty-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 5 to 25 percent slopes)
8LM1	Alpine Low Schist Mountains with Discontinuous Permafrost (Typic Histoturbels, loamy-skeletal-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 0 to 20 percent slopes)
8MFS1	Boreal Schist Lower Mountain Slopes with Continuous Permafrost (Typic Historthels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, loamy-skeletal Association, 8 to 25 percent slopes)
8ST1	Alpine Schist Terraces and Mountain Toeslopes with Discontinuous Permafrost (Typic Histoturbels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Haplogelods, sandy-skeletal Association, 0 to 10 percent slopes)

Geographically Associated Landtypes**M135A_180—Gravelly Frozen Slopes:**

This site occurs on soils that are drier. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_182—Gravelly Frozen Slopes, Ruptic:

This site occurs on non-sorted circles. The climax plant community is "Shrub birch/sedge scrub mosaic."

M135A_405—Swales:

This site occurs on very deep, seasonally wet soils in swales. The climax plant community is "Green alder scrub mosaic."

Loamy Frozen Slopes, High Elevation (M135A_177)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Boreal Mountains (M135A.M2L)

Alpine Mountains (M135A.M2)

Physiographic Features

	RV	Range
Elevation (meters):	868	593 to 1,479

Slope Gradient (percent):	17	3 to 45
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Aspect (clockwise direction): west to east

Landform: benches on mountains; fan terraces on alluvial fans on mountains; mountains

Landform Positions: backslopes; footslopes

	Frequency
Flooding:	None

Ponding:	None
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Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,024	552 to 2,466

Annual Air Temperature (°C):	-5.6	-10.7 to -2.5
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Frost Free Days:	60	50 to 70
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Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty eolian deposits over gravelly till
organic material over silty eolian deposits over sandy and silty alluvium over sandy and gravelly

Rooting Depth (cm): RV: 37 Range: 22 to 70

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
18 to 28	slightly decomposed plant material; peat	moderately rapid	.34	3.2 to 4.5	30	
3 to 8	mucky silt loam; silt loam	moderate	.18 to .40	3.5 to 5.2	12 to 15	
6 to 11	very cobbly loam; stratified gravelly sand to silt	moderate to moderately rapid	.12 to .14	4.3 to 6.2	10	8

Restrictive Features: permafrost at 68 to 96 cm
strongly contrasting textural stratification at 26 to 68 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Shrub birch-bog blueberry/moss scrub

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community with shrub birch-bog blueberry/moss scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Shrub birch-bog blueberry/moss scrub	27	13	16	22	3

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Shrub birch-bog blueberry/moss scrub	STLO	Stellaria longifolia

Characteristics of Shrub birch-bog blueberry/moss scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 10. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	SAPU15	Salix pulchra	0.1	7	20	90	25
SD-SL	BEGL	Betula glandulosa	10.0	30	45	100	55
SD-SL	VAUL	Vaccinium uliginosum	1.0	25	60	100	50
SD-SL	LEPAD	Ledum palustre ssp. decumbens	5.0	18	40	80	38
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	8	25	70	24
SD	EMNI	Empetrum nigrum	0.1	5	10	90	21
GM-GT	FEAL	Festuca altaica	2.0	6	10	20	11
GM	CAREX	Carex	5.0	12	25	30	19
GM	CABI5	Carex bigelowii	0.1	5	10	30	12
L	LICHEN	total lichens	0.0	7	20	100	26
M	MOSS	total bryophytes-mosses and liverworts	40.0	77	90	100	88
M1	HYSP70	Hylocomium splendens	0.1	32	45	60	44
M1	PLSC70	Pleurozium schreberi	15.0	30	45	40	35
M1	ZZMOSS	unknown-mosses	0.1	8	15	40	18
M1	SPHAG2	Sphagnum	0.1	5	10	30	12
M1	PTCR70	Ptilium crista-castrensis	5.0	5	5	20	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	5	20	100	22
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.3	0.6	1.0	m	2
Medium shrubs	SM	1.5	1.8	2.0	m	2
Low shrubs	SL	20.0	46.8	100.0	cm	25
Dwarf shrubs	SD	3.0	12.8	20.0	cm	31
Tall and medium grasses and grass-likes	GT, GM	30.0	56.0	120.0	cm	5
Tall and medium forbs	FT, FM	20.0	22.5	30.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	8.3	10.0	cm	22

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub gravelly till slopes, frozen (Typic Historthels, loamy-skeletal)

Alpine-scrub loamy diorite terraces, frozen (Typic Historthels, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 7SA3 Alpine and Subalpine Glaciated Mountains with Discontinuous Permafrost
(Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 20 to 55 percent slopes)
- 7TM2 Alpine Glaciated Mountains with Discontinuous Permafrost, Cool
(Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 10 to 50 percent slopes)
- 7V1B Alpine and Subalpine Diorite Fans and Flood Plains with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 3 to 15 percent slopes)

Geographically Associated Landtypes

M135A_303—Gravelly Mountains, Acid:

This site occurs on higher slopes and adjacent ridges. The climax plant community is "Green alder/red current/bluejoint scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site occurs on very deep, well drained soils. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

Similar Landtypes

M135A_180—Gravelly Frozen Slopes:

This site occurs on positions with a thin loam surface over gravelly material. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site has soils that are somewhat excessively drained and lack permafrost. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site has soils that are well drained and lack permafrost. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

M135A_358—Gravelly Slopes:

This site has soils that are well drained and lack permafrost. The climax plant community is "Shrub birch-bog blueberry scrub."

Gravelly Frozen Slopes (M135A_180)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)
Teklanika Boreal Mountains & Plateaus (M135A.M6L)
Teklanika Alpine Mountains & Plateaus (M135A.M6)
Alpine Mountains (M135A.M2)
Boreal Outer Range & Kantishna Hills (M135A.M1L)
Alpine Outer Range & Kantishna Hills (M135A.M1)
Glaciated Lowlands (M135A.G1L)
Glaciated Uplands (M135A.G1)

Physiographic Features

Elevation (meters): RV 827 Range 275 to 1,920

Slope Gradient (percent): 10 0 to 25

Aspect (clockwise direction): non-influencing

Landform: escarpments on mountains; escarpments on plateaus; fan terraces on alluvial fans on mountains; fan terraces on outwash plains on mountains; fans on mountains; hills; hummocks on mountains; mountains; plateaus; till plains

Landform Positions: backslopes; footslopes; shoulders; summits; toeslopes
Frequency

Flooding: None

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 713 Range 358 to 2,466

Annual Air Temperature (°C): -3.7 -10.7 to -2.0

Frost Free Days: 61 50 to 80

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty cryoturbate
mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist
mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from diorite and/or gravelly till
mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist
mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum
mossy organic material and/or woody organic material over loamy alluvium over loamy alluvium and/or sandy and gravelly alluvium
woody organic material and/or grassy organic material over silty eolian deposits over gravelly till

Rooting Depth (cm): RV: 38 Range: 11 to 77

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
18 to 31	peat	moderately rapid	.34	3.3 to 5.8	30	80
3 to 17	mucky silt loam	moderate or moderately rapid	.12 to .40	3.8 to 6.1	12 to 15	16 to 20
4 to 12	very gravelly sandy loam	moderate or moderately rapid	.10 to .26	3.8 to 6.0	6 to 12	6

Restrictive Features: permafrost at 32 to 96 cm
strongly contrasting textural stratification at 26 to 61 cm in some components

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained or very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Shrub birch-mixed ericaceous shrub/sedge scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with shrub birch-mixed ericaceous shrub/sedge scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Shrub birch-mixed ericaceous shrub/sedge scrub	157	12	22	42	34

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Shrub birch-mixed ericaceous shrub/sedge scrub	CASTS	Calamagrostis stricta ssp. stricta
	CAWI3	Carex williamsii
	DEBR2	Deschampsia brevifolia

Characteristics of Shrub birch-mixed ericaceous shrub/sedge scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 101. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy			
			Min.	Avg.	Max.		
SD-ST	SAPU15	Salix pulchra	0.1	10	65	75	27
SD-SM	BEGL	Betula glandulosa	0.1	31	80	100	56
SD-SL	VAUL	Vaccinium uliginosum	1.0	21	60	92	44
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	15	50	87	36
SD-SL	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	8	35	89	27
SD-SL	EMNI	Empetrum nigrum	0.1	9	40	78	26
SD	SARE2	Salix reticulata	0.1	10	50	24	15
GM-GT	CABI5	Carex bigelowii	0.1	31	80	43	37
GM-GT	CACA4	Calamagrostis canadensis	0.1	7	50	24	13
GM	CAREX	Carex	0.1	30	70	45	37
GM	ERBR6	Eriophorum brachyantherum	0.1	8	30	15	11
L	LICHEN	total lichens	0.0	9	50	99	30
M	MOSS	total bryophytes-mosses and liverworts	0.0	65	95	99	80
M1	SPHAG2	Sphagnum	0.1	18	90	49	30
M1	HYSP70	Hylocomium splendens	0.1	29	85	26	27
M1	ZZMOSS	unknown-mosses	0.1	17	75	44	27
M1	PLSC70	Pleurozium schreberi	0.1	22	70	30	26
M1	POCO38	Polytrichum commune	0.1	5	15	18	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	17	85	99	41
B	ROCK	mineral-surface rock fragments	0.0	1	40	99	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	5	99	0
B	SOIL	mineral-bare soil	0.0	0	5	99	0
B	WATER	water	0.0	0	7	99	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.4	2.2	10.0	m	40
Tree regeneration	TR	0.3	1.7	3.0	m	16
Tall shrubs	ST	7.0	7.0	7.0	m	1
Medium shrubs	SM	1.0	1.4	3.0	m	36
Low shrubs	SL	20.0	49.8	110.0	cm	191
Dwarf shrubs	SD	2.0	12.1	20.0	cm	134
Tall and medium grasses and grass-likes	GT, GM	8.0	41.0	130.0	cm	50
Tall and medium forbs	FT, FM	10.0	22.0	100.0	cm	23
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	6.3	15.0	cm	116

Map Unit Components**Common Name (Soils Name):**

- Alpine-scrub gravelly diorite till slopes, frozen (Typic Historthels, loamy-skeletal)
- Alpine-scrub gravelly schist colluvial toeslopes, frozen (Typic Historthels, coarse-loamy)
- Alpine-scrub-sedge gravelly slopes, frozen (Typic Historthels, loamy-skeletal)
- Alpine-scrub-sedge gravelly till slopes, frozen (Typic Historthels, loamy-skeletal)
- Alpine-scrub-sedge loamy terraces, frozen (Typic Historthels, coarse-loamy over sandy-skeletal)
- Alpine-scrub-sedge silty hummocks, frozen (Typic Histoturbels, coarse-silty)
- Alpine-scrub-sedge-gravelly schist hummocks, frozen (Typic Histoturbels, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 10ES Subalpine and Alpine Plateau Escarpments with Discontinuous Permafrost
(Typic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Complex, 10 to 70 percent slopes)
- 10ES1 Boreal Terrace Escarpments with Discontinuous Permafrost
(Typic Eutrocryepts, coarse-loamy-Typic Historthels, coarse-silty-Typic Historthels, loamy-skeletal Complex, 5 to 70 percent slopes)
- 10LM Alpine Low Mountains with Discontinuous Permafrost, Nenana Gravels
(Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 2 to 30 percent slopes)
- 10P1 Alpine Plateaus and Mountain Summits with Discontinuous Permafrost, Nenana Gravels
(Ruptic-Histic Aquiturbels, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 15 percent slopes)
- 10P4 Alpine and Subalpine Plateau Summits
(Ruptic-Histic Aquiturbels, coarse-loamy-Typic Eutrogelepts, loamy skeletal-Typic Historthels, loamy-skeletal Association, 0 to 16 percent slopes)
- 10SU Boreal Plateaus with Continuous Permafrost, Wet
(Typic Histoturbels, coarse-silty-Typic Historthels, loamy-skeletal Association, 0 to 10 percent slopes)
- 5SA2 Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Cool
(Ruptic-Histic Aquiturbels, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 12 to 36 percent slopes)
- 5TS1 Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Warm
(Ruptic-Histic-Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 5 to 45 percent slopes)
- 5V1 Alpine Schist Alluvial Fans with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy-Typic Gelorthents, loamy-skeletal Association, 2 to 15 percent slopes)
- 7FGA Alpine Plains and Hills with Continuous Permafrost, Nenana Gravels
(Typic Histoturbels, coarse-silty-Typic Historthels, loamy-skeletal Association, 0 to 15 percent slopes)
- 7MS3 Alpine Glaciated Mountains with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Oxyaquic Eutrocryepts, coarse-loamy Association, 8 to 25 percent slopes)

- 7MS31 Alpine Glaciated Mountain Summits and Benches with Discontinuous Permafrost
(Typic Eutroglepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutroglepts, coarse-loamy Association, 2 to 20 percent slopes)
- 7NG Alpine Plains and Hills with Discontinuous Permafrost, Nenana Gravels
(Typic Eutroglepts, loamy-skeletal-Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 25 percent slopes)
- 7P1 Alpine Glaciated Plains and Hills with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 0 to 25 percent slopes)
- 7TM Alpine Glaciated Low Mountains with Discontinuous Permafrost
(Typic Eutroglepts, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Typic Historthels, loamy-skeletal Association, 2 to 42 percent slopes)
- 7TM1 Alpine Glaciated Mountains with Discontinuous Permafrost, High Elevation
(Typic Eutroglepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutroglepts, coarse-loamy Association, 2 to 50 percent slopes)
- 7TP Alpine Till Plains with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutroglepts, coarse-loamy-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 16 percent slopes)
- 7TP2 Alpine Till Plains and Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Typic Eutroglepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 2 to 50 percent slopes)
- 7TP4 Boreal and Alpine Till Plains with Continuous Permafrost
(Typic Historthels, loamy-skeletal Association 0 to 12 percent slopes)
- 7V1 Alpine Lower Mountain Slopes and Fans with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Historthels, loamy-skeletal Association, 0 to 20 percent slopes)
- 7V5 Alpine Fans with Discontinuous Permafrost
(Typic Eutroglepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Gelorthents, sandy-skeletal Association, 2 to 20 percent slopes)
- 8LM Alpine Low Loess Mountains with Discontinuous Permafrost
(Typic Histoturbels, coarse-silty-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 5 to 25 percent slopes)
- 8LM1 Alpine Low Schist Mountains with Discontinuous Permafrost
(Typic Histoturbels, loamy-skeletal-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 0 to 20 percent slopes)
- 8MFS Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost
(Typic Historthels, coarse-loamy-Typic Dystroglepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 10 to 45 percent slopes)
- 8MFS1 Boreal Schist Lower Mountain Slopes with Continuous Permafrost
(Typic Historthels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, loamy-skeletal Association, 8 to 25 percent slopes)
- 8ST1 Alpine Schist Terraces and Mountain Toeslopes with Discontinuous Permafrost
(Typic Histoturbels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Haplogelods, sandy-skeletal Association, 0 to 10 percent slopes)

Geographically Associated Landtypes

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs on very deep, somewhat excessively drained soils. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

M135A_358—Gravelly Slopes:

This site occurs on deep, well drained soils. The climax plant community is "Shrub birch-bog blueberry scrub."

Similar Landtypes

M135A_182—Gravelly Frozen Slopes, Ruptic:

This site occurs on nonsorted circles with significant micro-relief and a complex mosaic of vegetation types. The climax plant community is "Shrub birch/sedge scrub mosaic."

M135A_400—Loamy Frozen Slopes:

This site occurs on soils with a thick loam surface mineral layer. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

Gravelly Frozen Slopes, Ruptic (M135A_182)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Teklanika Alpine Mountains & Plateaus (M135A.M6)

Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Glaciated Uplands (M135A.G1)

Physiographic Features

Elevation (meters): RV Range
872 275 to 1,546

Slope Gradient (percent): 10 0 to 25

Aspect (clockwise direction): non-influencing

Landform: nonsorted circles on hills; nonsorted circles on mountains; nonsorted circles on plains; nonsorted circles on plateaus; nonsorted circles on till plains

Landform Positions: backslopes; footslopes; shoulders; summits; toeslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV Range
690 426 to 2,466

Annual Air Temperature (°C): -3.6 -10.7 to -2.0

Frost Free Days: 60 50 to 70

Soil Features

Parent Materials: silty eolian deposits over gravelly cryoturbate

silty eolian deposits over gravelly cryoturbate derived from schist

Rooting Depth (cm): RV: 34 Range: 3 to 83

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
1	moderately decomposed plant material; slightly decomposed plant material	moderately rapid	.34	4.6 to 4.8	30	
2 to 4	silt loam	moderate	.26 to .40	4.4 to 5.6	12	
8 to 23	very channery silt loam; gravelly loam	moderately rapid	.10 to .12	4.5 to 6.4	5 to 6	6

Restrictive Features: bedrock (paralithic) at 88 to 150 cm or more
permafrost at 120 to 150 cm or more
strongly contrasting textural stratification at 3 to 5 cm

Water Table (May to September): 80 to 120 cm

Drainage Class: moderately well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Shrub birch/sedge scrub mosaic	Climax plant community
Lichen/dwarf scrub mosaic	Climax plant community on drier microsites

Ecological Status-Transition Description:

Two intricately associated but distinct plant communities occur as a complex mosaic on this site. A potential plant community with shrub birch/sedge scrub mosaic is described for the typical site and a second potential with /dwarf lichen scrub mosaic is described for a dry micro-site. No transitional pathways between these two vegetation types or other plant communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Shrub birch/sedge scrub mosaic	62	15	22	30	7
Lichen/dwarf scrub mosaic	52	11	22	30	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Shrub birch/sedge scrub mosaic	CAWI3	Carex williamsii
	DEBR2	Deschampsia brevifolia
	PIRO60	Pilophorus robustus

Characteristics of Shrub birch/sedge scrub mosaic

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 24. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-ST	SAGL	Salix glauca	0.1	6	25	33	14
SL-SM	B EGL	Betula glandulosa	0.1	41	80	96	63
SL-SM	SAPU15	Salix pulchra	0.1	11	50	88	31
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	17	50	75	36
SD-SL	VAUL	Vaccinium uliginosum	0.1	16	35	83	36
SD	EMNI	Empetrum nigrum	0.1	10	30	67	26
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	6	15	67	20
SD	DROC	Dryas octopetala	0.1	7	25	17	11
SD	SARE2	Salix reticulata	0.1	6	20	21	11
GM	CAREX	Carex	7.0	28	60	38	33
GM	CABI5	Carex bigelowii	10.0	27	70	38	32
GM	CAPO	Carex podocarpa	0.1	17	35	21	19
L	LICHEN	total lichens	0.0	11	70	100	33
M	MOSS	total bryophytes-mosses and liverworts	10.0	62	95	100	79
M1	PLSC70	Pleurozium schreberi	0.1	17	40	33	24
M1	ZZMOSS	unknown-mosses	0.1	13	35	38	22
M1	SPHAG2	Sphagnum	0.1	8	20	42	18
M1	HYSP70	Hylocomium splendens	0.1	8	15	29	15
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	18	60	100	42
B	SOIL	mineral-bare soil	0.0	2	10	100	14
B	ROCK	mineral-surface rock fragments	0.0	1	10	100	10
B	WATER	water	0.0	1	7	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	1.4	2.0	m	3
Tree regeneration	TR	1.0	1.0	1.0	m	1
Tall shrubs	ST	3.5	3.5	3.5	m	1
Medium shrubs	SM	1.0	1.3	1.8	m	7
Low shrubs	SL	20.0	46.2	100.0	cm	49
Dwarf shrubs	SD	2.0	9.8	20.0	cm	24
Tall and medium grasses and grass-likes	GT, GM	20.0	49.6	120.0	cm	12
Tall and medium forbs	FT, FM	15.0	41.2	100.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	5.1	10.0	cm	20

Characteristics of Lichen/dwarf scrub mosaic

Ecological Status: Climax plant community on drier microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 17. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SM	BEGL	Betula glandulosa	0.1	5	20	100	22
SD-SL	VAUL	Vaccinium uliginosum	0.1	9	25	82	27
SD	ARAL13	Arctous alpina	5.0	15	50	71	33
SD	EMNI	Empetrum nigrum	0.1	7	25	59	20
SD	DROC	Dryas octopetala	0.1	8	30	41	18
SD	SAAR4	Salix arctica	0.1	5	20	59	17
SD	DILA	Diapensia lapponica	0.1	5	15	53	16
SD	LOPR	Loiseleuria procumbens	2.0	6	15	41	16
SD	SARE2	Salix reticulata	0.1	7	20	18	11
GM	CAPO	Carex podocarpa	1.0	8	20	18	12
L	LICHEN	total lichens	15.0	64	90	100	80
L1	CLADI3	Cladina	0.1	13	50	29	19
L1	STERE2	Stereocaulon	0.1	9	20	41	19
L1	FLNI	Flavocetraria nivalis	0.1	13	30	24	18
L1	CLMI61	Cladina mitis group	5.0	12	20	24	17
L1	FLCU	Flavocetraria cucullata	5.0	10	25	24	15
M	MOSS	total bryophytes-mosses and liverworts	0.0	10	20	100	32
M1	ZZMOSS	unknown-mosses	0.1	7	15	29	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	5	25	100	22
B	ROCK	mineral-surface rock fragments	0.0	5	30	100	22
B	SOIL	mineral-bare soil	0.0	4	35	100	20
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.5	0.5	0.5	m	1
Medium shrubs	SM	1.5	1.5	1.5	m	1
Low shrubs	SL	40.0	62.5	100.0	cm	8
Dwarf shrubs	SD	1.0	10.0	20.0	cm	43
Tall and medium grasses and grass-likes	GT, GM	30.0	43.3	60.0	cm	3
Tall and medium forbs	FT, FM	10.0	15.0	20.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	6.5	10.0	cm	24

Map Unit Components

Common Name (Soils Name):

- Alpine-scrub gravelly circles, frozen (Ruptic-Histic Aquiturbels, coarse-loamy)
- Alpine-scrub gravelly schist circles, frozen (Ruptic-Histic Aquiturbels, loamy-skeletal)
- Alpine-scrub gravelly till circles, frozen (Ruptic-Histic Aquiturbels, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 10P1 Alpine Plateaus and Mountain Summits with Discontinuous Permafrost, Nenana Gravels
(Ruptic-Histic Aquiturbels, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 15 percent slopes)
- 10P4 Alpine and Subalpine Plateau Summits
(Ruptic-Histic Aquiturbels, coarse-loamy-Typic Eutrogelepts, loamy skeletal-Typic Historthels, loamy-skeletal Association, 0 to 16 percent slopes)
- 5P1 Alpine Schist Mountain Summits with Discontinuous Permafrost
(Ruptic Histic Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Tpic Aquiturbels, loamy-skeletal Association, 0 to 25 percent slopes)
- 5SA2 Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Cool
(Ruptic-Histic Aquiturbels, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 12 to 36 percent slopes)
- 5TS1 Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Warm
(Ruptic-Histic-Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 5 to 45 percent slopes)
- 7MS3 Alpine Glaciated Mountains with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Oxyaquic Eutrocryepts, coarse-loamy Association, 8 to 25 percent slopes)
- 7NG Alpine Plains and Hills with Discontinuous Permafrost, Nenana Gravels
(Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 25 percent slopes)
- 7TM Alpine Glaciated Low Mountains with Discontinuous Permafrost
(Typic Eutrogelepts, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Typic Historthels, loamy-skeletal Association, 2 to 42 percent slopes)
- 7TP Alpine Till Plains with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 16 percent slopes)
- 8LM Alpine Low Loess Mountains with Discontinuous Permafrost
(Typic Histoturbels, coarse-silty-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 5 to 25 percent slopes)
- 8LM1 Alpine Low Schist Mountains with Discontinuous Permafrost
(Typic Histoturbels, loamy-skeletal-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 0 to 20 percent slopes)

Geographically Associated Landtypes

M135A_180—Gravelly Frozen Slopes:

This site lacks significant micro-relief and has relatively uniform vegetation cover and moderate depth to permafrost. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_183—Gravelly Frozen Slopes, Cold:

This site occurs on slightly higher elevations. The climax plant community is "Sedge/dwarf willow-white mountain avens wet meadow."

M135A_405—Swales:

This site occurs on very deep, seasonally wet soils in swales. The climax plant community is "Green alder scrub mosaic."

Similar Landtypes

M135A_177—Loamy Frozen Slopes, High Elevation:

This site occurs on thick loamy surface layered soils. The climax plant community is "Shrub birch-bog blueberry/moss scrub."

M135A_180—Gravelly Frozen Slopes:

This site lacks significant micro-relief and has a relatively uniform vegetation. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

Gravelly Frozen Slopes, Cold (M135A_183)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Physiographic Features

Elevation (meters): RV 938 Range 261 to 1,546

Slope Gradient (percent): 14 8 to 25

Aspect (clockwise direction): non-influencing

Landform: mountains; saddles on mountains; solifluction lobes on mountains; stripes on mountains

Landform Positions: footslopes; shoulders; summits

Flooding: Frequency None

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV 746 Range 446 to 2,466

Annual Air Temperature (°C): -3.9 -10.7 to -2.4

Frost Free Days: 60 50 to 70

Soil Features

Parent Materials: gravelly cryoturbate derived from schist
mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist

Rooting Depth (cm): RV: 34 Range: 12 to 58

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
17 to 21	peat; moderately decomposed plant material	moderately rapid	.34	6.1 to 6.7		80
4 to 7	silt loam; very gravelly silt loam	moderately rapid	.14	6.1 to 6.9		12 to 16
6 to 13	very gravelly loam; very channery silt loam	moderately rapid	.12	5.8 to 6.7		6

Restrictive Features: bedrock (paralithic) at 130 to 150 cm or more
permafrost at 51 to 130 cm
strongly contrasting textural stratification at 28 cm in some components

Water Table (May to September): 0 to 40 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Sedge/dwarf willow-white mountain avens wet meadow	Climax plant community

Ecological Status-Transition Description:

A single plant community with sedge/dwarf willow-white mountain avens wet meadow is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sedge/dwarf willow-white mountain avens wet meadow	203	25	47	87	16

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sedge/dwarf willow-white mountain avens wet meadow	CAWI3	Carex williamsii
	CLTU	Claytonia tuberosa
	DEBR2	Deschampsia brevifolia
	FEBR2	Festuca brevissima
	KOSI	Kobresia sibirica
	OXME2	Oxytropis mertensiana

Characteristics of Sedge/dwarf willow-white mountain avens wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 24. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SM	SAPU15	Salix pulchra	0.1	9	20	42	19
SD-SL	VAUL	Vaccinium uliginosum	0.1	6	30	62	19
SD	SARE2	Salix reticulata	0.1	15	45	83	35
SD	DROC	Dryas octopetala	0.1	14	60	83	34
SD	SAAR4	Salix arctica	0.1	9	20	54	22
SD	SAPO	Salix polaris	0.1	14	45	33	21
GM	CABI5	Carex bigelowii	15.0	43	65	42	42
GM	CAMI4	Carex microchaeta	0.1	35	65	33	34
GM	CAREX	Carex	0.1	28	60	33	30
FD-FM	EQAR	Equisetum arvense	0.1	8	30	38	17
L	LICHEN	total lichens	0.0	7	45	100	26
L1	CLMI61	Cladina mitis group	0.1	6	20	25	12
M	MOSS	total bryophytes-mosses and liverworts	0.0	53	95	100	73
M1	ZZMOSS	unknown-mosses	0.1	29	90	62	42
M1	HYSP70	Hylocomium splendens	0.1	17	35	29	22
M1	RHRU70	Rhytidium rugosum	20.0	26	45	17	21
M1	THRE7	Thuidium recognitum	1.0	16	35	25	20
M1	DICRA8	Dicranum	2.0	6	15	25	12
M1	TONI70	Tomentypnum nitens	5.0	8	10	17	12
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	2.0	20	85	100	45

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	SOIL	mineral-bare soil	0.0	1	10	100	10
B	ROCK	mineral-surface rock fragments	0.0	1	15	100	10
B	WATER	water	0.0	1	5	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	1.0	1.0	m	1
Medium shrubs	SM	1.4	1.4	1.4	m	1
Low shrubs	SL	20.0	50.0	100.0	cm	11
Dwarf shrubs	SD	1.0	9.5	20.0	cm	46
Tall and medium grasses and grass-like	GT, GM	10.0	26.2	80.0	cm	17
Tall and medium forbs	FT, FM	10.0	18.7	30.0	cm	21
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	7.7	15.0	cm	92

Map Unit Components**Common Name (Soils Name):**

Alpine-sedge-dwarf scrub gravelly schist lobes and stripes, frozen (Typic Aquiturbels, loamy-skeletal)

Alpine-sedge-dwarf scrub gravelly schist slopes, frozen (Typic Historthels, loamy-skeletal)

Alpine-sedge-dwarf scrub gravelly swales, frozen (Typic Historthels, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

5P1	Alpine Schist Mountain Summits with Discontinuous Permafrost (Ruptic Histic Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Typic Aquiturbels, loamy-skeletal Association, 0 to 25 percent slopes)
7MFA	Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost (Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal Association, 0 to 36 percent slopes)
8MBS	Alpine Schist Mountains with Discontinuous Permafrost (Typic Dystrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 14 to 50 percent slopes)
8MS	Alpine Schist Mountain Ridges with Discontinuous Permafrost (Typic Dystrogelepts, loamy-skeletal-Rock Outcrop-Typic Aquiturbels, loamy-skeletal Association, 8 to 45 percent slopes)

Geographically Associated Landtypes**M135A_180—Gravelly Frozen Slopes:**

This site occurs at lower elevation. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site occurs on adjacent lower mountain ridges with moderately deep to deep well drained soils. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

M135A_405—Swales:

This site occurs on moderately deep to very deep, seasonally wet soils in swales. The climax plant community is "Green alder scrub mosaic."

Gravelly High Flood Plains, High Elevation (M135A_185)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Physiographic Features

Elevation (meters): RV Range
642 493 to 852

Slope Gradient (percent): 1 0 to 2

Aspect (clockwise direction): non-influencing

Landform: flood plains

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Rare		May	Sep

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV Range
589 344 to 923

Annual Air Temperature (°C): -3.1 -6.0 to -2.1

Frost Free Days: 70 60 to 80

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 27 Range: 10 to 46

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
9	moderately decomposed plant material	moderately rapid	.34	5.4	30	
4	stratified sand to silt	moderate	.15	5.9		16
14	extremely cobbly loamy coarse	rapid	.06	6.4		2

Restrictive Features: strongly contrasting textural stratification at 13 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
White spruce/willow forest	Climax plant community

Ecological Status-Transition Description:

A single plant community with white spruce/willow forest is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce/willow forest	68	27	33	44	3

Characteristics of White spruce/willow forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 12. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	<i>Picea glauca</i>	5.0	24	45	75	42
TM	PIGL	<i>Picea glauca</i>	5.0	11	20	33	19
TR	PIGL	<i>Picea glauca</i>	0.1	6	20	75	21
SM-ST	SAAL	<i>Salix alaxensis</i>	2.0	6	10	33	14
SL-SM	BEGL	<i>Betula glandulosa</i>	10.0	24	40	50	35
SL-SM	SAPU15	<i>Salix pulchra</i>	3.0	11	20	67	27
SM	SAGL	<i>Salix glauca</i>	5.0	10	15	25	16
SM	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	0.1	5	10	17	9
SD-SL	VAUL	<i>Vaccinium uliginosum</i>	5.0	21	30	92	44
SD-SL	SALIX	<i>Salix</i>	10.0	20	30	25	22
SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	0.1	7	15	33	15
SL	SHCA	<i>Shepherdia canadensis</i>	0.1	6	20	33	14
SD	EMNI	<i>Empetrum nigrum</i>	2.0	16	50	92	38
SD	SARE2	<i>Salix reticulata</i>	0.1	8	30	67	23
SD	VAVIM99	<i>Vaccinium vitis-idaea</i> spp. <i>Minus</i>	0.1	6	25	83	22
SD	ARRU6	<i>Arctous rubra</i>	0.1	5	20	83	20
SD	DRIN4	<i>Dryas integrifolia</i>	0.1	13	25	17	15
L	LICHEN	total lichens	0.0	1	5	100	10
M	MOSS	total bryophytes-mosses and liverworts	20.0	78	90	100	88
M1	HYSP70	<i>Hylocomium splendens</i>	25.0	60	85	50	55
M1	PLSC70	<i>Pleurozium schreberi</i>	20.0	38	55	17	25
M1	ZZMOSS	unknown-mosses	0.1	8	15	33	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	10	30	100	32
B	LITTER2	litter-woody debris >2.5 cm	0.0	3	15	100	17
B	SOIL	mineral-bare soil	0.0	2	20	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	12.8	27.0	m	15
Tree regeneration	TR	1.0	2.3	3.8	m	8
Tall shrubs	ST	5.5	5.5	5.5	m	1
Medium shrubs	SM	1.0	1.8	3.0	m	18
Low shrubs	SL	10.0	42.9	100.0	cm	24
Dwarf shrubs	SD	5.0	10.2	20.0	cm	26
Tall and medium grasses and grass-likes	GT, GM	20.0	30.0	50.0	cm	4
Tall and medium forbs	FT, FM	10.0	22.0	30.0	cm	20
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	8.5	10.0	cm	28

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	115	20.1	9.8	Min.	14	B
	147	30.6	13.4	Avg		
	275	42.4	17.4	Max.		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
-----	m ² / ha	-----	of Stands
9.2	16.5	25.3	3

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested gravelly high flood plains (Typic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7FP11 Boreal Diorite Flood Plains
(Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)

Geographically Associated Landtypes**M135A_153—Loamy Wet Flood Plains:**

This site occurs on lower positions with higher flooding frequency and have soils that have surface loamy mantles. The climax plant community is "Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub."

M135A_250—Gravelly Low Flood Plains, Acid:

This site occurs on lower positions with higher flooding frequency and wetter soils. The climax plant community is "Feltleaf willow-green alder scrub."

M135A_350—Gravelly and Sandy Slopes:

This site occurs on excessively drained soils. The climax plant community is "White spruce/shrub birch woodland."

Similar Landtypes**M135A_156—Loamy Wet High Flood Plains:**

This site has soils with a thick loamy surface mantle. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

M135A_354—Loamy Slopes, Wet:

This site occurs in uplands and is not flooded. The climax plant community is "White spruce/willow woodland, wet."

Gravelly Low Flood Plains, Wet (M135A_203)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Physiographic Features

Elevation (meters): RV Range
637 333 to 960

Slope Gradient (percent): 0 0 to 2

Aspect (clockwise direction): non-influencing

Landform: flood plains

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Frequent	Long	May	Sep

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV Range
589 344 to 923

Annual Air Temperature (°C): -3.1 -6.0 to -2.1

Frost Free Days: 70 60 to 80

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 23 Range: 9 to 38

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2	slightly decomposed plant material	moderately rapid	.34	6.9		80
7	stratified sand to silt	moderate	.17	7.6		20
14	extremely gravelly coarse sand	rapid	.06	7.6		2

Restrictive Features: strongly contrasting textural stratification at 9 cm

Water Table (May to September): 0 to 70 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Entire mountain avens/sedge wet dwarf scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with entire mountain avens/sedge wet dwarf scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Entire mountain avens/sedge wet dwarf scrub	95	27	38	52	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Entire mountain avens/sedge wet dwarf scrub	ARLO	Arenaria longipedunculata
	ASSE13	Astragalus sealei
	CASTS	Calamagrostis stricta ssp. stricta

Characteristics of Entire mountain avens/sedge wet dwarf scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	PEFL15	Pentaphylloides floribunda	2.0	7	20	67	22
SD-SL	VAUL	Vaccinium uliginosum	0.1	7	15	67	22
SL	SANI10	Salix niphoclada	10.0	10	10	17	13
SL	SHCA	Shepherdia canadensis	5.0	5	5	17	9
SD	DRIN4	Dryas integrifolia	0.1	23	45	100	48
SD	ANPO	Andromeda polifolia	0.1	15	30	67	32
SD	SARE2	Salix reticulata	0.1	7	20	100	26
GM	CAMI6	Carex microglochis	0.1	22	50	50	33
GM	CAREX	Carex	0.1	28	55	33	30
GM	KOSI2	Kobresia simpliciuscula	0.1	12	30	67	28
GM	CAGY2	Carex gynocrates	0.1	5	15	50	16
GM	CAAQ	Carex aquatilis	1.0	6	10	33	14
GM	CADI6	Carex disperma	5.0	5	5	17	9
FD-FM	EQVA	Equisetum variegatum	0.1	6	10	83	22
FD-FM	ASSE13	Astragalus sealei	0.1	5	10	33	13
FD	RUAR	Rubus arcticus	5.0	5	5	17	9
L	LICHEN	total lichens	0.0	1	5	100	10
M	MOSS	total bryophytes-mosses and liverworts	20.0	53	95	100	73
M1	ZZMOSS	unknown-mosses	35.0	48	60	50	49
M1	RACA11	Racomitrium canescens	5.0	5	5	17	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	32	65	100	57
B	ROCK	mineral-surface rock fragments	0.0	8	30	100	28
B	SOIL	mineral-bare soil	0.0	4	10	100	20
B	WATER	water	0.0	2	6	100	14
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.5	4.5	4.5	m	1
Tree regeneration	TR	2.0	2.0	2.0	m	1
Medium shrubs	SM	1.3	1.9	2.5	m	3
Low shrubs	SL	20.0	57.5	100.0	cm	4
Dwarf shrubs	SD	2.0	7.1	10.0	cm	7
Tall and medium grasses and grass-likes	GT, GM	10.0	20.0	30.0	cm	3
Tall and medium forbs	FT, FM	15.0	23.8	40.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	6.9	10.0	cm	12

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian scrub gravelly flood plains, wet (Typic Cryaquents, sandy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

- 11FP Boreal Flood Plains, High Elevation
(Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 0 to 3 percent slopes)
- 7FP1 Boreal Flood Plains and Terraces
(Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)

Geographically Associated Landtypes

M135A_100—Loamy Flood Plains:

This site occurs on slightly higher positions with well drained soils. The climax plant community is "Poplar-feltleaf willow scrub."

M135A_156—Loamy Wet High Flood Plains:

This site occurs on slightly drier soils with thick loamy surface mantles. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes

M135A_153—Loamy Wet Flood Plains:

This site occurs on drier soils with thick loam surface mantles. The climax plant community is "Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub."

Gravelly Flood Plains (M135A_204)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)
Boreal Mountains (M135A.M2L)

Physiographic Features

Elevation (meters):	RV 510	Range 333 to 960
Slope Gradient (percent):	1	0 to 2
Aspect (clockwise direction):	non-influencing	
Landform:	channels on flood plains; flood plains; flood plains on alluvial fans on mountains	
Landform Positions:	backslopes	
Flooding:	Frequency Frequent	Duration Long
Ponding:	Beginning Month May	Ending Month Sep
	None	

Climatic Features

Annual Precipitation (millimeters):	RV 589	Range 344 to 923
Annual Air Temperature (°C):	-3.1	-6.0 to -2.1
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 28 Range: 9 to 68

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 8	slightly decomposed plant material	moderately rapid	.34	5.2 to 7.2	30	80
8 to 20	stratified sand to silt; stratified fine sand to silt	moderate	.08 to .17	5.8 to 7.8		6 to 20
16 to 18	extremely cobbly coarse sand	rapid	.06	7.6 to 8.3		2

Restrictive Features: strongly contrasting textural stratification at 10 to 12 cm in some components

Water Table (May to September): 50 to 70 cm

Drainage Class: excessively drained to somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
White spruce-poplar/soapberry forest	Climax plant community
Beaver dam water horsetail-beaked sedge wet meadow	Beaver impacted site and vegetation
Forb meadow	Mid stage of primary succession on flood plains
Poplar/soapberry woodland	Late stage of primary succession on flood plains

Ecological Status-Transition Description:

Four plant communities are identified on this flood prone site including a potential community with white spruce-poplar/soapberry forest, late-seral community with poplar/soapberry woodland, and mid-seral community with forb meadow on successively lower and more flood prone positions. A community associated with beaver activity with water horsetail-beaked sedge wet meadow, beaver dam in which the site conditions have been significantly altered and are now wetter due to beaver dam construction. Flooding and beaver activity are considered transitional pathways between community types.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce-poplar/soapberry forest	93	27	34	46	5
Beaver dam water horsetail-beaked sedge wet meadow	46	46	46	46	1
Forb meadow	42	42	42	42	1
Poplar/soapberry woodland	86	22	34	51	3

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
White spruce-poplar/soapberry forest	ASRO	Astragalus robbinsii
	ASSE13	Astragalus sealei
	CASTS	Calamagrostis stricta ssp. stricta
	CAEB2	Carex eburnea
	ELCO	Elaeagnus commutata
	ERGLP	Erigeron glabellus ssp. pubescens
Beaver dam water horsetail-beaked sedge wet meadow	BOMI	Botrychium minganense
	CAEB2	Carex eburnea
	GOREO2	Goodyera repens var. ophioides
Forb meadow	ASRO	Astragalus robbinsii
	ELCO	Elaeagnus commutata
Poplar/soapberry woodland	ELCO	Elaeagnus commutata

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
-----	m ² / ha	-----	of Stands
20.7	20.7	20.7	2

Characteristics of Beaver dam water horsetail-beaked sedge wet meadow

Ecological Status: Beaver impacted site and vegetation

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	25.0	25	25	100	50
TR	POBA2	Populus balsamifera	5.0	5	5	100	22
ST	ALTE2	Alnus tenuifolia	45.0	45	45	100	67
SM	VIED	Viburnum edule	35.0	35	35	100	59
SM	ROAC	Rosa acicularis	15.0	15	15	100	39
SD	LIBO3	Linnaea borealis	15.0	15	15	100	39
GT	CACA4	Calamagrostis canadensis	25.0	25	25	100	50
GT	ARLA2	Arctagrostis latifolia	5.0	5	5	100	22
GM	CACO10	Carex concinna	6.0	6	6	100	24
FT	EPAN2	Epilobium angustifolium	15.0	15	15	100	39
FT	MEPA	Mertensia paniculata	5.0	5	5	100	22
FD	LYAN2	Lycopodium annotinum	15.0	15	15	100	39
FD	PYAS	Pyrola asarifolia	15.0	15	15	100	39
FD	COCA13	Cornus canadensis	10.0	10	10	100	32
FD	GELI2	Geocaulon lividum	5.0	5	5	100	22
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	20.0	20	20	100	45
M1	ZZMOSS	unknown-mosses	10.0	10	10	100	32
M1	HYSP70	Hylocomium splendens	5.0	5	5	100	22
M1	PLSC70	Pleurozium schreberi	5.0	5	5	100	22
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	70.0	70	70	100	84
B	LITTER2	litter-woody debris >2.5 cm	30.0	30	30	100	55
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	17.0	17.0	17.0	m	2
Tree regeneration	TR	2.5	2.8	3.0	m	2
Tall shrubs	ST	4.0	4.0	4.0	m	1
Medium shrubs	SM	1.3	1.3	1.3	m	1
Dwarf shrubs	SD	1.0	1.0	1.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	10.0	65.0	120.0	cm	2
Tall and medium forbs	FT, FM	90.0	90.0	90.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.7	8.0	cm	3

Characteristics of Forb meadow

Ecological Status: Mid stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	SAGL	Salix glauca	0.1	7	15	60	20
SM	SAAL	Salix alaxensis	5.0	5	5	40	14
SM	SALIX	Salix	5.0	5	5	20	10
SL	SHCA	Shepherdia canadensis	0.1	12	30	60	27
SL	ELCO	Elaeagnus commutata	10.0	10	10	20	14
SD	DRDR	Dryas drummondii	0.1	5	10	40	14
SD	ARUV	Arctostaphylos uva-ursi	5.0	5	5	20	10
GM	ZZGRASS	unknown-grasses	0.1	5	10	40	14
GM	ZZGRAM	unknown-graminoids	5.0	5	5	20	10
FM	EPLA	Epilobium latifolium	2.0	14	30	60	29
FM	ARTI	Artemisia tilesii	0.1	8	15	40	18
FM	HEAL	Hedysarum alpinum	5.0	8	10	40	18
FM	OXCA4	Oxytropis campestris	5.0	8	10	40	18
FM	EQVA	Equisetum variegatum	5.0	5	5	20	10
FM	HEMA	Hedysarum mackenziei	5.0	5	5	20	10
L	LICHEN	total lichens	0.0	8	40	100	28
L1	STERE2	Stereocaulon	40.0	40	40	20	28
M	MOSS	total bryophytes-mosses and liverworts	0.0	4	20	100	20
B	ROCK	mineral-surface rock fragments	10.0	49	80	100	70
B	SOIL	mineral-bare soil	5.0	22	40	100	47
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	7	15	100	26
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	10	100	14
B	WATER	water	0.0	1	5	100	10

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	1.2	1.5	m	3
Tree regeneration	TR	1.3	1.3	1.3	m	1
Medium shrubs	SM	1.2	2.3	3.0	m	6
Low shrubs	SL	60.0	83.3	100.0	cm	6
Dwarf shrubs	SD	10.0	10.0	10.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	30.0	30.0	30.0	cm	1
Tall and medium forbs	FT, FM	20.0	28.0	30.0	cm	10
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	0.5	0.5	cm	1

Characteristics of Poplar/soapberry woodland

Ecological Status: Late stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	POBA2	Populus balsamifera	15.0	15	15	17	16
TM	POBA2	Populus balsamifera	20.0	20	20	17	18
TR	POBA2	Populus balsamifera	0.1	15	40	83	35
SM-ST	SAAL	Salix alaxensis	5.0	8	15	67	23
SL-SM	SHCA	Shepherdia canadensis	3.0	22	60	100	47
SM	SAGL	Salix glauca	20.0	20	20	17	18
SM	SABA3	Salix barclayi	15.0	15	15	17	16
SM	SARI4	Salix richardsonii	15.0	15	15	17	16
SM	ELCO	Elaeagnus commutata	7.0	7	7	17	11
SM	SANI10	Salix niphoclada	5.0	5	5	17	9
SL	SAPU15	Salix pulchra	6.0	8	10	33	16

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	VIED	Viburnum edule	10.0	10	10	17	13
SL	PEFL15	Pentaphylloides floribunda	5.0	5	5	17	9
SL	SABA4	Salix barrattiana	5.0	5	5	17	9
SD	DRDR	Dryas drummondii	0.1	30	60	33	31
SD	DRIN4	Dryas integrifolia	5.0	5	5	17	9
SD	LIBO3	Linnaea borealis	5.0	5	5	17	9
SD	SARE2	Salix reticulata	5.0	5	5	17	9
GT	FEAL	Festuca altaica	15.0	15	15	17	16
GT	CACA4	Calamagrostis canadensis	10.0	10	10	17	13
GM	ZZGRAM	unknown-graminoids	10.0	12	15	33	20
GM	ZZGRASS	unknown-grasses	5.0	5	5	17	9
FT	EPAN2	Epilobium angustifolium	5.0	5	5	17	9
FD-FM	OXCA4	Oxytropis campestris	0.1	5	15	67	18
FM	MEPA	Mertensia paniculata	7.0	7	7	17	11
FM	GABO2	Galium boreale	5.0	5	5	17	9
FM	GEER2	Geranium erianthum	5.0	5	5	17	9
FM	HEDYS	Hedysarum	5.0	5	5	17	9
FM	SAST11	Sanguisorba stipulata	5.0	5	5	17	9
FD	PYAS	Pyrola asarifolia	40.0	40	40	17	26
FD	EQAR	Equisetum arvense	5.0	5	5	17	9
L	LICHEN	total lichens	0.0	7	15	100	26
L1	STERE2	Stereocaulon	10.0	10	10	33	18
L1	ZZLICHEN	unknown-foliose and fruticose lichens	5.0	5	5	17	9
M	MOSS	total bryophytes-mosses and liverworts	5.0	22	50	100	47
M1	RACOM	Racomitrium	15.0	15	15	17	16
M1	PTCR70	Ptilium crista-castrensis	10.0	10	10	17	13
M1	THRE7	Thuidium recognitum	10.0	10	10	17	13
M1	ZZMOSS	unknown-mosses	5.0	5	5	17	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	49	80	100	70
B	ROCK	mineral-surface rock fragments	0.0	18	75	100	42
B	LITTER2	litter-woody debris >2.5 cm	0.0	3	5	100	17
B	SOIL	mineral-bare soil	0.0	2	5	100	14
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	9.3	18.0	m	3
Tree regeneration	TR	0.3	1.6	3.5	m	7
Medium shrubs	SM	1.5	1.6	2.0	m	5
Low shrubs	SL	100.0	102.0	110.0	cm	5
Dwarf shrubs	SD	8.0	11.5	15.0	cm	2
Tall and medium forbs	FT, FM	20.0	44.0	100.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	7.8	15.0	cm	13

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian forested gravelly fans (Typic Cryorthents, loamy-skeletal)

Boreal-riparian scrub gravelly flood plains (Typic Cryorthents, sandy-skeletal)

Boreal-riparian scrub gravelly flood plains, moderately wet (Oxyaquic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

10V2	Boreal Terraces and Plateau Toeslopes with Continuous Permafrost (Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association, 0 to 2 percent slopes)
11FP	Boreal Flood Plains, High Elevation (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 0 to 3 percent slopes)
7FP1	Boreal Flood Plains and Terraces (Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)

Geographically Associated Landtypes

M135A_156—Loamy Wet High Flood Plains:

This site occurs on higher positions with less frequent flooding and have wetter soils with a thick loamy surface mantle. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

M135A_203—Gravelly Low Flood Plains, Wet:

This site occurs on wetter soils. The climax plant community is "Entire mountain avens/sedge wet dwarf scrub."

Riverwash—Alluvium, Nonvegetated:

This site occurs on barren alluvium. The climax plant community is "Sparsely vegetated alluvium."

Similar Landtypes

M135A_100—Loamy Flood Plains:

This site occurs on well drained soils with loam surface mantles. The climax plant community is "Poplar-feltleaf willow scrub."

M135A_405—Swales:

This site occurs in upland swales and is not flooded. The climax plant community is "Green alder scrub mosaic."

Gravelly Low Flood Plains, Acid (M135A_250)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Physiographic Features

	<i>RV</i>	<i>Range</i>		
Elevation (meters):	572	280 to 989		
Slope Gradient (percent):	2	0 to 3		
Aspect (clockwise direction):	non-influencing			
Landform:	channels on flood plains; flood plains on alluvial fans on mountains			

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Frequent	Long	May	Sep
Ponding:	None			

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	589	344 to 923
Annual Air Temperature (°C):	-3.1	-6.0 to -2.1
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium derived from diorite
sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 29 Range: 11 to 53

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
1	slightly decomposed plant material	moderately rapid	.34	5.9		80
10 to 12	stratified sand to silt; stratified very fine sand to silt	moderate	.17 to .20	5.6 to 7.1		12
17 to 18	extremely cobbly coarse sand; extremely cobbly sand	rapid	.06	6.0 to 7.2		2

Restrictive Features: strongly contrasting textural stratification at 11 to 12 cm

Water Table (May to September): 50 to 70 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Feltleaf willow-green alder scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with feltleaf willow-green alder scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand			Number of Stands
	Total	Min.	Avg. Max.	
Feltleaf willow-green alder scrub				0

Characteristics of Feltleaf willow-green alder scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	<i>Picea glauca</i>	5.0	5	5	25	11
TS	POBA2	<i>Populus balsamifera</i>	5.0	5	5	25	11
SM-ST	SAAL	<i>Salix alaxensis</i>	10.0	25	30	100	50
SM	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	5.0	40	85	75	55
SM	SAPS	<i>Salix pseudomonticola</i>	15.0	18	20	50	30
SM	SAPU15	<i>Salix pulchra</i>	5.0	8	10	50	20
SL-SM	SHCA	<i>Shepherdia canadensis</i>	0.1	5	10	50	16
SL	VAUL	<i>Vaccinium uliginosum</i>	0.1	8	15	100	28
SL	PEFL15	<i>Pentaphylloides floribunda</i>	5.0	10	15	75	27
SL	BEGL	<i>Betula glandulosa</i>	5.0	5	5	25	11
SD	DRIN4	<i>Dryas integrifolia</i>	30.0	30	30	25	27
SD	SARE2	<i>Salix reticulata</i>	30.0	30	30	25	27
SD	ARRU6	<i>Arctous rubra</i>	5.0	8	10	50	20
GM	CACA4	<i>Calamagrostis canadensis</i>	80.0	80	80	25	45
GM	ZZGRAM	unknown-graminoids	50.0	50	50	25	35

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GM	CAREX	Carex	5.0	18	30	50	30
GM	ZZGRASS	unknown-grasses	5.0	5	5	25	11
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	25	70	100	50
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	10	25	100	32
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	5	100	14
B	SOIL	mineral-bare soil	0.0	2	10	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	4.0	8.0	m	3
Tall shrubs	ST	3.0	3.5	4.0	m	2
Medium shrubs	SM	1.0	1.6	2.5	m	10
Low shrubs	SL	30.0	52.7	100.0	cm	11
Dwarf shrubs	SD	10.0	11.4	20.0	cm	7
Tall and medium forbs	FT, FM	20.0	21.8	30.0	cm	11
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	10.0	10.0	10.0	cm	15

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian scrub gravelly diorite flood plains, moderately wet (Oxyaquic Cryorthents, sandy-skeletal)

Boreal-riparian scrub gravelly schist flood plains, moderately wet (Oxyaquic Cryorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7FP11	Boreal Diorite Flood Plains (Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex)
8FP2	Boreal Schist Flood Plains and Terraces (Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal-Typic Haplogelods, sandy-skeletal Complex)

Geographically Associated Landtypes**M135A_151—Loamy High Flood Plains:**

This site occurs on higher flood positions. The climax plant community is "White spruce/bog blueberry/feathermoss

M135A_156—Loamy Wet High Flood Plains:

This site occurs on higher positions with less frequent flooding and have wetter soils with a thick loamy surface mantle. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

M135A_185—Gravelly High Flood Plains, High Elevation:

This site occurs on slightly higher positions with well drained soils. The climax plant community is "White spruce/willow forest."

Similar Landtypes**M135A_152—Loamy Wet Flood Plains, High Elevation:**

This site occurs on soils with thick loamy surface mantles. The climax plant community is "Diamondleaf willow/horsetail-fragile sedge scrub."

M135A_153—Loamy Wet Flood Plains:

This site has soils with a thick loamy surface mantle. The climax plant community is "Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub."

M135A_257—Gravelly Low Flood Plains, High Elevation:

This site occurs in the alpine biome at higher elevation. The climax plant community is "Feltleaf willow scrub, cool."

M135A_258—Gravelly Flood Plains, Cool:

This site has soils that are excessively drained. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

Loamy Slopes, High Elevation (M135A_253)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)

Alpine Mountains (M135A.M2)

Physiographic Features

	RV	Range
Elevation (meters):	797	620 to 1,077

Slope Gradient (percent):	4	2 to 8
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Aspect (clockwise direction): non-influencing

Landform: fan terraces on alluvial fans on mountains

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	783	497 to 1,229

Annual Air Temperature (°C):	-4.3	-8.3 to -2.5
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Frost Free Days:	60	50 to 70
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Soil Features

Parent Materials: silty eolian deposits over sandy and gravelly alluvium

Rooting Depth (cm): RV: 26 Range: 4 to 51

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
7	slightly decomposed plant material	moderately rapid	.34	4.2	30	
19	silt loam	moderate	.40	5.8	15	

Restrictive Features: strongly contrasting textural stratification at 41 cm

Water Table (May to September): 0 to 30 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type
Diamondleaf willow scrub, moist

Ecological Status
Climax plant community

Ecological Status-Transition Description:

A single plant community with diamondleaf willow scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Diamondleaf willow scrub, moist	63	14	28	42	6

Characteristics of Diamondleaf willow scrub, moist

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value
			Canopy Cover	Canopy Cover	Constancy	
			Min.	Avg.	Max.	
SL-ST	SAPU15	Salix pulchra	60.0	79	90	89
SL-SM	SPST3	Spiraea stevenii	1.0	12	20	26
GT	CACA4	Calamagrostis canadensis	0.1	23	55	48
FD	RUAR	Rubus arcticus	0.1	6	15	21
FD	ANRI	Anemone richardsonii	0.1	5	10	19
FD	COCA13	Cornus canadensis	5.0	6	7	13
L	LICHEN	total lichens	0.0	0	0	0
M	MOSS	total bryophytes-mosses and liverworts	15.0	60	80	77
M1	POCO38	Polytrichum commune	15.0	22	30	35
M1	ZZMOSS	unknown-mosses	10.0	16	30	34
M1	PLSC70	Pleurozium schreberi	7.0	15	30	33
M1	HYSP70	Hylocomium splendens	15.0	28	40	29
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	48	90	69
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	10	22
B	SOIL	mineral-bare soil	0.0	0	0	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	0
B	WATER	water	0.0	0	0	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall shrubs	ST	4.0	4.0	4.0	m	2
Medium shrubs	SM	1.0	1.4	1.8	m	6
Low shrubs	SL	20.0	54.0	100.0	cm	5
Dwarf shrubs	SD	10.0	12.5	15.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	70.0	123.3	150.0	cm	6
Tall and medium forbs	FT, FM	20.0	42.0	80.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	6.3	10.0	cm	13

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub silty fan terraces ((Oxyaquic) Humic Eutrogelepts, coarse-silty over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7AF	Alpine Alluvial Fans ((Oxyaquic) Humic Eutrogelepts, coarse-silty over sandy-skeletal-Typic Haplogelods, sandy-skeletal Association, 2 to 8 percent slopes)
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Geographically Associated Landtypes

M135A_150—Loamy Flood Plains, High Elevation:

This site occurs on slightly higher positions with well drained soils. The climax plant community is "Riparian low diamondleaf willow-feltleaf willow scrub."

M135A_257—Gravelly Low Flood Plains, High Elevation:

This site occurs on gravelly surface texture soils. The climax plant community is "Feltleaf willow scrub, cool."

M135A_258—Gravelly Flood Plains, Cool:

This site occurs on flood plains with excessively drained soils and gravelly surface textures. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs on higher terrace positions with somewhat excessively drained and flooded soils that have a thin loamy surface layer over sand and gravel. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

Similar Landtypes

M135A_420—Swales, High Elevation:

This site occurs in upland swales and has wetter soils. The climax plant community is "Diamondleaf willow-mixed willow scrub mosaic."

M135A_502—Loamy Drainages, Frozen:

This site has wetter soils. The climax plant community is "Diamondleaf willow-green alder-leatherleaf scrub."

M135A_505—Loamy Drainages, High Elevation:

This site has wetter soils in drainages. The climax plant community is "Diamondleaf willow-green alder scrub."

Gravelly Low Flood Plains, High Elevation (M135A_257)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Alpine Flood Plains & Terraces & Fans (M135A.V1)

Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Physiographic Features

Elevation (meters):	RV 872	Range 609 to 1,298		
Slope Gradient (percent):	1	0 to 3		
Aspect (clockwise direction):	west to east			
Landform:	channels on flood plains			
	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Frequent	Long	May	Aug
Ponding:	None			

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	783	497 to 1,229
Annual Air Temperature (°C):	-4.3	-8.3 to -2.5
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
 sandy and silty alluvium over sandy and gravelly alluvium derived from diorite
 sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 31 Range: 7 to 72

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
1	moderately decomposed plant material	moderately rapid	.34	6.7		80
10 to 12	stratified sand to silt; stratified highly decomposed plant material to sand to silt	moderate	.17 to .20	6.0 to 7.6		12 to 20
19 to 20	extremely cobbly loamy sand; extremely gravelly coarse sand; extremely cobbly loamy coarse sand; extremely gravelly coarse sand	rapid	.06	6.0 to 7.6		2

Restrictive Features: strongly contrasting textural stratification at 11 to 12 cm

Water Table (May to September): 50 to 120 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Feltleaf willow scrub, cool

Dry herbaceous meadow, cool

Ecological Status

Climax plant community

Mid stage of primary succession on flood plains

Ecological Status-Transition Description:

Two plant communities are identified within this flood prone site including a potential community of feltleaf willow scrub, cool and a mid-seral community of dry herbaceous meadow, cool on slightly lower positions. Flooding is considered a transitional pathway between seral communities within this site as well as between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Feltleaf willow scrub, cool	109	38	47	55	5
Dry herbaceous meadow, cool	22	22	22	22	1

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type

Feltleaf willow scrub, cool

Symbol

BOMI

CALA13

Scientific Name

Botrychium minganense

Carex laevisulmis

Characteristics of Feltleaf willow scrub, cool

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 16. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	SAAL	Salix alaxensis	0.1	30	80	100	55
SL-SM	SAPU15	Salix pulchra	2.0	23	60	75	42
SL-SM	PEFL15	Pentaphylloides floribunda	0.1	6	30	94	24
SL-SM	SHCA	Shepherdia canadensis	0.1	10	30	56	24
SL-SM	B EGL	Betula glandulosa	0.1	6	20	50	17
SM	SARI4	Salix richardsonii	0.1	6	15	25	12
SD-SL	VAUL	Vaccinium uliginosum	0.1	7	15	50	19
SD	SARE2	Salix reticulata	0.1	9	40	56	22
SD	EMNI	Empetrum nigrum	0.1	6	30	50	17
GM-GT	CACA4	Calamagrostis canadensis	0.1	21	60	56	34
GM	ZZGRAM	unknown-graminoids	5.0	10	15	19	14
GM	CAREX	Carex	0.1	8	25	19	12
FD-FM	EPLA	Epilobium latifolium	0.1	7	20	75	23
FD-FM	COCA13	Cornus canadensis	0.1	11	40	25	17
FD-FM	ARAR9	Artemisia arctica	0.1	5	10	19	10
FD-FM	ZZFORB	unknown-forbs	0.1	5	15	19	10
L	LICHEN	total lichens	0.0	2	15	100	14
M	MOSS	total bryophytes-mosses and liverworts	3.0	32	70	100	57
M1	ZZMOSS	unknown-mosses	5.0	11	25	38	20
M1	PLSC70	Pleurozium schreberi	0.1	17	30	19	18
M1	RACA11	Racomitrium canescens	5.0	17	30	19	18
M1	HYSP70	Hylocomium splendens	0.1	10	25	25	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	1.0	31	70	100	56
B	ROCK	mineral-surface rock fragments	0.0	11	50	100	33
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	10	100	20
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	WATER	water	0.0	1	5	100	10

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	1.7	2.0	m	3
Tree regeneration	TR	1.0	2.0	3.0	m	5
Tall shrubs	ST	3.0	3.6	5.0	m	6
Medium shrubs	SM	1.0	1.8	2.5	m	20
Low shrubs	SL	20.0	77.5	100.0	cm	20
Dwarf shrubs	SD	2.0	13.4	20.0	cm	8
Tall and medium grasses and grass-like	GT, GM	40.0	46.7	50.0	cm	3
Tall and medium forbs	FT, FM	10.0	24.4	70.0	cm	32
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	8.4	10.0	cm	25

Characteristics of Dry herbaceous meadow, cool

Ecological Status: Mid stage of primary succession on flood plains

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
GT	CACA4	Calamagrostis canadensis	15.0	15	15	100	39
GM	FERU2	Festuca rubra	15.0	15	15	100	39
FM	EPLA	Epilobium latifolium	20.0	20	20	100	45
FD	ANRI	Anemone richardsonii	5.0	5	5	100	22
FD	EQSC	Equisetum scirpoides	5.0	5	5	100	22
L	LICHEN	total lichens	0.0	0	0	100	0

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M	MOSS	total bryophytes-mosses and liverworts	30.0	30	30	100	55
B	ROCK	mineral-surface rock fragments	50.0	50	50	100	71
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	20	20	100	45
B	WATER	water	10.0	10	10	100	32
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0
B	SOIL	mineral-bare soil	0.1	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall and medium grasses and grass-like	GT, GM	130.0	130.0	130.0	cm	1
Tall and medium forbs	FT, FM	40.0	40.0	40.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.0	2.0	cm	1

Map Unit Components**Common Name (Soils Name):**

- Alpine-riparian scrub gravelly diorite flood plains, moderately wet (Oxyaquic Gelorthents, sandy-skeletal)
- Alpine-riparian scrub gravelly flood plains, moderately wet (Oxyaquic Gelorthents, sandy-skeletal)
- Alpine-riparian scrub gravelly schist flood plains, moderately wet (Oxyaquic Gelorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 7FP2 Alpine Flood Plains
(Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Riverwash Complex)
- 7FP21 Alpine Diorite Terraces and Flood Plains
(Typic Haplogelods, sandy-skeletal-Oxyaquic Gelorthents, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Complex)
- 8FP1 Alpine Schist Flood Plains and Terraces
(Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Typic Gelaquents, coarse-loamy over sandy-skeletal Complex)

Geographically Associated Landtypes**M135A_150—Loamy Flood Plains, High Elevation:**

This site occurs on well drained flooded soils. The climax plant community is "Riparian low diamondleaf willow-feltleaf willow scrub."

M135A_258—Gravelly Flood Plains, Cool:

This site occurs on flood plains and excessively drained soils with gravelly surface textures. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs on terraces. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

Similar Landtypes**M135A_153—Loamy Wet Flood Plains:**

This site has wetter soils with a thick loamy surface mantle. The climax plant community is "Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub."

M135A_250—Gravelly Low Flood Plains, Acid:

This site occurs within the alpine biome at higher elevation. The climax plant community is "Feltleaf willow-green alder scrub."

M135A_258—Gravelly Flood Plains, Cool:

This site has soils that are excessively drained. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

Gravelly Flood Plains, Cool (M135A_258)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)

Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Physiographic Features

Elevation (meters): RV Range
950 609 to 1,569

Slope Gradient (percent): 4 0 to 15

Aspect (clockwise direction): non-influencing

Landform: flood plains; flood plains on alluvial fans on mountains

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Occasional	Long	May	Aug

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV Range
879 497 to 2,466

Annual Air Temperature (°C): -4.8 -10.7 to -2.5

Frost Free Days: 60 50 to 70

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
silty alluvium over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): RV: 45 Range: 12 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 7	slightly decomposed plant material; moderately decomposed plant material	moderately rapid	.34	5.5 to 7.2	30	80
7 to 12	stratified fine sand to silt; silt loam	moderate	.15 to .20	5.6 to 7.8		12 to 20
15 to 33	extremely cobbly coarse sand; extremely cobbly loamy coarse	rapid	.06 to .10	6.4 to 8.3		2

Restrictive Features: strongly contrasting textural stratification at 7 to 19 cm

Water Table (May to September): none

Drainage Class: excessively drained or somewhat excessively drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Feltleaf willow-mixed shrub/herbaceous scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with feltleaf willow-mixed shrub/herbaceous scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Feltleaf willow-mixed shrub/herbaceous scrub	147	16	34	54	13

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Feltleaf willow-mixed shrub/herbaceous scrub	BRGL	Braya glabella
	SASE4	Salix setchelliana

Characteristics of Feltleaf willow-mixed shrub/herbaceous scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 23. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-ST	SAAL	Salix alaxensis	1.0	28	85	100	53
SL-SM	SAPU15	Salix pulchra	10.0	26	60	43	33
SL-SM	SHCA	Shepherdia canadensis	0.1	14	45	74	32
SL-SM	SAGL	Salix glauca	0.1	19	50	48	30
SL-SM	SABA3	Salix barclayi	5.0	20	40	30	24
SL-SM	SARI4	Salix richardsonii	0.1	12	60	39	22
SD-SM	SANI10	Salix niphoclada	0.1	6	15	17	10
SD-SL	VAUL	Vaccinium uliginosum	1.0	14	40	26	19
SD	SARE2	Salix reticulata	0.1	11	40	57	25
SD	DROC	Dryas octopetala	0.1	7	30	43	17
SD	EMNI	Empetrum nigrum	0.1	5	20	39	14
SD	ARRU6	Arctous rubra	0.1	6	25	30	13
GM-GT	CACA4	Calamagrostis canadensis	3.0	26	80	39	32
GM-GT	FEAL	Festuca altaica	0.1	9	35	48	21
GM-GT	CAPO	Carex podocarpa	0.1	5	20	26	11
FM-FT	MEPA	Mertensia paniculata	0.1	7	40	52	19
FM	HEAL	Hedysarum alpinum	0.1	7	15	26	13
FD-FM	PEFR5	Petasites frigidus	0.1	8	20	17	12
FD	RUAR	Rubus arcticus	0.1	6	20	30	13
L	LICHEN	total lichens	0.0	7	40	100	26
M	MOSS	total bryophytes-mosses and liverworts	0.0	45	85	100	67
M1	ZZMOSS	unknown-mosses	0.1	36	70	52	43
M1	HYSP70	Hylocomium splendens	5.0	23	40	26	24
M1	CLDE70	Climacium dendroides	1.0	6	10	17	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	2.0	35	95	100	59
B	ROCK	mineral-surface rock fragments	0.0	7	40	100	26
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	30	100	22
B	SOIL	mineral-bare soil	0.0	5	50	100	22
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	5.5	6.0	m	2
Tall shrubs	ST	3.0	3.7	5.0	m	4
Medium shrubs	SM	1.0	1.8	3.0	m	27
Low shrubs	SL	20.0	70.0	100.0	cm	22
Dwarf shrubs	SD	2.0	8.3	20.0	cm	12
Tall and medium grasses and grass-likes	GT, GM	15.0	72.8	130.0	cm	9
Tall and medium forbs	FT, FM	10.0	31.1	70.0	cm	15
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	5.7	20.0	cm	29

Map Unit Components**Common Name (Soils Name):**

Alpine-riparian scrub gravelly flood plains (Typic Gelorthents, sandy-skeletal)

Alpine-riparian scrub gravelly flood plains, cool (Typic Gelorthents, sandy-skeletal)

Alpine-riparian scrub gravelly schist flood plains (Typic Gelorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

5V1	Alpine Schist Alluvial Fans with Discontinuous Permafrost (Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy-Typic Gelorthents, loamy- skeletal Association, 2 to 15 percent slopes)
7FP2	Alpine Flood Plains (Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Riverwash Complex)
7V11	Alpine Fans (Typic Gelorthents, sandy-skeletal-Riverwash-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes)
7V5	Alpine Fans with Discontinuous Permafrost (Typic Eutrogelepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Gelorthents, sandy-skeletal Association, 2 to 20 percent slopes)
8FP1	Alpine Schist Flood Plains and Terraces (Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Typic Gelaquents, coarse- loamy over sandy-skeletal Complex)

Geographically Associated Landtypes**M135A_150—Loamy Flood Plains, High Elevation:**

This site occurs on thick loamy surface textured soils. The climax plant community is "Riparian low diamondleaf willow-feltleaf willow scrub."

M135A_257—Gravelly Low Flood Plains, High Elevation:

This site occurs on slightly lower flood plains with somewhat poorly drained soils. The climax plant community is "Feltleaf willow scrub, cool."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs on terraces. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

Similar Landtypes**M135A_153—Loamy Wet Flood Plains:**

This site has soils with a thick loamy surface mantle. The climax plant community is "Feltleaf willow/shrubby cinquefoil/scouring rush meadow/scrub."

M135A_250—Gravelly Low Flood Plains, Acid:

This site occurs in the boreal biome at lower elevation. The climax plant community is "Feltleaf willow-green alder

M135A_257—Gravelly Low Flood Plains, High Elevation:

This site occurs in the alpine biome at higher elevation. The climax plant community is "Feltleaf willow scrub, cool."

Gravelly Mountains, Acid (M135A_303)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)

Alpine Mountains (M135A.M2)

Boreal Outer Range & Kantishna Hills (M135A.M1L)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Physiographic Features

Elevation (meters): RV Range
768 301 to 1,554

Slope Gradient (percent): 26 3 to 70

Aspect (clockwise direction): non-influencing

Landform: flood plains on alluvial fans; flood plains on alluvial fans on mountains; mountains

Landform Positions: backslopes; footslopes

	Frequency	Duration	Beginning Month	Ending Month
Flooding: None to occasional	Brief		May	Sep

Ponding: None

Climatic Features

Annual Precipitation (millimeters): RV Range
800 358 to 2,466

Annual Air Temperature (°C): -4.3 -10.7 to -2.4

Frost Free Days: 62 50 to 80

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium
sandy and silty alluvium over sandy and gravelly alluvium derived from diorite
silty eolian deposits over gravelly colluvium derived from schist
silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock

Rooting Depth (cm): RV: 35 Range: 4 to 58

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 9	slightly decomposed plant material; moderately decomposed plant material	moderately rapid	.34	3.8 to 7.2	30	80
2 to 21	silt loam	moderate or moderately rapid	.14 to .26	3.8 to 7.8	6 to 15	20
5 to 25	very channery loam; extremely gravelly coarse sand	moderate to rapid	.03 to .20	4.8 to 8.3	5 to 6	2

Restrictive Features: bedrock (paralithic) at 84 to 150 cm or more
strongly contrasting textural stratification at 11 to 30 cm

Water Table (May to September): none

Drainage Class: excessively drained to well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Green alder/red current/bluejoint scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with green alder/red current bluejoint scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Green alder/red current/bluejoint scrub	70	10	20	30	8

Characteristics of Green alder/red current/bluejoint scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 16. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	60.0	82	95	88	85
SL-SM	RITR	<i>Ribes triste</i>	0.1	10	40	75	27
SL-SM	SPST3	<i>Spiraea stevenii</i>	0.1	5	10	88	21
SD-SL	VAUL	<i>Vaccinium uliginosum</i>	0.1	16	35	31	22
GM-GT	CACA4	<i>Calamagrostis canadensis</i>	0.1	36	80	100	60
FD-FT	ARTI	<i>Artemisia tilesii</i>	0.1	5	15	25	11
FD-FM	RUAR	<i>Rubus arcticus</i>	0.1	7	35	44	18
FD	LYAN2	<i>Lycopodium annotinum</i>	0.1	8	30	44	19
FD	COCA13	<i>Cornus canadensis</i>	0.1	6	40	56	18
L	LICHEN	total lichens	0.0	1	5	100	10
M	MOSS	total bryophytes-mosses and liverworts	0.0	22	90	100	47
M1	PLSC70	<i>Pleurozium schreberi</i>	5.0	33	90	19	25
M1	ZZMOSS	unknown-mosses	2.0	14	35	38	23
M1	HYSP70	<i>Hylocomium splendens</i>	5.0	9	15	31	17
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	69	95	100	83
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	15	100	22
B	SOIL	mineral-bare soil	0.0	0	5	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	5	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	9.6	20.0	m	9
Tree regeneration	TR	1.0	1.0	1.0	m	1
Tall shrubs	ST	3.0	3.8	5.5	m	11
Medium shrubs	SM	1.0	2.2	3.0	m	11
Low shrubs	SL	30.0	62.7	100.0	cm	15
Dwarf shrubs	SD	1.0	7.9	10.0	cm	11
Tall and medium grasses and grass-like	GT, GM	100.0	125.0	150.0	cm	4
Tall and medium forbs	FT, FM	20.0	24.7	50.0	cm	19
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	7.0	10.0	cm	20

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	102	33.0	12.8	Min.	1	B
	102	33.0	12.8	Avg		
	102	33.0	12.8	Max.		

Map Unit Components**Common Name (Soils Name):**

Subalpine-riparian scrub gravelly diorite flood plains (Typic Cryorthents, sandy-skeletal)

Subalpine-riparian scrub gravelly fan terraces (Typic Cryorthents, sandy-skeletal)

Subalpine-scrub gravelly colluvial slopes (Typic Dystrocryepts, loamy-skeletal)

Subalpine-scrub gravelly schist colluvial slopes (Typic Dystrocryepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

5MS21	Boreal and Subalpine Schist Mountains with Discontinuous Permafrost (Humic Cryaquepts, loamy-skeletal-Typic Dystrocryepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 10 to 50 percent slopes)
7AF2	Alpine and Boreal Alluvial Fans (Typic Haplogelods, sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 10 to 25 percent slopes)
7SA31	Subalpine Mountains (Typic Dystrocryepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal Association, 8 to 70 percent slopes)
7V1B	Alpine and Subalpine Diorite Fans and Flood Plains with Discontinuous Permafrost (Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 3 to 15 percent slopes)
8LMV	Alpine and Subalpine Schist Mountain Valleys (Typic Dystrogelepts, loamy-skeletal Association, 8 to 60 percent slopes)

Geographically Associated Landtypes**M135A_310—Gravelly Mountains, High Elevation:**

This site occurs on ridges and higher slopes. The climax plant community is "White mountain avens-mixed ericaceous shrub dwarf alpine scrub."

M135A_355—Gravelly Mountains, Warm:

This site occurs on slightly lower slopes. The climax plant community is "White spruce/green alder forest."

M135A_405—Swales:

This site occurs on seasonally wet soils in swales. The climax plant community is "Green alder scrub mosaic."

Similar Landtypes**M135A_405—Swales:**

This site occurs in upland swales and is not flooded. The climax plant community is "Green alder scrub mosaic."

Gravelly Mountains, Moist (M135A_306)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Mountains (M135A.M2)

Physiographic Features

	RV	Range
Elevation (meters):	1,188	670 to 2,053

Slope Gradient (percent):	38	2 to 70
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Aspect (clockwise direction): non-influencing

Landform: fan terraces on alluvial fans on mountains; mountains; ridges on mountains

Landform Positions: backslopes; summits

	Frequency
Flooding:	None

Ponding:	None
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Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,024	552 to 2,466

Annual Air Temperature (°C):	-5.6	-10.7 to -2.5
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Frost Free Days:	60	50 to 70
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Soil Features

Parent Materials: gravelly colluvium derived from diorite
 gravelly colluvium derived from schist
 silty eolian deposits over gravelly colluvium
 silty eolian deposits over gravelly colluvium derived from diorite
 silty eolian deposits over gravelly colluvium derived from shale
 silty eolian deposits over gravelly till
 silty eolian deposits over sandy and gravelly alluvium

Rooting Depth (cm): RV: 39 Range: 6 to 74

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 3	moderately decomposed plant material; slightly decomposed plant material	moderately rapid	.34	4.0 to 6.0	30	80
3 to 9	silt loam	moderate to moderately rapid	.12 to .40	4.4 to 7.1	6 to 12	16 to 20
1 to 32	very gravelly sandy loam; very cobbly sandy loam	moderately rapid to rapid	.03 to .12	4.8 to 7.8	6	2 to 16

Restrictive Features: bedrock (paralithic) at 63 to 150 cm or more
 strongly contrasting textural stratification at 6 to 12 cm in some components

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Cassiope-polar willow-mountain avens dwarf alpine scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with cassiope-polar willow- mountain avens dwarf scrub is identified on this site and no transitional pathways to other communities have been identified. This site has been designated as "moist" due to snow drifting which covers the ground into early summer, shortening the effective growing season, and maintains relatively high soil moisture well into summer.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Cassiope-polar willow-mountain avens dwarf alpine scrub	181	17	31	54	36

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Cassiope-polar willow-mountain avens dwarf alpine scrub	DOAL2	Douglasia alaskana
	DOGO	Douglasia gormanii
	FEBR2	Festuca brevissima
	STAL3	Stellaria alaskana

Characteristics of Cassiope-polar willow-mountain avens dwarf alpine scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 48. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance	
			Canopy Cover	Constancy	Value		
			Min.	Avg.	Max.		
SD-SL	VAUL	Vaccinium uliginosum	0.1	7	30	54	19
SD	CATE11	Cassiope tetragona	0.1	31	70	90	53
SD	SAPO	Salix polaris	0.1	17	60	60	32
SD	DROC	Dryas octopetala	0.1	14	40	67	31
SD	EMNI	Empetrum nigrum	0.1	14	40	48	26
SD	SARE2	Salix reticulata	0.1	8	45	62	22
SD	DRAL7	Dryas alaskensis	5.0	21	35	17	19
L	LICHEN	total lichens	0.0	22	70	100	47
L1	CLMI61	Cladina mitis group	0.1	7	25	48	18
L1	LOLI60	Lobaria linita	0.1	6	45	52	18
L1	CLST60	Cladina stellaris	0.1	8	35	15	11
L2	L2ALL	total lichens-crustose and soil crust	0.1	9	25	17	12
M	MOSS	total bryophytes-mosses and liverworts	5.0	49	85	100	70
M1	ZZMOSS	unknown-mosses	0.1	25	70	75	43
M1	HYSP70	Hylocomium splendens	0.1	15	55	31	22
M1	THRE7	Thuidium recognitum	0.1	21	50	23	22
M1	PLSC70	Pleurozium schreberi	0.1	19	45	17	18
M1	DICRA8	Dicranum	0.1	6	15	38	15
M1	RACOM	Racomitrium	0.1	8	20	25	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	20	65	100	45
B	ROCK	mineral-surface rock fragments	0.0	4	40	100	20
B	SOIL	mineral-bare soil	0.0	2	25	100	14
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	5	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.3	0.3	0.3	m	1
Medium shrubs	SM	1.2	1.5	1.8	m	3
Low shrubs	SL	25.0	47.9	100.0	cm	7
Dwarf shrubs	SD	1.0	7.5	20.0	cm	59
Tall and medium grasses and grass-likes	GT, GM	4.0	27.6	70.0	cm	17
Tall and medium forbs	FT, FM	20.0	27.5	40.0	cm	8
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.4	4.2	15.0	cm	96

Map Unit Components**Common Name (Soils Name):**

- Alpine-dwarf scrub dark gravelly colluvial slopes, moist (Typic Haplogelolls, loamy-skeletal)
- Alpine-dwarf scrub gravelly colluvial slopes, moist (Typic Eutrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite colluvial slopes, moist (Typic Dystrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly fan terraces, moist (Typic Eutrogelepts, sandy-skeletal)
- Alpine-dwarf scrub gravelly schist colluvial slopes, moist (Typic Dystrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly till slopes, moist (Typic Eutrogelepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7MSA	Alpine Diorite Mountains, Interior (Typic Dystrogelepts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes)
7MSHD	Alpine Dark Sedimentary Mountains, High Elevation (Rock Outcrop-Typic Haplogelolls, loamy-skeletal Association, 25 to 150 percent slopes)
7MSHL	Alpine Mixed Lithology Mountains, High Elevation (Rock Outcrop-Typic Eutrogelepts, loamy-skeletal Association, 25 to 70 percent slopes)
7TM24	Alpine Diorite Mountains with Discontinuous Permafrost (Typic Dystrogelepts, loamy-skeletal Association, 14 to 65 percent slopes)
7TMS	Alpine Glaciated Low Mountain Summits (Typic Eutrogelepts, loamy-skeletal Association, 0 to 48 percent slopes)
7V1A	Alpine Diorite Fans (Typic Dystrogelepts, loamy-skeletal-Typic Haplogelods, sandy-skeletal Association, 0 to 6 percent slopes)

Geographically Associated Landtypes**M135A_310—Gravelly Mountains, High Elevation:**

This site occurs on colder more exposed micro-sites that have thinner accumulation of snow due to winter winds. The climax plant community is "White mountain avens-mixed ericaceous shrub dwarf alpine scrub."

M135A_420—Swales, High Elevation:

This site occurs on swales. The climax plant community is "Diamondleaf willow-mixed willow scrub mosaic."

M135A_ROC—Rock and Ice, Nonvegetated:

This site is interspersed with the others and is more prevalent at higher elevations. The climax plant community is "Sparsely vegetated mountain slopes, Interior."

Restrictive Features: bedrock (paralithic) at 72 to 150 cm or more
strongly contrasting textural stratification at 6 to 12 cm in some components

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
White mountain avens-mixed ericaceous shrub dwarf alpine scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with white mountain avens-mixed ericaceous shrub dwarf scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White mountain avens-mixed ericaceous shrub dwarf alpine scrub	271	14	34	72	71

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
White mountain avens-mixed ericaceous shrub dwarf alpine scrub	BOMI	Botrychium minganense
	CAWI3	Carex williamsii
	DOAL2	Douglasia alaskana
	DOGO	Douglasia gormanii
	DRLOL	Draba lonchocarpa var. lonchocarpa
	DRMA7	Draba macounii
	DRRU	Draba ruaxes
	DRST3	Draba stenopetala
	ERER8	Erigeron eriocephalus
	FEBA	Festuca baffinensis
	FEBR2	Festuca brevissima
	MIBI9	Minuartia biflora
	STAL3	Stellaria alaskana
	STDI4	Stellaria dicranoides

Characteristics of White mountain avens-mixed ericaceous shrub dwarf alpine scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 139. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SM	VAUL	Vaccinium uliginosum	0.1	13	60	58	27
SD	DROC	Dryas octopetala	0.1	35	80	91	56
SD	SARE2	Salix reticulata	0.1	9	50	56	22
SD	ARAL13	Arctous alpina	0.1	10	50	37	19
SD	CATE11	Cassiope tetragona	0.1	6	35	54	18
SD	SAAR4	Salix arctica	0.1	5	40	60	17
SD	EMNI	Empetrum nigrum	0.1	6	30	44	16
SD	SAPO	Salix polaris	0.1	5	25	24	11
GM-GT	FEAL	Festuca altaica	0.1	5	30	42	14
GM	CAREX	Carex	0.1	5	55	21	10
L	LICHEN	total lichens	0.0	26	85	100	51
L1	CLMI61	Cladina mitis group	0.1	11	45	30	18

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
L1	STERE2	Stereocaulon	0.1	6	40	53	18
L1	ALOC60	Alectoria ochroleuca	0.1	5	20	26	11
L1	FLNI	Flavocetraria nivalis	0.1	6	30	22	11
L1	CLADI3	Cladina	0.1	5	45	18	9
L2	L2ALL	total lichens-crustose and soil crust	0.1	11	35	17	14
L2	ZZCRUST	unknown-crustose and soil crust lichens	0.1	5	50	29	12
M	MOSS	total bryophytes-mosses and liverworts	0.0	22	90	100	47
M1	ZZMOSS	unknown-mosses	0.1	15	55	48	27
M1	RHRU70	Rhytidium rugosum	0.1	7	30	17	11
M1	RACOM	Racomitrium	0.1	6	15	16	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	19	95	100	44
B	ROCK	mineral-surface rock fragments	0.0	14	65	100	37
B	SOIL	mineral-bare soil	0.0	4	50	100	20
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	2	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.3	1.0	2.0	m	4
Tree regeneration	TR	0.3	0.3	0.3	m	1
Medium shrubs	SM	1.2	1.7	2.5	m	10
Low shrubs	SL	10.0	51.5	110.0	cm	36
Dwarf shrubs	SD	1.0	9.3	20.0	cm	309
Tall and medium grasses and grass-likes	GT, GM	4.0	26.6	90.0	cm	42
Tall and medium forbs	FT, FM	10.0	19.9	30.0	cm	34
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.1	7.0	10.0	cm	424

Map Unit Components**Common Name (Soils Name):**

- Alpine-dwarf scrub dark gravelly colluvial slopes (Typic Haplogelolls, loamy-skeletal)
- Alpine-dwarf scrub gravelly colluvial slopes (Typic Eutrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite colluvial slopes (Typic Dystrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite fans (Typic Dystrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite till hummocks and lobes (Typic Eutrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite till slopes (Typic Dystrogelepts, sandy-skeletal)
- Alpine-dwarf scrub gravelly fan terraces (Typic Eutrogelepts, sandy-skeletal)
- Alpine-dwarf scrub gravelly schist colluvial slopes (Typic Dystrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly schist steps and lobes (Typic Dystrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly till slopes (Typic Eutrogelepts, loamy-skeletal)
- Alpine-dwarf scrub gravelly till steps and lobes (Typic Eutrogelepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 5P1 Alpine Schist Mountain Summits with Discontinuous Permafrost
(Ruptic Histic Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Typic Aquiturbels, loamy-skeletal Association, 0 to 25 percent slopes)
- 5SA1 Alpine Schist Mountains
(Typic Dystrogelepts, loamy-skeletal-Rock Outcrop Association, 12 to 55 percent slopes)

- 7MFA Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal Association, 0 to 36 percent slopes)
- 7MS1D Alpine Dark Sedimentary Mountains
(Typic Haplogelolls, loamy-skeletal-Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes)
- 7MS1L Alpine Mixed Lithology Mountains
(Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes)
- 7MS31 Alpine Glaciated Mountain Summits and Benches with Discontinuous Permafrost
(Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy Association, 2 to 20 percent slopes)
- 7MSA Alpine Diorite Mountains, Interior
(Typic Dystrogelepts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes)
- 7MSC Alpine Mountain Fans
(Typic Eutrogelepts, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 15 to 70 percent slopes)
- 7MSHD Alpine Dark Sedimentary Mountains, High Elevation
(Rock Outcrop-Typic Haplogelolls, loamy-skeletal Association, 25 to 150 percent slopes)
- 7MSHL Alpine Mixed Lithology Mountains, High Elevation
(Rock Outcrop-Typic Eutrogelepts, loamy-skeletal Association, 25 to 70 percent slopes)
- 7MSHS Alpine Schist Mountains, High Elevation
(Rock Outcrop-Typic Dystrogelepts, loamy-skeletal Association, 0 to 150 percent slopes)
- 7SA1 Alpine and Subalpine Mountains
(Rock Outcrop-Typic Haplogelolls, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 25 to 85 percent slopes)
- 7TM Alpine Glaciated Low Mountains with Discontinuous Permafrost
(Typic Eutrogelepts, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Typic Historthels, loamy-skeletal Association, 2 to 42 percent slopes)
- 7TM1 Alpine Glaciated Mountains with Discontinuous Permafrost, High Elevation
(Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy Association, 2 to 50 percent slopes)
- 7TM2 Alpine Glaciated Mountains with Discontinuous Permafrost, Cool
(Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 10 to 50 percent slopes)
- 7TM21 Alpine Glaciated Low Diorite Mountains with Discontinuous Permafrost
(Typic Dystrogelepts, sandy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 8 to 40 percent slopes)
- 7TM24 Alpine Diorite Mountains with Discontinuous Permafrost
(Typic Dystrogelepts, loamy-skeletal Association, 14 to 65 percent slopes)
- 7TMS Alpine Glaciated Low Mountain Summits
(Typic Eutrogelepts, loamy-skeletal Association, 0 to 48 percent slopes)
- 7TP8 Alpine Glaciated Diorite Plains and Hills
(Typic Haplogelods, loamy-skeletal-Typic Dystrogelepts, sandy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal Association, 2 to 35 percent slopes)
- 7V1A Alpine Diorite Fans
(Typic Dystrogelepts, loamy-skeletal-Typic Haplogelods, sandy-skeletal Association, 0 to 6 percent slopes)
- 7V5 Alpine Fans with Discontinuous Permafrost
(Typic Eutrogelepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Gelorthents, sandy-skeletal Association, 2 to 20 percent slopes)
- 8LMV Alpine and Subalpine Schist Mountain Valleys
(Typic Dystrogelepts, loamy-skeletal Association, 8 to 60 percent slopes)
- 8MS Alpine Schist Mountain Ridges with Discontinuous Permafrost
(Typic Dystrogelepts, loamy-skeletal-Rock Outcrop-Typic Aquiturbels, loamy-skeletal Association, 8 to 45 percent slopes)
- 9V12 Alpine Fans and Flood Plains, High Elevation
(Typic Eutrocryepts, sandy-skeletal-Riverwash-Typic Eutrogelepts, sandy-skeletal Complex, 0 to 30 percent slopes)

Geographically Associated Landtypes

M135A_306—Gravelly Mountains, Moist:

This site occurs on moister micro-sites where snow persists later into the growing season. The climax plant community is "Cassiope-polar willow-mountain avens dwarf alpine scrub."

M135A_420—Swales, High Elevation:

This site occurs on swales. The climax plant community is "Diamondleaf willow-mixed willow scrub mosaic."

M135A_ROC—Rock and Ice, Nonvegetated:

This site is interspersed with the others and is more prevalent at higher elevations. The climax plant community is "Sparsely vegetated mountain slopes, Interior."

Gravelly and Sandy Slopes (M135A_350)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)
Alpine Flood Plains & Terraces & Fans (M135A.V1)
Boreal Mountains (M135A.M2L)
Glaciated Lowlands (M135A.G1L)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	694	446 to 1,145
Slope Gradient (percent):	6	0 to 30
Aspect (clockwise direction):	non-influencing	

Landform: fan terraces on alluvial fans; fan terraces on alluvial fans on mountains; hills; outwash plains; pitted outwash plains; till plains

Landform Positions: backslopes; shoulders; summits

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	587	344 to 923
Annual Air Temperature (°C):	-3.1	-6.0 to -2.1
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: silty eolian deposits over gravelly alluvium derived from schist
silty eolian deposits over gravelly till
silty eolian deposits over sandy and gravelly alluvium and/or sandy and gravelly outwash
silty eolian deposits over sandy and gravelly outwash

Rooting Depth (cm): *RV:* 25 *Range:* 8 to 61

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4 to 10	slightly decomposed plant material	moderately rapid	.34	3.5 to 6.1	30	
1 to 10	silt loam	moderate	.18 to .40	3.8 to 5.2	12	
1 to 15	silt loam; very gravelly loamy sand; very gravelly sandy loam; extremely gravelly loamy coarse	moderate to rapid	.03 to .40	4.0 to 5.8	2 to 12	2

Restrictive Features: strongly contrasting textural stratification at 9 to 20 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
White spruce/shrub birch woodland	Climax plant community
White spruce/lichen woodland	Climax plant community on drier microsites
Quaking aspen-white spruce woodland	Mid stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this flood prone site including a potential community with white spruce/shrub birch woodland and a community of white spruce/lichen woodland on slightly drier microsites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce/shrub birch woodland	48	19	25	31	3
White spruce/lichen woodland	25	25	25	25	1
Quaking aspen-white spruce woodland	22	22	22	22	1

Characteristics of White spruce/shrub birch woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 18. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy	Cover	Constancy		
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	5.0	17	30	50	29
TM	PIGL	Picea glauca	5.0	11	25	67	27
TM	PIMA	Picea mariana	0.1	8	20	17	12
TR	PIGL	Picea glauca	0.1	9	15	67	25
SL-SM	BEGL	Betula glandulosa	1.0	36	70	100	60
SL-SM	SAPU15	Salix pulchra	0.1	7	20	67	22
SL-SM	SAGL	Salix glauca	0.1	11	30	28	18
SD-SL	VAUL	Vaccinium uliginosum	0.1	30	70	94	53
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	10	25	83	29
SD	EMNI	Empetrum nigrum	0.1	17	40	94	40
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	2.0	10	40	100	32
GM	CAREX	Carex	0.1	5	15	39	14
GM	ZZGRASS	unknown-grasses	5.0	10	15	17	13
L	LICHEN	total lichens	3.0	17	45	100	41
L1	CLADI3	Cladina	0.1	5	10	50	16
L1	CLRA61	Cladina rangiferina group	0.1	5	10	22	10
M	MOSS	total bryophytes-mosses and liverworts	50.0	75	95	100	87
M1	PLSC70	Pleurozium schreberi	25.0	44	60	39	41

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M1	HYSP70	Hylocomium splendens	10.0	35	60	39	37
M1	ZZMOSS	unknown-mosses	0.1	6	10	33	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	9	30	100	30
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	20	100	14
B	SOIL	mineral-bare soil	0.0	0	1	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	1	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	10.8	22.0	m	25
Tree regeneration	TR	2.0	2.7	4.0	m	13
Tall shrubs	ST	4.8	4.8	4.8	m	1
Medium shrubs	SM	1.0	1.5	2.5	m	17
Low shrubs	SL	10.0	54.1	100.0	cm	32
Dwarf shrubs	SD	7.0	12.3	20.0	cm	18
Tall and medium grasses and grass-likes	GT, GM	30.0	30.0	30.0	cm	2
Tall and medium forbs	FT, FM	20.0	36.0	100.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	8.0	10.0	cm	13

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	51	20.6	10.7	8	B
	113	27.3	12.5		
	179	36.8	14.3		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
12.7	12.7	12.7	1

Characteristics of White spruce/lichen woodland

Ecological Status: Climax plant community on drier microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	Picea glauca	5.0	10	15	100	32
SL-SM	BEGL	Betula glandulosa	45.0	53	65	100	73
SD	LEPAD	Ledum palustre ssp. decumbens	20.0	20	20	33	26
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	10	15	67	26
SD	EMNI	Empetrum nigrum	15.0	15	15	33	22
SD	ARUV	Arctostaphylos uva-ursi	5.0	5	5	33	13
GM	FESTU	Festuca	0.1	18	35	67	35
GM	CACA4	Calamagrostis canadensis	5.0	5	5	33	13
GM	FEAL	Festuca altaica	5.0	5	5	33	13
L	LICHEN	total lichens	45.0	53	60	100	73
L1	CLADI3	Cladina	20.0	20	20	33	26
L1	CLRA61	Cladina rangiferina group	10.0	10	10	33	18
L1	STERE2	Stereocaulon	10.0	10	10	33	18
L1	CLADO3	Cladonia	5.0	5	5	33	13
L1	CLUN61	Cladonia uncialis group	5.0	5	5	33	13

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M	MOSS	total bryophytes-mosses and liverworts	15.0	23	35	100	48
M1	PLSC70	Pleurozium schreberi	20.0	20	20	33	26
M1	ZZMOSS	unknown-mosses	10.0	10	10	33	18
M1	POCO38	Polytrichum commune	5.0	5	5	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	28	50	100	53
B	LITTER2	litter-woody debris >2.5 cm	0.1	0	0	100	0
B	SOIL	mineral-bare soil	0.1	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.1	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	5.3	6.0	m	3
Tree regeneration	TR	0.4	1.6	3.0	m	4
Medium shrubs	SM	1.5	1.5	1.5	m	1
Low shrubs	SL	50.0	75.0	100.0	cm	2
Dwarf shrubs	SD	20.0	20.0	20.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	30.0	36.7	50.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	3.0	3.0	cm	2

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	52	21.0	8.5		
	54	21.8	9.1		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
8.1	8.1	8.1	1

Characteristics of Quaking aspen-white spruce woodland

Ecological Status: Mid stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	POTR5	Populus tremuloides	10.0	25	40	67	41
TM	PIGL	Picea glauca	10.0	10	10	33	18
TR	PIGL	Picea glauca	2.0	9	15	67	25
SM	SAPU15	Salix pulchra	5.0	5	5	33	13
SL	VAUL	Vaccinium uliginosum	10.0	20	30	67	37
SL	LEPAD	Ledum palustre ssp. decumbens	0.1	15	30	67	32
SL	BEGL	Betula glandulosa	0.1	10	20	67	26
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	25	50	100	50
SD	EMNI	Empetrum nigrum	0.1	13	25	100	36
SD	ARRU6	Arctous rubra	5.0	5	5	33	13
GT	CACA4	Calamagrostis canadensis	5.0	5	5	33	13
GM	FEAL	Festuca altaica	15.0	15	15	33	22
GM	ZZGRASS	unknown-grasses	5.0	5	5	33	13
FM	LUAR2	Lupinus arcticus	5.0	10	15	67	26
L	LICHEN	total lichens	0.1	20	55	100	45
M	MOSS	total bryophytes-mosses and liverworts	20.0	25	30	100	50

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M1	POCO38	Polytrichum commune	15.0	15	15	33	22
M1	HYSP70	Hylocomium splendens	5.0	5	5	33	13
M1	ZZMOSS	unknown-mosses	5.0	5	5	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	45.0	57	65	100	75
B	LITTER2	litter-woody debris >2.5 cm	5.0	8	10	100	28
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	10.8	17.0	m	4
Tree regeneration	TR	1.0	1.5	2.0	m	4
Low shrubs	SL	30.0	46.7	80.0	cm	3
Dwarf shrubs	SD	3.0	3.0	3.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	30.0	30.0	30.0	cm	2
Tall and medium forbs	FT, FM	30.0	30.0	30.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.0	2.0	cm	1

Map Unit Components**Common Name (Soils Name):**

- Boreal-forested gravelly outwash slopes (Typic Eutrocryepts, sandy-skeletal)
- Boreal-forested gravelly schist terraces (Typic Haplocryods, loamy-skeletal)
- Boreal-forested gravelly till slopes (Typic Haplocryods, loamy-skeletal)
- Boreal-woodland gravelly terraces (Typic Eutrocryepts, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 5V2 Boreal Schist Alluvial Fans
(Typic Haplocryods, loamy-skeletal-Typic Cryorthents, sandy-skeletal Association, 4 to 16 percent slopes)
- 7AFF Boreal Outwash Plains and Fans with Discontinuous Permafrost
(Typic Eutrocryepts, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy Association, 0 to 5 percent slopes)
- 7P2 Boreal Glaciated Plains and Hills
(Typic Eutrocryepts, sandy-skeletal-Typic Eutrocryepts, coarse-silty over sandy-skeletal Association, 0 to 30 percent slopes)
- 7P4 Boreal Glaciated Plains and Hills with Discontinuous Permafrost
(Typic Haplocryods, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 20 percent slopes)
- 7P6 Boreal Outwash Plains with Continuous Permafrost
(Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 10 percent slopes)
- 7V2 Boreal Fans and Mountain Footslopes
(Oxyaquic Eutrocryepts, coarse-loamy over sandy-skeletal-Typic Eutrocryepts, sandy-skeletal-Typic Haplogeleods, sandy-skeletal Association, 0 to 32 percent slopes)

Geographically Associated Landtypes**M135A_400—Loamy Frozen Slopes:**

This site occurs on wetter soils with permafrost at moderate depths and has thick loamy surface textures. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

M135A_550—Loamy Depressions:

This site occurs on kettle depressions. The climax plant community is "Graminoid herbaceous meadow."

Similar Landtypes**M135A_104—Loamy Frozen Terraces:**

This site has soils that are moderately deep over permafrost. The climax plant community is "Spruce/shrub birch-bog blueberry woodland."

Gravelly and Sandy Terraces, High Elevation (M135A_352)**Ecoregion Classification**

Section: Alaska Mountains (M135A)

Subsection(s): Lowland Flood Plains & Terraces & Fans (M135A.V1L)

Alpine Flood Plains & Terraces & Fans (M135A.V1)

Boreal Mountains (M135A.M2L)

Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	842	280 to 1,460

Slope Gradient (percent):	7	0 to 25
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Aspect (clockwise direction): non-influencing

Landform: fan terraces on alluvial fans; fan terraces on alluvial fans on mountains; stream terraces

Landform Positions: backslopes; shoulders; summits

	<i>Frequency</i>
Flooding:	None

Ponding:	None
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Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	793	344 to 2,466

Annual Air Temperature (°C):	-4.4	-10.7 to -2.1
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Frost Free Days:	62	50 to 80
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Soil Features

Parent Materials: silty eolian deposits over sandy and gravelly alluvium

silty eolian deposits over sandy and gravelly alluvium derived from schist

Rooting Depth (cm): *RV:* 26 *Range:* 2 to 81

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
5 to 8	slightly decomposed plant material	moderately rapid	.34	4.0	30	
2 to 12	silt loam	moderate	.18 to .19	4.0 to 4.3	12	
2 to 6	silt loam; loamy sand; extremely gravelly loamy sand; extremely gravelly coarse sand	moderate to rapid	.03 to .19	4.0 to 5.8	2 to 12	2 to 16

Restrictive Features: strongly contrasting textural stratification at 15 to 34 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Shrub birch-bog blueberry/lichen scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with shrub birch-bog blueberry/lichen scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
Shrub birch-bog blueberry/lichen scrub	64	Min. 17	Avg. 23	Max. 37	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Shrub birch-bog blueberry/lichen scrub	STLO	Stellaria longifolia

Characteristics of Shrub birch-bog blueberry/lichen scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 27. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-ST	SAAL	Salix alaxensis	0.1	7	40	22	12
SL-SM	B EGL	Betula glandulosa	0.1	50	95	100	71
SL-SM	SAPU15	Salix pulchra	0.1	8	45	74	24
SL-SM	SAGL	Salix glauca	0.1	5	20	37	14
SL-SM	SALIX	Salix	0.1	8	25	19	12
SD-SL	VAUL	Vaccinium uliginosum	0.1	17	60	93	40
SD-SL	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	10	40	89	30
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	10	40	56	24
SD	EMNI	Empetrum nigrum	0.1	17	40	78	36
SD	SARE2	Salix reticulata	4.0	6	10	19	11
GM-GT	CACA4	Calamagrostis canadensis	0.1	9	30	37	18
GM-GT	FEAL	Festuca altaica	0.1	5	20	52	16
L	LICHEN	total lichens	0.0	21	70	100	46
L1	CLADI3	Cladina	0.1	11	40	52	24
L1	STERE2	Stereocaulon	0.1	9	40	44	20
L1	FLCU	Flavocetraria cucullata	1.0	5	15	15	9
M	MOSS	total bryophytes-mosses and liverworts	0.0	56	95	100	75
M1	HYS P70	Hylocomium splendens	0.1	41	90	22	30
M1	ZZMOSS	unknown-mosses	0.1	9	25	41	19
M1	PLSC70	Pleurozium schreberi	0.1	11	30	22	16
M1	POCO38	Polytrichum commune	3.0	12	20	19	15
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	15	100	100	39
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	15	100	10
B	SOIL	mineral-bare soil	0.0	0	5	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	3	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.2	3.7	9.0	m	9
Tree regeneration	TR	0.5	2.7	4.0	m	3

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.6	2.0	m	13
Low shrubs	SL	20.0	61.0	110.0	cm	53
Dwarf shrubs	SD	2.0	9.2	20.0	cm	22
Tall and medium grasses and grass-likes	GT, GM	20.0	42.5	70.0	cm	8
Tall and medium forbs	FT, FM	10.0	25.6	100.0	cm	16
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	7.8	10.0	cm	32

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	67	20.8	8.5	3	B
	95	24.2	10.0		
	148	29.5	11.0		

Map Unit Components**Common Name (Soils Name):**

- Alpine-scrub gravelly schist terraces (Typic Haplogelods, sandy-skeletal)
- Alpine-scrub gravelly terraces (Typic Haplogelods, sandy-skeletal)
- Alpine-scrub loamy terraces (Typic Haplogelods, coarse-loamy over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

5V1	Alpine Schist Alluvial Fans with Discontinuous Permafrost (Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy-Typic Gelorthents, loamy- skeletal Association, 2 to 15 percent slopes)
7AF	Alpine Alluvial Fans ((Oxyaquic) Humic Entrogelepts, coarse-silty over sandy-skeletal-Typic Haplogelods, sandy-skeletal Association, 2 to 8 percent slopes)
7AF2	Alpine and Boreal Alluvial Fans (Typic Haplogelods, sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 10 to 25 percent slopes)
7FP21	Alpine Diorite Terraces and Flood Plains (Typic Haplogelods, sandy-skeletal-Oxyaquic Gelorthents, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Complex)
7ST	Alpine Terraces (Typic Haplogelods, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Association, 0 to 10 percent slopes)
7V1	Alpine Lower Mountain Slopes and Fans with Discontinuous Permafrost (Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Historthels, loamy-skeletal Association, 0 to 20 percent slopes)
7V11	Alpine Fans (Typic Gelorthents, sandy-skeletal-Riverwash-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes)
7V2	Boreal Fans and Mountain Footslopes (Oxyaquic Entrocryepts, coarse-loamy over sandy-skeletal-Typic Entrocryepts, sandy-skeletal-Typic Haplogelods, sandy-skeletal Association, 0 to 32 percent slopes)
8FP2	Boreal Schist Flood Plains and Terraces (Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal-Typic Haplogelods, sandy-skeletal Complex)
8ST1	Alpine Schist Terraces and Mountain Toeslopes with Discontinuous Permafrost (Typic Histoturbels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes)

Geographically Associated Landtypes

M135A_150—Loamy Flood Plains, High Elevation:

This site occurs on flooded soils with thick loamy surface textures. The climax plant community is "Riparian low diamondleaf willow-feltleaf willow scrub."

M135A_258—Gravelly Flood Plains, Cool:

This site occurs on flooded soils. The climax plant community is "Feltleaf willow-mixed shrub/herbaceous scrub."

Similar Landtypes

M135A_177—Loamy Frozen Slopes, High Elevation:

This site has soils that are moderately deep over permafrost. The climax plant community is "Shrub birch-bog blueberry/moss scrub."

M135A_180—Gravelly Frozen Slopes:

This site occurs on wetter soils with permafrost at moderate depths and has thick loamy surface textures. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site has soils that are well drained. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

M135A_358—Gravelly Slopes:

This site has soils that are well drained. The climax plant community is "Shrub birch-bog blueberry scrub."

Loamy Slopes, Wet (M135A_354)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Boreal Mountains (M135A.M2L)

Boreal Outer Range & Kantishna Hills (M135A.M1L)

Glaciated Lowlands (M135A.G1L)

Physiographic Features

	RV	Range
Elevation (meters):	742	273 to 1,152
Slope Gradient (percent):	17	3 to 45

Aspect (clockwise direction): non-influencing

Landform: fan terraces on alluvial fans on mountains; hills; mountains; valleys on mountains

Landform Positions: backslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	565	358 to 783
Annual Air Temperature (°C):	-3.4	-5.7 to -2.4
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: silty eolian deposits over gravelly colluvium derived from schist
 silty eolian deposits over gravelly till
 silty eolian deposits over sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 36 Range: 8 to 108

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3 to 9	slightly decomposed plant material	moderately rapid	.34	5.2 to 5.9	30	80
9 to 33	silt loam; mucky silt loam	moderate	.26 to .40	5.7 to 6.4		16 to 20
9 to 14	very channery silt loam; gravelly silt loam	moderate or moderately rapid	.12 to .40	6.0 to 6.4		6 to 20

Restrictive Features: bedrock (paralithic) at 103 to 150 cm or more
strongly contrasting textural stratification at 18 to 62 cm

Water Table (May to September): 0 to 75 cm

Drainage Class: somewhat poorly drained or poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
White spruce/willow woodland, wet	Climax plant community
White spruce/shrub birch-willow woodland, wet	Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire-influenced site including a potential community with white spruce/willow woodland, wet and late-seral community with white spruce/shrub-birch-willow woodland, wet. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand			Number of Stands
	Total	Min.	Avg.	
White spruce/willow woodland, wet	77	26	33	4
White spruce/shrub birch-willow woodland, wet	47	22	29	2

Characteristics of White spruce/willow woodland, wet

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 25. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value
			Canopy Cover	Constancy		
			Min.	Avg.	Max.	
TT	PIGL	Picea glauca	10.0	23	50	36
TM	PIGL	Picea glauca	3.0	13	25	26
SL-ST	SAPU15	Salix pulchra	0.1	14	40	33
SL-ST	ALVIC	Alnus viridis ssp. crispa	0.1	19	45	30
SL-ST	SALIX	Salix	5.0	35	60	26
SL-ST	SAGL	Salix glauca	0.1	11	35	22
SL-ST	SAAL	Salix alaxensis	0.1	7	20	14
SM	SARI4	Salix richardsonii	1.0	21	40	32
SL-SM	BEGL	Betula glandulosa	0.1	8	30	20
SD-SL	VAUL	Vaccinium uliginosum	0.1	20	45	44
SL	LEGR	Ledum groenlandicum	0.1	6	20	15
SD	EMNI	Empetrum nigrum	0.1	7	20	25
SD	SARE2	Salix reticulata	0.1	12	55	23
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	5	15	20
SD	ARRU6	Arctous rubra	0.1	5	15	16
GM-GT	CACA4	Calamagrostis canadensis	0.1	13	40	19
GM	CAREX	Carex	0.1	8	20	17
GM	CABI5	Carex bigelowii	0.1	12	40	14
FD-FM	EQAR	Equisetum arvense	0.1	21	70	30

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
FM	EQUIS	Equisetum	0.1	23	45	20	21
FM	EQSY	Equisetum sylvaticum	2.0	26	50	16	20
FD-FM	PEFR5	Petasites frigidus	0.1	6	25	52	18
L	LICHEN	total lichens	0.0	3	20	100	17
M	MOSS	total bryophytes-mosses and liverworts	5.0	59	90	100	77
M1	HYSPT0	Hylocomium splendens	5.0	42	80	44	43
M1	PLSC70	Pleurozium schreberi	5.0	31	60	28	29
M1	ZZMOSS	unknown-mosses	0.1	9	35	32	17
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	21	70	100	46
B	LITTER2	litter-woody debris >2.5 cm	0.0	6	55	100	24
B	SOIL	mineral-bare soil	0.0	2	30	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	10	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	4.0	11.3	45.0	m	35
Tree regeneration	TR	0.1	2.4	5.0	m	15
Tall shrubs	ST	3.0	3.2	4.0	m	12
Medium shrubs	SM	1.0	1.8	3.0	m	37
Low shrubs	SL	10.0	43.8	100.0	cm	42
Dwarf shrubs	SD	10.0	10.9	20.0	cm	34
Tall and medium grasses and grass-likes	GT, GM	30.0	86.0	160.0	cm	5
Tall and medium forbs	FT, FM	20.0	23.7	50.0	cm	35
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	8.6	10.0	cm	32

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	52	18.8	7.9	20	B
	113	27.6	11.2		
	190	41.1	16.2		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
----- m ² / ha -----			
11.5	21.9	32.2	2

Characteristics of White spruce/shrub birch-willow woodland, wet

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	5.0	11	20	71	28
TM	PIGL	Picea glauca	10.0	10	10	57	24
TR	PIGL	Picea glauca	0.1	5	10	86	21
SM-ST	ALVIC	Alnus viridis ssp. crispa	5.0	6	7	29	13
SL-SM	SAPU15	Salix pulchra	0.1	32	80	71	48
SL-SM	BEGL	Betula glandulosa	0.1	16	45	100	40
SM	SABA3	Salix barclayi	10.0	17	30	43	27
SL-SM	SAGL	Salix glauca	5.0	8	10	57	21
SL-SM	SAAL	Salix alaxensis	0.1	5	10	29	12

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	VAUL	Vaccinium uliginosum	5.0	31	60	100	56
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	6	20	57	18
SD	EMNI	Empetrum nigrum	0.1	7	30	100	26
SD	SARE2	Salix reticulata	5.0	15	25	29	21
GM-GT	CACA4	Calamagrostis canadensis	1.0	7	15	43	17
GM	ZZGRASS	unknown-grasses	5.0	27	60	43	34
FD-FM	EQAR	Equisetum arvense	0.1	33	80	43	38
L	LICHEN	total lichens	0.1	4	15	100	20
M	MOSS	total bryophytes-mosses and liverworts	10.0	55	75	100	74
M1	ZZMOSS	unknown-mosses	10.0	13	20	43	24
M1	HYSP70	Hylocomium splendens	10.0	15	20	29	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	48	90	100	69
B	LITTER2	litter-woody debris >2.5 cm	0.1	3	5	100	17
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	12.0	24.0	m	9
Tree regeneration	TR	0.8	2.6	4.8	m	6
Tall shrubs	ST	6.0	6.0	6.0	m	1
Medium shrubs	SM	1.0	1.6	2.0	m	12
Low shrubs	SL	20.0	52.3	100.0	cm	13
Tall and medium grasses and grass-likes	GT, GM	30.0	45.0	60.0	cm	2
Tall and medium forbs	FT, FM	20.0	22.5	30.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.5	3.0	cm	2

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	46	19.6	8.5	7	B
	93	25.7	11.0		
	130	32.8	14.6		
					Min.
					Avg.
					Max.

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
----- m ² / ha -----			
12.7	12.7	12.7	1

Map Unit Components**Common Name (Soils Name):**

Boreal-forested gravelly till slopes, moderately wet (Oxyaquic Eutrocryepts, coarse-loamy)

Boreal-forested loamy fan terraces (Oxyaquic Eutrocryepts, coarse-loamy)

Boreal-forested silty schist slopes, wet (Humic Cryaquepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

5MS21 Boreal and Subalpine Schist Mountains with Discontinuous Permafrost
(Humic Cryaquepts, loamy-skeletal-Typic Dystrocryepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 10 to 50 percent slopes)

- 7MS2 Boreal Glaciated Lower Mountain Slopes
(Oxyaquic Eutrocryepts, coarse-loamy-Typic Eutrocryepts, loamy-skeletal Association, 10 to 45 percent slopes)
- 7TP3 Boreal and Alpine Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 35 percent slopes)
- 7V2 Boreal Fans and Mountain Footslopes
(Oxyaquic Eutrocryepts, coarse-loamy over sandy-skeletal-Typic Eutrocryepts, sandy-skeletal-Typic Haplogelods, sandy-skeletal Association, 0 to 32 percent slopes)
- 8MVF Boreal and Subalpine Schist Mountain Valleys
(Humic Cryaquepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal-Typic Dystrocryepts, loamy-skeletal Association, 12 to 50 percent slopes)

Geographically Associated Landtypes

M135A_303—Gravelly Mountains, Acid:

This site occurs on higher slopes and adjacent ridges. The climax plant community is "Green alder/red current/bluejoint scrub."

M135A_355—Gravelly Mountains, Warm:

This site occurs on more convex positions. The climax plant community is "White spruce/green alder forest."

M135A_400—Loamy Frozen Slopes:

This site occurs on wetter soils with permafrost at moderate depths. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

Similar Landtypes

M135A_156—Loamy Wet High Flood Plains:

This site is flooded. The climax plant community is "White spruce/Richardson willow/horsetail woodland."

M135A_185—Gravelly High Flood Plains, High Elevation:

This site has soils that are very shallow to sand and gravel. The climax plant community is "White spruce/willow forest."

Gravelly Mountains, Warm (M135A_355)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Boreal Mountains (M135A.M2L)
Boreal Outer Range & Kantishna Hills (M135A.M1L)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	760	273 to 1,152
Slope Gradient (percent):	29	14 to 48

Aspect (clockwise direction): east to west

Landform: mountains; valleys on mountains

Landform Positions: backslopes; footslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	560	358 to 783
Annual Air Temperature (°C):	-3.6	-5.7 to -2.4

Frost Free Days: 70 60 to 80

Soil Features

Parent Materials: silty eolian deposits over gravelly colluvium derived from schist
silty eolian deposits over gravelly till

Rooting Depth (cm): RV: 30 Range: 12 to 58

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
8 to 9	slightly decomposed plant material	moderately rapid	.34	3.8 to 4.0	30	
4 to 11	mucky silt loam; silt loam	moderate	.26 to .40	3.8 to 4.4	12 to 15	
9 to 10	very channery loam; very gravelly sandy loam	moderately rapid	.10 to .12	4.8 to 6.2	6	6

Restrictive Features: bedrock (paralithic) at 96 to 150 cm or more
strongly contrasting textural stratification at 12 to 20 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
White spruce/green alder forest	Climax plant community
Broadleaf deciduous-white spruce forest	Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Two plant communities are identified within this fire influenced site including a potential community with white spruce/green alder forest and late-seral community with broadleaf-white spruce forest. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Per Stand			Number of Stands
	Total	Min.	Avg. Max.	
White spruce/green alder forest				0
Broadleaf deciduous-white spruce forest				0

Characteristics of White spruce/green alder forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 9. Only those vascular, lichen, and bryophyte species

with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	<i>Picea glauca</i>	10.0	22	30	56	35
TM	PIGL	<i>Picea glauca</i>	5.0	16	30	44	27
SM-ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	0.1	17	40	100	41
SL-SM	BEGL	<i>Betula glandulosa</i>	0.1	23	50	67	39
SD-SL	VAUL	<i>Vaccinium uliginosum</i>	2.0	21	45	100	46
SD-SL	EMNI	<i>Empetrum nigrum</i>	10.0	18	35	56	32
SL	LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i>	0.1	10	20	44	21
SD-SL	VAVIM99	<i>Vaccinium vitis-idaea</i> ssp. <i>Minus</i>	0.1	5	10	89	21

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	RITR	Ribes triste	3.0	5	7	33	13
SL	LEGR	Ledum groenlandicum	0.1	5	10	22	10
SD	ARRU6	Arctous rubra	0.1	6	15	44	16
GM-GT	CACA4	Calamagrostis canadensis	1.0	6	10	22	11
GM	CALAM	Calamagrostis	5.0	13	20	33	21
GM	ZZGRASS	unknown-grasses	10.0	13	15	22	17
FM	GELI2	Geocaulon lividum	5.0	8	10	22	13
L	LICHEN	total lichens	0.0	9	25	100	30
M	MOSS	total bryophytes-mosses and liverworts	10.0	57	90	100	75
M1	PLSC70	Pleurozium schreberi	10.0	20	30	22	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	26	75	100	51
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	15	100	20
B	SOIL	mineral-bare soil	0.0	0	2	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	12.0	20.0	m	6
Tree regeneration	TR	2.0	2.8	4.0	m	4
Tall shrubs	ST	3.0	3.3	4.0	m	3
Medium shrubs	SM	1.0	1.9	3.0	m	12
Low shrubs	SL	20.0	54.1	100.0	cm	22
Dwarf shrubs	SD	10.0	10.0	10.0	cm	4
Tall and medium grasses and grass-like	GT, GM	20.0	26.7	30.0	cm	3
Tall and medium forbs	FT, FM	30.0	75.0	100.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	10.0	10.0	10.0	cm	4

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured.

G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	76	23.2	13.6		
	140	30.2	15.8		

Characteristics of Broadleaf deciduous-white spruce forest

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	10.0	10	10	33	18
TM	BENE4	Betula neoalaskana	25.0	33	40	67	47
TM	POTR5	Populus tremuloides	35.0	35	35	33	34
TM	PIGL	Picea glauca	10.0	10	10	33	18
TM	PIMA	Picea mariana	5.0	5	5	33	13
TR	PIMA	Picea mariana	15.0	15	15	33	22
SM-ST	ALVIC	Alnus viridis ssp. crispa	5.0	8	10	67	23
SL	VAUL	Vaccinium uliginosum	5.0	12	15	100	35
SL	LEGR	Ledum groenlandicum	5.0	13	20	67	30
SL	SPST3	Spiraea stevenii	5.0	10	15	67	26
SL	BEGL	Betula glandulosa	5.0	5	5	33	13
SL	LEPAD	Ledum palustre ssp. decumbens	5.0	5	5	33	13

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	SHCA	Shepherdia canadensis	5.0	5	5	33	13
SD	EMNI	Empetrum nigrum	0.1	15	30	67	32
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	5.0	8	10	100	28
SD	ARUV	Arctostaphylos uva-ursi	5.0	5	5	33	13
GT	CACA4	Calamagrostis canadensis	20.0	20	20	33	26
L	LICHEN	total lichens	0.0	8	25	100	28
M	MOSS	total bryophytes-mosses and liverworts	10.0	28	60	100	53
M1	HYSP70	Hylocomium splendens	65.0	65	65	33	46
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	42	65	100	65
B	ROCK	mineral-surface rock fragments	0.0	7	20	100	26
B	LITTER2	litter-woody debris >2.5 cm	2.0	6	10	100	24
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	8.0	9.3	12.0	m	6
Tree regeneration	TR	3.0	3.0	3.0	m	1
Tall shrubs	ST	3.0	4.5	6.0	m	2
Medium shrubs	SM	1.5	1.8	2.0	m	2
Low shrubs	SL	30.0	54.5	100.0	cm	11
Dwarf shrubs	SD	10.0	10.0	10.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	70.0	70.0	70.0	cm	1
Tall and medium forbs	FT, FM	10.0	10.0	10.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	10.0	10.0	10.0	cm	3

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
	88	22.6	13.4		Avg
	88	22.6	13.4		Max.

Map Unit Components**Common Name (Soils Name):**

Boreal-forested gravelly schist colluvial slopes (Typic Dystricrypts, loamy-skeletal)

Boreal-forested gravelly warm till slopes (Typic Eutrocrypts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7MS2	Boreal Glaciated Lower Mountain Slopes (Oxyaquic Eutrocrypts, coarse-loamy-Typic Eutrocrypts, loamy-skeletal Association, 10 to 45 percent slopes)
8MVF	Boreal and Subalpine Schist Mountain Valleys (Humic Cryaquepts, loamy-skeletal-Oxyaquic Eutrocrypts, loamy-skeletal-Typic Dystricrypts, loamy-skeletal Association, 12 to 50 percent slopes)

Geographically Associated Landtypes**M135A_303—Gravelly Mountains, Acid:**

This site occurs on adjacent ridges. The climax plant community is "Green alder/red current/bluejoint scrub."

M135A_354—Loamy Slopes, Wet:

This site occurs on wetter soils with thick loamy surface textures. The climax plant community is "White spruce/willow woodland, wet."

M135A_400—Loamy Frozen Slopes:

This site occurs on wetter soils with permafrost at moderate depths. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

Similar Landtypes**M135A_151—Loamy High Flood Plains:**

This site is flooded. The climax plant community is "White spruce/bog blueberry/feathermoss forest."

M135A_358—Gravelly Slopes:

This site occurs on slightly higher slopes. The climax plant community is "Shrub birch-bog blueberry scrub."

M135A_800—Escarpments:

This site occurs on steeper, drier slopes. The climax plant community is "White spruce forest."

Gravelly Slopes, High Elevation (M135A_356)**Ecoregion Classification**

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Flood Plains & Terraces & Fans (M135A.V1)
Teklanika Alpine Mountains & Plateaus (M135A.M6)
Alpine Mountains (M135A.M2)
Alpine Outer Range & Kantishna Hills (M135A.M1)
Glaciated Uplands (M135A.G1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	848	261 to 1,536
Slope Gradient (percent):	13	0 to 50

Aspect (clockwise direction): non-influencing

Landform: fan terraces on alluvial fans on mountains; hills; hills on plateaus; mountains; pitted outwash plains; ridges on mountains; stream terraces

Landform Positions: backslopes; shoulders; summits
Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	701	426 to 2,466
Annual Air Temperature (°C):	-3.6	-10.7 to -2.0
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: gravelly colluvium derived from schist
silty eolian deposits over gravelly residuum
silty eolian deposits over gravelly till
silty eolian deposits over sandy and gravelly alluvium derived from diorite
silty eolian deposits over sandy and gravelly outwash

Rooting Depth (cm): *RV:* 29 *Range:* 3 to 62

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 8	moderately decomposed plant material; slightly decomposed plant material	moderately rapid	.34	4.0 to 4.5	30	
2 to 26	silt loam	moderate or moderately rapid	.12 to .40	4.0 to 5.2	6 to 12	
1 to 26	silt loam; very gravelly sandy loam; extremely gravelly coarse sand	moderate to rapid	.03 to .19	4.0 to 5.8	2 to 12	2 to 6

Restrictive Features: bedrock (paralithic) at 86 to 150 cm or more
strongly contrasting textural stratification at 8 to 15 cm in some components

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Shrub birch-dwarf ericaceous scrub mosaic	Climax plant community
Lichen/white mountain avens-alpine bearberry dwarf scrub mosaic	Climax plant community on drier microsites

Ecological Status-Transition Description:

Two intricately associated but distinct plant communities occur as a complex mosaic on this site. A potential plant community with shrub birch-dwarf ericaceous scrub mosaic is described for the typical site and a second potential with lichen/white mountain avens-alpine bearberry dwarf scrub mosaic is described for a dry micro-site. No transitional pathways between these two vegetation types or other plant communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Shrub birch-dwarf ericaceous scrub mosaic	71	9	26	50	5
Lichen/white mountain avens-alpine bearberry dwarf scrub mosaic	89	17	26	36	10

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Shrub birch-dwarf ericaceous scrub mosaic	ASAB	Astragalus aboriginorum
	CASTS	Calamagrostis stricta ssp. stricta
	DOGO	Douglasia gormanii
	FEBR2	Festuca brevissima
	SESI	Selaginella sibirica
Lichen/white mountain avens-alpine bearberry dwarf scrub mosaic	FEBR2	Festuca brevissima
	STDI4	Stellaria dicranoides

Characteristics of Shrub birch-dwarf ericaceous scrub mosaic

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 25. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SM	B EGL	Betula glandulosa	0.1	41	90	100	64
SD-SL	VAUL	Vaccinium uliginosum	0.1	22	40	96	46
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	11	40	88	31
SD	ARAL13	Arctous alpina	0.1	16	75	56	30
SD	EMNI	Empetrum nigrum	0.1	8	20	84	26
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	6	20	72	21
SD	DROC	Dryas octopetala	0.1	15	75	28	20
SD	ARRU6	Arctous rubra	0.1	5	15	20	10
GM	CAREX	Carex	0.1	5	20	40	14
L	LICHEN	total lichens	0.1	25	60	100	50
L1	STERE2	Stereocaulon	0.1	7	20	44	18
L1	CLADI3	Cladina	0.1	5	25	48	15
L1	CLMI61	Cladina mitis group	3.0	11	20	16	13
M	MOSS	total bryophytes-mosses and liverworts	0.0	38	90	100	62
M1	HYSP70	Hylocomium splendens	3.0	35	90	24	29
M1	PLSC70	Pleurozium schreberi	2.0	21	45	32	26
M1	ZZMOSS	unknown-mosses	0.1	8	20	28	15
M1	PTCR70	Ptilium crista-castrensis	0.1	7	20	16	11
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	6	30	100	24
B	ROCK	mineral-surface rock fragments	0.0	3	20	100	17
B	SOIL	mineral-bare soil	0.0	1	15	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	1	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.6	1.9	4.5	m	7
Tree regeneration	TR	1.0	2.6	4.2	m	2
Medium shrubs	SM	1.0	1.6	2.5	m	9
Low shrubs	SL	10.0	51.7	100.0	cm	50
Dwarf shrubs	SD	1.0	10.8	20.0	cm	86
Tall and medium grasses and grass-likes	GT, GM	20.0	37.0	120.0	cm	10
Tall and medium forbs	FT, FM	10.0	16.4	30.0	cm	11
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	8.6	10.0	cm	68

Characteristics of Lichen/white mountain avens-alpine bearberry dwarf scrub mosaic

Ecological Status: Climax plant community on drier microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 25. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-ST	ALVIC	Alnus viridis ssp. crispa	0.1	10	75	32	18
SD-SM	B EGL	Betula glandulosa	0.1	11	50	100	33
SD-SL	VAUL	Vaccinium uliginosum	0.1	11	35	80	30
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	9	25	60	23
SD	ARAL13	Arctous alpina	0.1	18	35	68	35
SD	DROC	Dryas octopetala	0.1	16	80	60	31
SD	EMNI	Empetrum nigrum	0.1	12	30	64	28
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	6	15	60	19
SD	SARE2	Salix reticulata	0.1	5	20	20	10
L	LICHEN	total lichens	0.0	40	90	100	63
L1	CLMI61	Cladina mitis group	1.0	15	40	32	22

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
L1	STERE2	Stereocaulon	0.1	5	25	60	17
L1	FLNI	Flavocetraria nivalis	0.1	5	20	28	12
L1	CETRA2	Cetraria	0.1	8	30	16	11
L1	CLRA61	Cladina rangiferina group	1.0	5	10	16	9
L1	CLST60	Cladina stellaris	1.0	5	10	16	9
L2	L2ALL	total lichens-crustose and soil crust	0.1	8	30	24	14
M	MOSS	total bryophytes-mosses and liverworts	0.0	19	65	100	44
M1	ZZMOSS	unknown-mosses	0.1	7	15	40	17
M1	PLSC70	Pleurozium schreberi	1.0	13	25	16	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	18	90	100	42
B	ROCK	mineral-surface rock fragments	0.0	11	55	100	33
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	3	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.5	2.5	8.0	m	8
Tree regeneration	TR	0.5	0.7	0.8	m	2
Tall shrubs	ST	3.0	3.0	3.0	m	1
Medium shrubs	SM	1.2	1.5	2.0	m	7
Low shrubs	SL	20.0	54.8	100.0	cm	25
Dwarf shrubs	SD	2.0	9.2	20.0	cm	69
Tall and medium grasses and grass-likes	GT, GM	20.0	26.7	30.0	cm	3
Tall and medium forbs	FT, FM	10.0	20.0	30.0	cm	10
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	7.3	10.0	cm	48

Map Unit Components**Common Name (Soils Name):**

- Alpine-scrub gravelly outwash slopes (Typic Haplogelods, sandy-skeletal)
- Alpine-scrub mosaic gravelly colluvial schist slopes (Typic Dystrogelepts, loamy-skeletal)
- Alpine-scrub mosaic gravelly diorite terraces (Typic Haplogelods, sandy-skeletal)
- Alpine-scrub mosaic gravelly slopes (Typic Eutrogelepts, loamy-skeletal)
- Alpine-scrub mosaic gravelly till slopes (Typic Eutrogelepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 10LM Alpine Low Mountains with Discontinuous Permafrost, Nenana Gravels
(Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 2 to 30 percent slopes)
- 10P4 Alpine and Subalpine Plateau Summits
(Ruptic-Histic Aquiturbels, coarse-loamy-Typic Eutrogelepts, loamy skeletal-Typic Historthels, loamy-skeletal Association, 0 to 16 percent slopes)
- 5SA11 Alpine and Subalpine Schist Mountains
(Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 5 to 40 percent slopes)
- 7FP21 Alpine Diorite Terraces and Flood Plains
(Typic Haplogelods, sandy-skeletal-Oxyaquic Gelorthents, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Complex)
- 7NG Alpine Plains and Hills with Discontinuous Permafrost, Nenana Gravels
(Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 25 percent slopes)

- 7P1 Alpine Glaciated Plains and Hills with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 0 to 25 percent slopes)
- 7TP2 Alpine Till Plains and Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 2 to 50 percent slopes)
- 7V1A Alpine Diorite Fans
(Typic Dystrogelepts, loamy-skeletal-Typic Haplogelods, sandy-skeletal Association, 0 to 6 percent slopes)
- 7V1B Alpine and Subalpine Diorite Fans and Flood Plains with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Cryorthents, sandy-skeletal Association, 3 to 15 percent slopes)
- 8MBS Alpine Schist Mountains with Discontinuous Permafrost
(Typic Dystrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 14 to 50 percent slopes)

Geographically Associated Landtypes

M135A_358—Gravelly Slopes:

This site occurs on slightly lower elevations. The climax plant community is "Shrub birch-bog blueberry scrub."

M135A_405—Swales:

This site occurs on swales with seasonally wet soils. The climax plant community is "Green alder scrub mosaic."

Similar Landtypes

M135A_177—Loamy Frozen Slopes, High Elevation:

This site has soils that are moderately deep over permafrost. The climax plant community is "Shrub birch-bog blueberry/moss scrub."

M135A_180—Gravelly Frozen Slopes:

This site occurs on wetter soils with permafrost at moderate depths. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs at lower elevation. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

M135A_358—Gravelly Slopes:

This site occurs at lower elevation. The climax plant community is "Shrub birch-bog blueberry scrub."

Gravelly Slopes (M135A_358)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Teklanika Alpine Mountains & Plateaus (M135A.M6)

Boreal Mountains (M135A.M2L)

Alpine Mountains (M135A.M2)

Boreal Outer Range & Kantishna Hills (M135A.M1L)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Glaciated Lowlands (M135A.G1L)

Glaciated Uplands (M135A.G1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	854	261 to 1,792
Slope Gradient (percent):	30	4 to 70
Aspect (clockwise direction):	non-influencing	

Landform: escarpments; hills; mountains; till plains

Landform Positions: backslopes; footslopes; toeslopes

Flooding: None
Frequency

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	762	446 to 2,466
Annual Air Temperature (°C):	-3.9	-10.7 to -2.4
Frost Free Days:	62	50 to 80

Soil Features

Parent Materials: silty eolian deposits over gravelly colluvium derived from schist
silty eolian deposits over gravelly colluvium derived from shale
silty eolian deposits over gravelly residuum
silty eolian deposits over gravelly till
silty eolian deposits over gravelly till derived from diorite

Rooting Depth (cm): RV: 37 Range: 10 to 113

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 7	slightly decomposed plant material	moderately rapid	.34	4.4 to 5.1	30	
1 to 6	silt loam	moderate to moderately rapid	.14 to .40	4.2 to 5.1	6 to 15	
1 to 28	silt loam; very gravelly sandy loam; very channery silt loam; extremely channery silt loam	moderate to moderately rapid	.10 to .40	4.2 to 5.6	5 to 12	6

Restrictive Features: bedrock (paralithic) at 120 to 150 cm or more
strongly contrasting textural stratification at 8 to 13 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Shrub birch-bog blueberry scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with shrub birch-bog blueberry scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Shrub birch-bog blueberry scrub	141	12	25	43	23

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Shrub birch-bog blueberry scrub	CAAL6	Carex albonigra
	DOGO	Douglasia gormanii
	FEBR2	Festuca brevissima

Characteristics of Shrub birch-bog blueberry scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 74. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Percent Constancy	Importance Value
			Canopy Cover	Min.	Avg.		
SD-ST	BEGL	Betula glandulosa	0.1	36	85	100	60
SD-SM	SAPU15	Salix pulchra	0.1	7	45	57	20
SD-SM	SAGL	Salix glauca	0.1	5	25	38	14
SD-SL	VAUL	Vaccinium uliginosum	0.1	28	60	97	52
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	10	40	69	26
SD	EMNI	Empetrum nigrum	0.1	14	40	70	31
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	7	25	88	25
SD	ARAL13	Arctous alpina	0.1	7	30	38	16
SD	CATE11	Cassiope tetragona	0.1	10	35	19	14
SD	DROC	Dryas octopetala	0.1	9	40	23	14
SD	SARE2	Salix reticulata	0.1	7	40	23	13
GM-GT	CACA4	Calamagrostis canadensis	0.1	10	40	24	15
GM	CAREX	Carex	0.1	6	25	42	16
L	LICHEN	total lichens	0.0	12	70	100	35
L1	STERE2	Stereocaulon	0.1	5	20	34	13
M	MOSS	total bryophytes-mosses and liverworts	0.0	44	90	100	66
M1	PLSC70	Pleurozium schreberi	0.1	29	75	32	30
M1	HYSP70	Hylocomium splendens	0.1	20	65	28	24
M1	ZZMOSS	unknown-mosses	0.1	14	60	34	22
M1	DICRA8	Dicranum	0.1	5	10	16	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	22	90	100	47
B	SOIL	mineral-bare soil	0.0	1	30	100	10
B	ROCK	mineral-surface rock fragments	0.0	1	45	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	5	100	0
B	WATER	water	0.0	0	3	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.5	4.2	18.0	m	29
Tree regeneration	TR	0.5	1.9	4.0	m	9
Tall shrubs	ST	3.0	3.9	4.8	m	2
Medium shrubs	SM	1.0	1.5	2.5	m	44
Low shrubs	SL	20.0	52.6	100.0	cm	150
Dwarf shrubs	SD	2.0	11.5	20.0	cm	171
Tall and medium grasses and grass-likes	GT, GM	20.0	55.2	130.0	cm	21
Tall and medium forbs	FT, FM	10.0	26.7	200.0	cm	42
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	7.8	10.0	cm	147

Map Unit Components

Common Name (Soils Name):

- Alpine-scrub gravelly colluvial slopes (Typic Eutrogelepts, loamy-skeletal)
- Alpine-scrub gravelly diorite till slopes (Typic Haplogelods, loamy-skeletal)
- Alpine-scrub gravelly schist colluvial slopes (Typic Dystrogelepts, loamy-skeletal)
- Alpine-scrub gravelly schist colluvial slopes, thick surface (Typic Dystrogelepts, loamy-skeletal)
- Alpine-scrub gravelly slopes (Typic Haplogelods, loamy-skeletal)
- Alpine-scrub gravelly till slopes (Typic Haplogelods, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 5SA11 Alpine and Subalpine Schist Mountains
(Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 5 to 40 percent slopes)
- 5TS1 Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Warm
(Ruptic-Histic-Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 5 to 45 percent slopes)
- 7ES Boreal and Alpine Escarpments
(Typic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal-Nonvegetated Talus Complex, 30 to 70 percent slopes)
- 7MS1D Alpine Dark Sedimentary Mountains
(Typic Haplogelolls, loamy-skeletal-Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes)
- 7MS1L Alpine Mixed Lithology Mountains
(Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes)
- 7NG2 Alpine Backslopes on Hills, Nenana Gravels
(Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-(Oxyaquic) Humic Eutrogelepts, coarse-loamy Association, 12 to 45 percent slopes)
- 7SA1 Alpine and Subalpine Mountains
(Rock Outcrop-Typic Haplogelolls, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 25 to 85 percent slopes)
- 7SA3 Alpine and Subalpine Glaciated Mountains with Discontinuous Permafrost
(Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 20 to 55 percent slopes)
- 7SA31 Subalpine Mountains
(Typic Dystrocryepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal Association, 8 to 70 percent slopes)
- 7TM21 Alpine Glaciated Low Diorite Mountains with Discontinuous Permafrost
(Typic Dystrogelepts, sandy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 8 to 40 percent slopes)
- 7TP2 Alpine Till Plains and Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 2 to 50 percent slopes)
- 7TP3 Boreal and Alpine Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 35 percent slopes)
- 7TP5 Boreal and Alpine Till Plains and Hills with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 2 to 24 percent slopes)
- 7TP8 Alpine Glaciated Diorite Plains and Hills
(Typic Haplogelods, loamy-skeletal-Typic Dystrogelepts, sandy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal Association, 2 to 35 percent slopes)
- 8LMV Alpine and Subalpine Schist Mountain Valleys
(Typic Dystrogelepts, loamy-skeletal Association, 8 to 60 percent slopes)
- 8MBS Alpine Schist Mountains with Discontinuous Permafrost
(Typic Dystrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 14 to 50 percent slopes)
- 8MFS Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost
(Typic Historthels, coarse-loamy-Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 10 to 45 percent slopes)

Geographically Associated Landtypes

M135A_180—Gravelly Frozen Slopes:

This site occurs on wetter soils with permafrost at moderate depths. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site occurs on slightly higher elevations. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

M135A_405—Swales:

This site occurs on swales with seasonally wet soils. The climax plant community is "Green alder scrub mosaic."

Similar Landtypes**M135A_177—Loamy Frozen Slopes, High Elevation:**

This site has soils that are moderately deep over permafrost. The climax plant community is "Shrub birch-bog blueberry/moss scrub."

M135A_352—Gravelly and Sandy Terraces, High Elevation:

This site occurs on terraces with somewhat excessively drained soils. The climax plant community is "Shrub birch-bog blueberry/lichen scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site occurs at higher elevation. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

Loamy Frozen Slopes (M135A_400)**Ecoregion Classification**

Section: Alaska Mountains (M135A)

Subsection(s): Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Teklanika Alpine Mountains & Plateaus (M135A.M6)

Boreal Mountains (M135A.M2L)

Boreal Outer Range & Kantishna Hills (M135A.M1L)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Glaciated Lowlands (M135A.G1L)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	619	333 to 1,050
Slope Gradient (percent):	10	0 to 30

Aspect (clockwise direction): non-influencing

Landform: escarpments on plateaus; hills; mountain slopes; mountains; outwash plains; plateaus; till plains

Landform Positions: backslopes; footslopes; summits; toeslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	529	358 to 783
Annual Air Temperature (°C):	-2.8	-5.7 to -2.2
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: mossy organic material and/or woody organic material over silty eolian deposits
 mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist
 mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum
 mossy organic material and/or woody organic material over silty eolian deposits over gravelly till
 mossy organic material and/or woody organic material over silty eolian deposits over loamy drift

Rooting Depth (cm): RV: 34 Range: 12 to 72

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
21 to 29	peat	moderately rapid	.34	3.7 to 4.8	30	
4 to 9	mucky silt loam	moderate	.26 to .40	5.1 to 5.8	15	20

Restrictive Features: bedrock (paralithic) at 84 to 150 cm or more
 permafrost at 35 to 58 cm
 strongly contrasting textural stratification at 33 to 35 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Black spruce/bog blueberry-Labrador tea woodland	Climax plant community
Shrub birch-Labrador tea-bog blueberry scrub	Early stage of fire induced secondary succession
White spruce-black spruce/shrub birch woodland	Late stage of fire induced secondary succession

Ecological Status-Transition Description:

Three plant communities are identified within this fire influenced site including a potential community with black spruce/bog blueberry-Labrador tea woodland, an early-seral community with shrub birch-Labrador tea-bog blueberry scrub and a late-seral community with spruce/shrub birch woodland. Fire is considered a transitional pathway between seral communities within this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Black spruce/bog blueberry-Labrador tea woodland	67	10	17	29	22
Shrub birch-Labrador tea-bog blueberry scrub	45	19	22	24	4
White spruce-black spruce/shrub birch woodland	49	19	21	22	4

Characteristics of Black spruce/bog blueberry-Labrador tea woodland

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 34. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Importance	
			Min.	Avg.	Max.	Constancy	Value
TM	PIMA	<i>Picea mariana</i>	5.0	20	50	68	37
TS	PIMA	<i>Picea mariana</i>	10.0	22	50	26	24
TR	PIMA	<i>Picea mariana</i>	4.0	11	20	35	20
SM-ST	ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i>	0.1	10	20	38	19
SL-SM	BEGL	<i>Betula glandulosa</i>	0.1	8	35	100	28
SL-SM	SAPU15	<i>Salix pulchra</i>	0.1	8	25	59	22

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	VAUL	Vaccinium uliginosum	5.0	22	75	100	47
SD-SL	LEPAD	Ledum palustre ssp. decumbens	2.0	14	25	88	35
SD	EMNI	Empetrum nigrum	0.1	10	40	97	31
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	8	35	100	28
GM	CABI5	Carex bigelowii	0.1	13	60	59	28
GM	CAREX	Carex	0.1	23	35	26	24
FD-FM	EQSY	Equisetum sylvaticum	0.1	7	25	47	18
FD	RUCH	Rubus chamaemorus	0.1	6	45	85	23
L	LICHEN	total lichens	0.0	13	50	100	36
L1	CLMI61	Cladina mitis group	0.1	6	20	47	17
M	MOSS	total bryophytes-mosses and liverworts	50.0	82	95	100	91
M1	SPHAG2	Sphagnum	0.1	32	60	68	47
M1	PLSC70	Pleurozium schreberi	5.0	24	60	68	40
M1	HYSP70	Hylocomium splendens	0.1	22	80	53	34
M1	ZZMOSS	unknown-mosses	0.1	8	20	65	23
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	11	65	100	33
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	15	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	5	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.3	5.8	20.0	m	37
Tree regeneration	TR	1.0	1.7	3.0	m	12
Tall shrubs	ST	3.0	3.0	3.0	m	3
Medium shrubs	SM	1.0	1.8	3.0	m	28
Low shrubs	SL	20.0	49.5	100.0	cm	55
Dwarf shrubs	SD	2.0	9.0	20.0	cm	44
Tall and medium grasses and grass-likes	GT, GM	20.0	39.4	90.0	cm	17
Tall and medium forbs	FT, FM	15.0	24.1	40.0	cm	16
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	5.5	10.0	cm	67

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea mariana	113	20.6	7.9	1	B
			7.9		
			7.9		
Picea mariana	45	6.1	3.0	4	G
			4.5		
			5.5		

Characteristics of Shrub birch-Labrador tea-bog blueberry scrub

Ecological Status: Early stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 16. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	Picea glauca	3.0	5	7	25	11
SL-SM	BEGL	Betula glandulosa	0.1	31	80	100	56
SM	ALVIC	Alnus viridis ssp. crispa	5.0	20	55	62	35
SL-SM	SAPU15	Salix pulchra	0.1	9	40	75	26

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	LEPAD	Ledum palustre ssp. decumbens	3.0	21	40	94	44
SD-SL	VAUL	Vaccinium uliginosum	5.0	17	40	100	41
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	11	35	94	32
SD	EMNI	Empetrum nigrum	0.1	6	20	44	16
GM-GT	CACA4	Calamagrostis canadensis	5.0	8	10	19	12
GM	CAREX	Carex	0.1	16	40	62	31
GM	CABI5	Carex bigelowii	1.0	15	30	38	24
GM	ZZGRASS	unknown-grasses	5.0	10	15	31	18
FM	EQSY	Equisetum sylvaticum	0.1	6	15	19	11
L	LICHEN	total lichens	0.0	6	40	100	24
M	MOSS	total bryophytes-mosses and liverworts	40.0	60	80	100	77
M1	HYSPT0	Hylocomium splendens	2.0	21	40	19	20
M1	PLSC70	Pleurozium schreberi	0.1	16	30	25	20
M1	ZZMOSS	unknown-mosses	10.0	10	10	25	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	39	65	100	62
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	7	100	14
B	SOIL	mineral-bare soil	0.0	1	10	100	10
B	ROCK	mineral-surface rock fragments	0.0	0	1	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.2	5.4	10.0	m	8
Tree regeneration	TR	0.4	1.1	2.0	m	7
Medium shrubs	SM	1.0	1.5	2.5	m	24
Low shrubs	SL	20.0	52.3	100.0	cm	26
Dwarf shrubs	SD	3.0	12.6	20.0	cm	16
Tall and medium grasses and grass-likes	GT, GM	30.0	48.3	110.0	cm	6
Tall and medium forbs	FT, FM	30.0	52.9	100.0	cm	7
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	5.8	10.0	cm	9

Characteristics of White spruce-black spruce/shrub birch woodland

Ecological Status: Late stage of fire induced secondary succession

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 21. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	PIGL	Picea glauca	5.0	12	35	57	26
TM	PIMA	Picea mariana	2.0	10	20	33	18
TR	PIGL	Picea glauca	0.1	7	15	57	20
TR	PIMA	Picea mariana	5.0	5	5	19	10
SL-SM	BEGL	Betula glandulosa	0.1	25	75	100	50
SL-SM	SAGL	Salix glauca	0.1	6	30	62	19
SL-SM	SAPU15	Salix pulchra	0.1	5	15	76	19
SL-SM	ALVIC	Alnus viridis ssp. crispa	0.1	5	15	43	15
SD-SL	VAUL	Vaccinium uliginosum	3.0	19	45	90	41
SD-SL	LEPAD	Ledum palustre ssp. decumbens	5.0	17	30	90	39
SD-SL	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	8	40	95	28
SD	EMNI	Empetrum nigrum	0.1	10	25	48	22
GM-GT	CACA4	Calamagrostis canadensis	0.1	12	50	33	20
GM	CAREX	Carex	5.0	27	75	57	39
FD-FM	EQSY	Equisetum sylvaticum	0.1	8	20	29	15
L	LICHEN	total lichens	0.0	7	20	100	26
M	MOSS	total bryophytes-mosses and liverworts	30.0	75	95	100	87

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M1	SPHAG2	Sphagnum	1.0	50	95	33	41
M1	PLSC70	Pleurozium schreberi	5.0	40	85	24	31
M1	HYSP70	Hylocomium splendens	0.1	26	60	29	27
M1	ZZMOSS	unknown-mosses	5.0	9	15	19	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	18	80	100	42
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	5	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	6.1	12.0	m	25
Tree regeneration	TR	0.5	2.0	3.0	m	18
Medium shrubs	SM	1.0	1.5	2.0	m	28
Low shrubs	SL	20.0	55.0	100.0	cm	46
Dwarf shrubs	SD	7.0	14.6	20.0	cm	19
Tall and medium grasses and grass-likes	GT, GM	20.0	45.6	130.0	cm	18
Tall and medium forbs	FT, FM	20.0	21.7	30.0	cm	6
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	6.3	10.0	cm	12

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	93	22.4	9.1	Min.	2	B
	122	27.9	13.9	Avg.		
	150	33.5	18.6	Max.		
Picea mariana	51	13.5	6.4	Min.	2	B
	54	13.6	6.6	Avg.		
	58	13.7	6.7	Max.		

Map Unit Components

Common Name (Soils Name):

- Boreal-taiga gravelly schist slopes, frozen (Typic Historthels, loamy-skeletal)
- Boreal-taiga gravelly slopes, frozen (Typic Historthels, loamy-skeletal)
- Boreal-taiga gravelly till slopes, frozen (Typic Historthels, loamy-skeletal)
- Boreal-taiga high elevation silty loess slopes, frozen (Typic Historthels, coarse-silty)
- Boreal-taiga loamy drift slopes, frozen (Typic Historthels, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 10ES1 Boreal Terrace Escarpments with Discontinuous Permafrost
(Typic Eutrocryepts, coarse-loamy-Typic Historthels, coarse-silty-Typic Historthels, loamy-skeletal Complex, 5 to 70 percent slopes)
- 10P3 Boreal Dissected Plateaus with Discontinuous Permafrost
(Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 0 to 20 percent slopes)
- 10TS Boreal Plateaus with Continuous Permafrost
(Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 20 percent slopes)
- 10TS1 Boreal Mountain Toeslopes with Discontinuous Permafrost, Nenana Gravels
(Typic Historthels, loamy-skeletal-Typic Histoturbels, coarse-silty Association, 0 to 14 percent slopes)

- 5MS21 Boreal and Subalpine Schist Mountains with Discontinuous Permafrost
(Humic Cryaquepts, loamy-skeletal-Typic Dystrocrepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 10 to 50 percent slopes)
- 7MS4 Boreal Lower Mountain Slopes with Continuous Permafrost
(Typic Historthels, coarse-loamy, 10 to 22 percent slopes)
- 7P4 Boreal Glaciated Plains and Hills with Discontinuous Permafrost
(Typic Haplocryods, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 20 percent slopes)
- 7TP3 Boreal and Alpine Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 35 percent slopes)
- 7TP4 Boreal and Alpine Till Plains with Continuous Permafrost
(Typic Historthels, loamy-skeletal Association 0 to 12 percent slopes)
- 7TP5 Boreal and Alpine Till Plains and Hills with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 2 to 24 percent slopes)
- 8MFS1 Boreal Schist Lower Mountain Slopes with Continuous Permafrost
(Typic Historthels, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Histoturbels, loamy-skeletal Association, 8 to 25 percent slopes)

Geographically Associated Landtypes

M135A_105—Loamy Frozen Terraces, Wet:

This site occurs on terraces with wetter soils. The climax plant community is "Black spruce/tussock cottongrass woodland."

M135A_303—Gravelly Mountains, Acid:

This site occurs on higher slopes and adjacent ridges. The climax plant community is "Green alder/red current/bluejoint scrub."

M135A_354—Loamy Slopes, Wet:

This site occurs on moderately deep to deep soils over bedrock. The climax plant community is "White spruce/willow woodland, wet."

M135A_358—Gravelly Slopes:

This site occurs on slightly higher slopes and well drained soils with gravelly surface textures. The climax plant community is "Shrub birch-bog blueberry scrub."

Similar Landtypes

M135A_105—Loamy Frozen Terraces, Wet:

This site has wetter soils. The climax plant community is "Black spruce/tussock cottongrass woodland."

M135A_113—Loamy Frozen Slopes, Ice Cored:

This site has well drained soils and occurs on steeper slopes. The climax plant community is "Black spruce/green alder woodland."

Swales (M135A_405)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Teklanika Alpine Mountains & Plateaus (M135A.M6)
Alpine Mountains (M135A.M2)
Boreal Outer Range & Kantishna Hills (M135A.M1L)
Alpine Outer Range & Kantishna Hills (M135A.M1)
Glaciated Uplands (M135A.G1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	853	273 to 1,554
Slope Gradient (percent):	26	5 to 55

Aspect (clockwise direction): south to southwest

Landform: depressions on outwash plains; swales on escarpments; swales on hills; swales on mountains; swales on till plains

Landform Positions: backslopes; footslopes; summits

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	796	358 to 2,466
Annual Air Temperature (°C):	-4.2	-10.7 to -2.4
Frost Free Days:	61	50 to 80

Soil Features

Parent Materials: silty eolian deposits over gravelly colluvium derived from schist
 silty eolian deposits over gravelly colluvium derived from shale
 silty eolian deposits over gravelly residuum
 silty eolian deposits over gravelly till
 silty eolian deposits over loamy drift

Rooting Depth (cm): *RV:* 36 *Range:* 9 to 112

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3 to 8	slightly decomposed plant material	moderately rapid	.34	5.2 to 6.6	30	80
6 to 32	mucky silt loam; channery loam	moderate	.18 to .40	5.6 to 6.3		16 to 20
8 to 27	very channery loam	moderately rapid	.10 to .12	5.4 to 6.1	6	6

Restrictive Features: bedrock (paralithic) at 124 to 150 cm or more
 strongly contrasting textural stratification at 9 to 41 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: somewhat poorly drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type

Green alder scrub mosaic

Bluejoint-forb meadow mosaic

Ecological Status

Climax plant community

Climax plant community on wetter microsites

Ecological Status-Transition Description:

Two intricately associated but distinct plant communities occur as a complex mosaic on this site. A potential plant community with green alder scrub mosaic is described for the typical site and a second potential with bluejoint-forb meadow mosaic is described for a moist micro-site. No transitional pathways between these two vegetation types or other plant communities have been identified for this site. The concave surface relief typical of this site favors snow drifting during winter followed by temporary saturation of soils during early summer from snow melt.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Green alder scrub mosaic	91	10	20	45	13
Bluejoint-forb meadow mosaic	68	33	40	46	2

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Green alder scrub mosaic	CYMO3	Cystopteris montana
	HUMI	Huperzia miyoshiana
Bluejoint-forb meadow mosaic	BOMI	Botrychium minganense

Characteristics of Green alder scrub mosaic

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 49. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
SM-ST	ALVIC	Alnus viridis ssp. crispa	0.1	66	100	94	79
SL-ST	SAPU15	Salix pulchra	0.1	21	95	71	39
SM-ST	SAAL	Salix alaxensis	0.1	24	70	22	23
SM-ST	SARI4	Salix richardsonii	0.1	7	20	16	11
SL-SM	SPST3	Spiraea stevenii	0.1	10	30	71	27
SL-SM	RITR	Ribes triste	0.1	5	25	55	17
GM-GT	CACA4	Calamagrostis canadensis	0.1	43	80	84	60
GM	CAREX	Carex	0.1	7	25	18	11
FD-FM	EQSY	Equisetum sylvaticum	0.1	18	60	27	22
FD-FM	EQAR	Equisetum arvense	0.1	7	40	27	14
FD-FM	BORI2	Boykinia richardsonii	0.1	7	15	16	11
L	LICHEN	total lichens	0.0	0	5	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	14	80	100	37
M1	HYSP70	Hylocomium splendens	0.1	20	45	22	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	68	95	100	82
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	25	100	20
B	SOIL	mineral-bare soil	0.0	1	15	100	10
B	ROCK	mineral-surface rock fragments	0.0	0	5	100	0
B	WATER	water	0.0	0	10	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	6.7	15.0	m	8
Tree regeneration	TR	0.5	0.5	0.5	m	2
Tall shrubs	ST	3.0	3.3	5.0	m	40
Medium shrubs	SM	1.0	2.0	3.0	m	54
Low shrubs	SL	20.0	62.1	100.0	cm	72
Dwarf shrubs	SD	1.0	9.9	20.0	cm	18
Tall and medium grasses and grass-like	GT, GM	20.0	74.3	160.0	cm	30
Tall and medium forbs	FT, FM	9.0	35.8	100.0	cm	102
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	8.2	10.0	cm	70

Characteristics of Bluejoint-forb meadow mosaic

Ecological Status: Climax plant community on wetter microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	BEGL	Betula glandulosa	1.0	11	20	67	27
SM	SABA3	Salix barclayi	5.0	5	5	33	13
SL	PEFL15	Pentaphylloides floribunda	6.0	6	6	33	14
SD	SARE2	Salix reticulata	5.0	13	20	67	30
SD	DRAL7	Dryas alaskensis	20.0	20	20	33	26
GT	CACA4	Calamagrostis canadensis	35.0	45	60	100	67
GM-GT	FEAL	Festuca altaica	0.1	5	10	67	18
GM	CAPO	Carex podocarpa	10.0	10	10	33	18
GM	CAREX	Carex	5.0	5	5	33	13
GM	POAR2	Poa arctica	5.0	5	5	33	13
FT	EPAN2	Epilobium angustifolium	15.0	18	20	67	35
FT	VEVIE2	Veratrum viride ssp. eschscholtzii	15.0	15	15	33	22
FT	ANLU	Angelica lucida	5.0	5	5	33	13
FT	BORI2	Boykinia richardsonii	5.0	5	5	33	13
FM	SAST11	Sanguisorba stipulata	20.0	20	20	33	26
FM	GEER2	Geranium erianthum	15.0	15	15	33	22
FD	RUAR	Rubus arcticus	10.0	10	10	33	18
FD	DOFR	Dodecatheon frigidum	5.0	5	5	33	13
FD	VILA6	Viola langsdorfii	5.0	5	5	33	13
L	LICHEN	total lichens	0.0	0	1	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	20	40	100	45
M1	ZZMOSS	unknown-mosses	0.1	18	35	67	35
M1	POCO38	Polytrichum commune	5.0	5	5	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	60	95	100	77
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	2	100	10
B	WATER	water	0.0	1	3	100	10
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	7.5	7.5	7.5	m	1
Medium shrubs	SM	1.2	1.7	2.7	m	4
Low shrubs	SL	30.0	30.0	30.0	cm	1
Dwarf shrubs	SD	15.0	15.0	15.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	60.0	90.0	120.0	cm	2
Tall and medium forbs	FT, FM	60.0	60.0	60.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.5	4.0	cm	2

Map Unit Components**Common Name (Soils Name):**

- Subalpine-scrub-meadow mosaic dark gravelly swales (Oxyaquic Haplocryolls, coarse-loamy)
- Subalpine-scrub-meadow mosaic gravelly schist swales (Oxyaquic Eutrocryepts, loamy-skeletal)
- Subalpine-scrub-meadow mosaic gravelly swales, Nenana Gravels (Oxyaquic Eutrocryepts, coarse-loamy)
- Subalpine-scrub-meadow mosaic gravelly till swales (Oxyaquic Eutrocryepts, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 5SA11 Alpine and Subalpine Schist Mountains
(Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 5 to 40 percent slopes)
- 5SA2 Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost, Cool
(Ruptic-Histic Aquiturbels, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal-Typic Histoturbels, loamy-skeletal Association, 12 to 36 percent slopes)
- 7MS3 Alpine Glaciated Mountains with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy-Oxyaquic Eutrocryepts, coarse-loamy Association, 8 to 25 percent slopes)
- 7NG2 Alpine Backslopes on Hills, Nenana Gravels
(Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-(Oxyaquic) Humic Eutrogelepts, coarse-loamy Association, 12 to 45 percent slopes)
- 7P1 Alpine Glaciated Plains and Hills with Discontinuous Permafrost
(Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 0 to 25 percent slopes)
- 7SA3 Alpine and Subalpine Glaciated Mountains with Discontinuous Permafrost
(Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 20 to 55 percent slopes)
- 7SA31 Subalpine Mountains
(Typic Dystrocryepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal Association, 8 to 70 percent slopes)
- 7TM2 Alpine Glaciated Mountains with Discontinuous Permafrost, Cool
(Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 10 to 50 percent slopes)
- 8MFS Alpine and Subalpine Schist Lower Mountain Slopes with Discontinuous Permafrost
(Typic Historthels, coarse-loamy-Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 10 to 45 percent slopes)
- 8MVF Boreal and Subalpine Schist Mountain Valleys
(Humic Cryaquepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal-Typic Dystrocryepts, loamy-skeletal Association, 12 to 50 percent slopes)

Geographically Associated Landtypes

M135A_180—Gravelly Frozen Slopes:

This site occurs on lower mountain slopes with wetter soils and permafrost at moderate depths.. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site occurs on adjacent mountain ridges with moderately deep to deep well drained soils. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

M135A_358—Gravelly Slopes:

This site occurs on slightly lower elevations. The climax plant community is "Shrub birch-bog blueberry scrub."

Similar Landtypes

M135A_204—Gravelly Flood Plains:

This site occurs on flood plains and has soils that are very shallow to sand and gravel. The climax plant community is "White spruce-poplar/soapberry forest."

M135A_303—Gravelly Mountains, Acid:

This site occurs on higher slopes and adjacent ridges. The climax plant community is "Green alder/red current/bluejoint scrub."

Swales, High Elevation (M135A_420)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Glaciated Uplands (M135A.G1)

Physiographic Features

	RV	Range
Elevation (meters):	963	502 to 1,920
Slope Gradient (percent):	14	2 to 45

Aspect (clockwise direction): non-influencing

Landform: swales on hills; swales on mountains; swales on till plains

Landform Positions: backslopes; footslopes

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	811	528 to 2,466
Annual Air Temperature (°C):	-4.1	-10.7 to -2.4
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty eolian deposits over gravelly colluvium derived from diorite
 silty eolian deposits over gravelly colluvium derived from schist
 silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock
 silty eolian deposits over gravelly till

Rooting Depth (cm): RV: 43 Range: 3 to 82

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3 to 6	slightly decomposed plant material	moderately rapid	.34	5.2 to 5.9	30	80
18 to 28	silt loam; mucky silt loam	moderate	.16 to .40	5.7 to 6.3		12 to 20
9 to 14	cobbly loam	moderately rapid	.10 to .12	5.6 to 6.9		2 to 6

Restrictive Features: bedrock (paralithic) at 55 to 150 cm or more
 strongly contrasting textural stratification at 21 to 34 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Diamondleaf willow-mixed willow scrub mosaic	Climax plant community
Short stalk sedge-mixed forb/dwarf willow meadow mosaic	Climax plant community on wetter microsites

Ecological Status-Transition Description:

Two intricately associated but distinct plant communities occur as a complex mosaic on this site. A potential plant community with diamondleaf willow-mixed willow scrub mosaic is described for the typical site and a second potential with short stalk sedge-mixed forb/dwarf willow meadow mosaic is described for a moist micro-site. No transitional pathways between these two vegetation types or other plant communities have been identified for this site. The concave surface relief typical of this site favors snow drifting during winter followed by temporary saturation of soils during early summer from snow melt.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Diamondleaf willow-mixed willow scrub mosaic	145	17	39	74	10
Short stalk sedge-mixed forb/dwarf willow meadow mosaic	177	32	54	91	13

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Diamondleaf willow-mixed willow scrub mosaic	BOMI	Botrychium minganense
	CYMO3	Cystopteris montana
	RAPE2	Ranunculus pensylvanicus
Short stalk sedge-mixed forb/dwarf willow meadow mosaic	APES	Aphragmus eschscholtzianus
	CYMO3	Cystopteris montana
	DRLA	Draba lactea
	PHAL4	Phyllodoce aleutica

Characteristics of Diamondleaf willow-mixed willow scrub mosaic

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 35. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-ST	SARI4	Salix richardsonii	5.0	30	65	31	30
SL-ST	SAAL	Salix alaxensis	0.1	17	60	40	26
SL-ST	SALIX	Salix	10.0	29	75	17	22
SL-SM	SAPU15	Salix pulchra	0.1	42	95	89	61
SL-SM	SABA3	Salix barclayi	5.0	47	95	20	31
SL-SM	SAGL	Salix glauca	0.1	13	40	17	15
SL	SPST3	Spiraea stevenii	0.1	6	20	23	12
SD	SARE2	Salix reticulata	0.1	12	35	43	23
GM-GT	CACA4	Calamagrostis canadensis	0.1	26	80	54	37
GM-GT	FEAL	Festuca altaica	0.1	15	60	31	22
GM-GT	CAPO	Carex podocarpa	1.0	10	30	29	17
GM-GT	ARLA2	Arctagrostis latifolia	0.1	8	35	20	13
GM	CABI5	Carex bigelowii	0.1	11	45	17	14
GM	CAREX	Carex	0.1	6	20	20	11
FD-FT	MEPA	Mertensia paniculata	0.1	5	30	80	20
FM-FT	BORI2	Boykinia richardsonii	0.1	7	20	40	17
FM-FT	EPAN2	Epilobium angustifolium	0.1	5	35	46	15
FT	HELA4	Heraclium lanatum	0.1	7	25	20	12
FD-FM	EQAR	Equisetum arvense	0.1	13	60	43	24
FM	SAST11	Sanguisorba stipulata	0.1	10	35	31	18
FD-FM	LYAN2	Lycopodium annotinum	0.1	9	60	29	16
L	LICHEN	total lichens	0.0	1	7	100	10
M	MOSS	total bryophytes-mosses and liverworts	0.0	25	90	100	50
M1	ZZMOSS	unknown-mosses	0.1	15	40	40	24
M1	HYSP70	Hylocomium splendens	3.0	20	65	20	20
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.1	45	95	100	67
B	LITTER2	litter-woody debris >2.5 cm	0.0	4	20	100	20

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	SOIL	mineral-bare soil	0.0	2	30	100	14
B	ROCK	mineral-surface rock fragments	0.0	1	15	100	10
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	10.7	18.0	m	3
Tree regeneration	TR	2.0	3.3	4.5	m	2
Tall shrubs	ST	3.0	4.3	6.0	m	7
Medium shrubs	SM	1.0	1.7	3.0	m	43
Low shrubs	SL	20.0	53.4	100.0	cm	22
Dwarf shrubs	SD	2.0	8.7	15.0	cm	13
Tall and medium grasses and grass-likes	GT, GM	40.0	76.7	130.0	cm	9
Tall and medium forbs	FT, FM	10.0	33.3	100.0	cm	63
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	8.8	10.0	cm	61

Characteristics of Short stalk sedge-mixed forb/dwarf willow meadow mosaic

Ecological Status: Climax plant community on wetter microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 17. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	SAPO	Salix polaris	0.1	22	65	65	38
SD	SARE2	Salix reticulata	3.0	16	40	82	36
SD	SAAR4	Salix arctica	2.0	27	80	24	25
SD	DROC	Dryas octopetala	0.1	9	15	29	16
GM-GT	CAPO	Carex podocarpa	5.0	21	50	94	44
GM-GT	CACA4	Calamagrostis canadensis	0.1	19	60	41	28
GM-GT	ARLA2	Arctagrostis latifolia	0.1	8	25	59	22
FM-FT	BORI2	Boykinia richardsonii	0.1	6	15	47	17
FM-FT	HELA4	Heracleum lanatum	0.1	5	15	24	11
FD-FM	ANPA	Anemone parviflora	0.1	8	25	65	23
FD-FM	ARAR9	Artemisia arctica	0.1	6	15	82	22
FD-FM	SAST11	Sanguisorba stipulata	0.1	12	25	35	20
FD-FM	EQAR	Equisetum arvense	0.1	9	55	41	19
FD-FM	ASUM2	Astragalus umbellatus	0.1	7	25	41	17
FD	SIPR	Sibbaldia procumbens	0.0	5	15	18	9
L	LICHEN	total lichens	0.0	4	25	100	20
M	MOSS	total bryophytes-mosses and liverworts	10.0	52	90	100	72
M1	ZZMOSS	unknown-mosses	10.0	40	80	65	51
M1	PLSC70	Pleurozium schreberi	3.0	19	40	29	23
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	33	95	100	57
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	3	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	5	100	0
B	WATER	water	0.0	0	5	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.2	1.2	m	1
Low shrubs	SL	30.0	75.0	100.0	cm	6
Dwarf shrubs	SD	1.0	4.5	10.0	cm	13
Tall and medium grasses and grass-likes	GT, GM	15.0	70.5	130.0	cm	10

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall and medium forbs	FT, FM	10.0	53.7	150.0	cm	19
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	6.8	10.0	cm	43

Map Unit Components

Common Name (Soils Name):

- Alpine-scrub-meadow mosaic gravelly diorite swales ((Oxyaquic) Humic Eutrogelepts, loamy-skeletal)
- Alpine-scrub-meadow mosaic gravelly schist swales ((Oxyaquic) Humic Eutrogelepts, loamy-skeletal)
- Alpine-scrub-meadow mosaic gravelly swales ((Oxyaquic) Typic Haplogelolls, loamy-skeletal)
- Alpine-scrub-meadow mosaic gravelly till swales ((Oxyaquic) Humic Eutrogelepts, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 7MFA Alpine Schist Lower Mountain Slopes with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal-Typic Dystrogelepts, loamy- skeletal Association, 0 to 36 percent slopes)
- 7MS31 Alpine Glaciated Mountain Summits and Benches with Discontinuous Permafrost
(Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy Association, 2 to 20 percent slopes)
- 7NG2 Alpine Backslopes on Hills, Nenana Gravels
(Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-(Oxyaquic) Humic Eutrogelepts, coarse- loamy Association, 12 to 45 percent slopes)
- 7TM1 Alpine Glaciated Mountains with Discontinuous Permafrost, High Elevation
(Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse- loamy Association, 2 to 50 percent slopes)
- 7TP Alpine Till Plains with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 16 percent slopes)
- 7TP8 Alpine Glaciated Diorite Plains and Hills
(Typic Haplogelods, loamy-skeletal-Typic Dystrogelepts, sandy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy- skeletal Association, 2 to 35 percent slopes)

Geographically Associated Landtypes

M135A_182—Gravelly Frozen Slopes, Ruptic:

This site occurs on non-sorted circles of a complex of barren mounds and vegetated inter-mounds underlain by permafrost at variable depths. The climax plant community is "Shrub birch/sedge scrub mosaic."

M135A_306—Gravelly Mountains, Moist:

This site occurs on moister micro-sites where snow persists later into the growing season. The climax plant community is "Cassiope-polar willow-mountain avens dwarf alpine scrub."

M135A_310—Gravelly Mountains, High Elevation:

This site occurs on colder more exposed micro-sites that have thinner accumulation of snow due to winter winds. The climax plant community is "White mountain avens-mixed ericaceous shrub dwarf alpine scrub."

M135A_ROC—Rock and Ice, Nonvegetated:

This site is interspersed with the others and is more prevalent at higher elevations. The climax plant community is "Sparsely vegetated mountain slopes, Interior."

Similar Landtypes

M135A_253—Loamy Slopes, High Elevation:

This site occurs on fan terraces and has well drained soils. The climax plant community is "Diamondleaf willow scrub, moist."

M135A_505—Loamy Drainages, High Elevation:

This site occurs in drainages and has wetter soils. The climax plant community is "Diamondleaf willow-green alder

Pond Margins (M135A_500)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Glaciated Lowlands (M135A.G1L)

Glaciated Uplands (M135A.G1)

Physiographic Features

	RV	Range
Elevation (meters):	666	471 to 1,471

Slope Gradient (percent):	0	0 to 1
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Aspect (clockwise direction): non-influencing

Landform: kettles; fens on till plains

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	582	506 to 758
Annual Air Temperature (°C):	-2.8	-3.5 to -2.4
Frost Free Days:	60	50 to 80

Soil Features

Parent Materials: grassy organic material over gravelly drift
 grassy organic material over silty eolian deposits

Rooting Depth (cm): RV: 58 Range: 13 to 100

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
38 to 58	mucky peat	moderately rapid	.34	5.0 to 6.2	30	80
20	very gravelly sandy loam	moderately rapid	.10	5.4	6	

Restrictive Features: permafrost at 63 to 150 cm or more
 strongly contrasting textural stratification at 63 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Sedge wet meadow	Climax plant community

Ecological Status-Transition Description:

A single plant community with sedge wet meadow is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sedge wet meadow	32	16	19	22	2

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sedge wet meadow	VESC2	Veronica scutellata

Characteristics of Sedge wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Percent Importance Value
			Min.	Avg.	Max.		
SL	SAFU	Salix fuscescens	7.0	9	10	50	21
SL	B EGL	Betula glandulosa	5.0	5	5	50	16
GM-GT	CASAL2	Carex saxatilis ssp. laxa	30.0	38	50	75	53
GM-GT	CAAQ	Carex aquatilis	30.0	53	75	50	51
GT	CARO6	Carex rostrata	10.0	10	10	25	16
GM	ALAE	Alopecurus aequalis	2.0	31	60	50	39
GM	CAAR2	Carex arcta	20.0	20	20	25	22
GM	JUFI	Juncus filiformis	15.0	15	15	25	19
GM	CAREX	Carex	10.0	10	10	25	16
GM	ARFU2	Arctophila fulva	5.0	5	5	25	11
FD	RUAR	Rubus arcticus	0.1	13	25	50	25
FD	VIEPR	Viola epipsila ssp. repens	15.0	15	15	25	19
L	LICHEN	total lichens	0.0	0	1	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	21	35	100	46
M1	POLYT5	Polytrichum	2.0	11	20	75	29
M1	SPHAG2	Sphagnum	1.0	10	25	75	27
M1	ZZMOSS	unknown-mosses	0.1	8	15	50	20
B	WATER	water	5.0	36	80	100	60
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	1.0	28	80	100	53
B	SOIL	mineral-bare soil	0.0	1	3	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	1	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	30.0	56.0	100.0	cm	5
Tall and medium grasses and grass-like	GT, GM	40.0	92.5	130.0	cm	4
Tall and medium forbs	FT, FM	20.0	20.0	20.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	4.0	4.0	4.0	cm	1

Map Unit Components**Common Name (Soils Name):**

Alpine-sedge wet meadow organic depressions, frozen (Terric Fibristels, loamy)

Alpine-wet meadow gravelly pond margins (Histic Cryaquepts, loamy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

- 7P2 Boreal Glaciated Plains and Hills
(Typic Eutrocryepts, sandy-skeletal-Typic Eutrocryepts, coarse-silty over sandy-skeletal Association, 0 to 30 percent slopes)
- 7P4 Boreal Glaciated Plains and Hills with Discontinuous Permafrost
(Typic Haplocryods, loamy-skeletal-Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 20 percent slopes)
- 7TP Alpine Till Plains with Discontinuous Permafrost
(Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 16 percent slopes)
- 7TP2 Alpine Till Plains and Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 2 to 50 percent slopes)
- 7TP3 Boreal and Alpine Hills with Discontinuous Permafrost
(Typic Haplogelods, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal Association, 0 to 35 percent slopes)
- 7TP8 Alpine Glaciated Diorite Plains and Hills
(Typic Haplogelods, loamy-skeletal-Typic Dystrogelepts, sandy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal Association, 2 to 35 percent slopes)

Geographically Associated Landtypes

M135A_180—Gravelly Frozen Slopes:

This site occurs on adjacent uplands with soils that have permafrost at moderate depths. The climax plant community is

"Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_356—Gravelly Slopes, High Elevation:

This site occurs on somewhat excessively drained soils that are very shallow to sand and gravel. The climax plant community is "Shrub birch-dwarf ericaceous scrub mosaic."

M135A_358—Gravelly Slopes:

This site occurs on well drained soils that are very shallow to sand and gravel. The climax plant community is "Shrub birch-bog blueberry scrub."

M135A_405—Swales:

This site occurs on swales with seasonally wet soils. The climax plant community is "Green alder scrub mosaic."

Similar Landtypes

M135A_530—Organic Depressions, Bogs:

This site has soils with a thick surface organic mat. The climax plant community is "Sedge/sphagnum bog."

Loamy Drainages, Frozen (M135A_502)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Boreal Outer Range & Kantishna Hills (M135A.M1L)

Glaciated Lowlands (M135A.G1L)

Physiographic Features

	RV	Range
Elevation (meters):	595	211 to 641
Slope Gradient (percent):	2	0 to 6

Aspect (clockwise direction): non-influencing

Landform: drainageways on mountains; drainageways on hills; drainageways on till plains; drainageways on outwash plains

	Frequency	Duration	Beginning Month	Ending Month	Depth (cm)
Flooding:	Frequent	Long	May	Sep	
Ponding:	Frequent	Long	May	Sep	10 to 20

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	582	506 to 776
Annual Air Temperature (°C):	-2.8	-4.0 to -2.4
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: woody organic material and/or silty alluvium over silty alluvium

Rooting Depth (cm): RV: 46 Range: 17 to 78

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
9	slightly decomposed plant material	moderately rapid	.34	3.6	30	
37	stratified very fine sand to highly decomposed plant material	moderate	.19	5.3	25	

Restrictive Features: permafrost at 48 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: poorly drained or very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Diamondleaf willow-green alder-leatherleaf scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with diamondleaf willow-green alder-leatherleaf scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Diamondleaf willow-green alder-leatherleaf scrub	44	12	18	24	5

Characteristics of Diamondleaf willow-green alder-leatherleaf scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	SAPU15	Salix pulchra	30.0	59	90	100	77
SM-ST	ALVIC	Alnus viridis ssp. crispa	0.1	12	45	86	32
SL	CHCA2	Chamaedaphne calyculata	3.0	25	50	86	46
SL	VAUL	Vaccinium uliginosum	0.1	23	60	86	44

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL	SPST3	Spiraea stevenii	1.0	9	15	57	23
GT	CACA4	Calamagrostis canadensis	0.1	18	60	57	32
GM-GT	ARFU2	Arctophila fulva	0.1	15	30	29	21
FD-FM	COPA28	Comarum palustre	0.1	8	20	71	24
L	LICHEN	total lichens	0.0	0	1	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	39	75	100	62
M1	SPHAG2	Sphagnum	5.0	23	75	86	44
M1	ZZMOSS	unknown-mosses	5.0	16	30	71	34
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	30.0	54	80	100	73
B	SOIL	mineral-bare soil	0.0	13	80	100	36
B	WATER	water	0.0	8	40	100	28
B	LITTER2	litter-woody debris >2.5 cm	0.0	3	10	100	17
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.0	3.0	3.0	m	1
Tall shrubs	ST	3.0	4.0	5.0	m	4
Medium shrubs	SM	1.0	1.8	3.0	m	5
Low shrubs	SL	40.0	70.0	100.0	cm	9
Dwarf shrubs	SD	10.0	10.0	10.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	80.0	118.0	160.0	cm	5
Tall and medium forbs	FT, FM	30.0	50.0	60.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	6.8	15.0	cm	5

Map Unit Components**Common Name (Soils Name):**

Boreal-riparian tall scrub silty frozen drains (Fluvaquentic Aquorthels, coarse-silty)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

7P6	Boreal Outwash Plains with Continuous Permafrost (Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 10 percent slopes)
7TP4	Boreal and Alpine Till Plains with Continuous Permafrost (Typic Historthels, loamy-skeletal Association 0 to 12 percent slopes)
7TP5	Boreal and Alpine Till Plains and Hills with Discontinuous Permafrost (Typic Historthels, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 2 to 24 percent slopes)
8LMF	Boreal Lower Mountain Slopes, Thermokarsted (Typic Umbrorthels, coarse-silty-Typic Histoturbels, coarse-silty Association, 0 to 40 percent slopes)

Geographically Associated Landtypes**M135A_105—Loamy Frozen Terraces, Wet:**

This site occurs on terraces and soils are wetter. The climax plant community is "Black spruce/tussock cottongrass woodland."

M135A_400—Loamy Frozen Slopes:

This site is not flooded, occurs on adjacent uplands with soils that have permafrost at moderate depths. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

Similar Landtypes**M135A_253—Loamy Slopes, High Elevation:**

This site occurs on upland fan terraces and is not flooded. The climax plant community is "Diamondleaf willow scrub, moist."

M135A_420—Swales, High Elevation:

This site occurs in upland swales and is not flooded. The climax plant community is "Diamondleaf willow-mixed willow scrub mosaic."

M135A_505—Loamy Drainages, High Elevation:

This site occurs within the alpine biome at higher elevation. The climax plant community is "Diamondleaf willow-green alder scrub."

Loamy Drainages, High Elevation (M135A_505)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Toklat Basin Lowlands (M135A.M7)

Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Teklanika Alpine Mountains & Plateaus (M135A.M6)

Glaciated Uplands (M135A.G1)

Physiographic Features

	RV	Range
Elevation (meters):	512	304 to 1222
Slope Gradient (percent):	1	0 to 10

Aspect (clockwise direction): non-influencing

Landform: drainageways on mountains; drainageways on hills; drainageways on till plains; drainageways on outwash plains

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	Occasional	Brief	May	Sep
Ponding:	None			

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	598	405 to 856
Annual Air Temperature (°C):	-2.7	-4.8 to -2.0
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: sandy and silty alluvium over sandy and gravelly alluvium

Rooting Depth (cm): RV: 44 Range: 17 to 100

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3	slightly decomposed plant material	moderately rapid	.30	5.8		80
8	stratified sand to silt	moderately rapid	.16	6.0		16
2 to 31	stratified gravelly coarse sand to silt; extremely gravelly coarse sand	moderately rapid to very rapid	.03 to .16	6.2		2 to 16

Restrictive Features: strongly contrasting textural stratification at 42 cm

Water Table (May to September): 50 to 70 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Diamondleaf willow-green alder scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with diamondleaf willow-green alder scrub is identified on this site and flooding is considered a transitional pathway between this site and other geographically associated sites.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Diamondleaf willow-green alder scrub	43	16	19	22	4

Characteristics of Diamondleaf willow-green alder scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 15. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-ST	SAPU15	Salix pulchra	35.0	72	100	93	82
SM-ST	ALVIC	Alnus viridis ssp. crispa	2.0	29	85	40	34
SD-SM	BEGL	Betula glandulosa	0.1	6	20	73	21
SL	VAUL	Vaccinium uliginosum	0.1	11	40	47	23
SD	LIBO3	Linnaea borealis	3.0	6	10	20	11
GM-GT	CACA4	Calamagrostis canadensis	5.0	34	90	67	48
FD-FM	EQAR	Equisetum arvense	0.1	30	50	33	31
FD-FM	PEFR5	Petasites frigidus	0.1	14	60	67	31
FD-FM	COCA13	Cornus canadensis	0.1	9	20	33	17
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.0	25	90	100	50
M1	SPHAG2	Sphagnum	10.0	43	80	27	34
M1	ZZMOSS	unknown-mosses	5.0	23	50	20	21
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	51	95	100	71
B	LITTER2	litter-woody debris >2.5 cm	0.0	5	15	100	22
B	WATER	water	0.0	4	20	100	20
B	SOIL	mineral-bare soil	0.0	3	40	100	17
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.5	8.8	21.0	m	9
Tree regeneration	TR	2.0	2.1	2.2	m	3
Tall shrubs	ST	3.0	3.6	4.0	m	6
Medium shrubs	SM	1.0	1.9	2.5	m	18
Low shrubs	SL	20.0	71.1	100.0	cm	18
Dwarf shrubs	SD	18.0	18.0	18.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	30.0	83.3	130.0	cm	6
Tall and medium forbs	FT, FM	10.0	27.5	70.0	cm	20
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	8.6	15.0	cm	22

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number
----- m ² / ha -----			of Stands
0.2	0.2	0.2	1

Map Unit Components

Common Name (Soils Name):

Subalpine-riparian scrub loamy drains (Aquic Cryofluvents, coarse-loamy over sandy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

- | | |
|-------|--|
| 10ES1 | Boreal Terrace Escarpments with Discontinuous Permafrost
(Typic Eutrocryepts, coarse-loamy-Typic Historthels, coarse-silty-Typic Historthels, loamy-skeletal Complex, 5 to 70 percent slopes) |
| 10LM | Alpine Low Mountains with Discontinuous Permafrost, Nenana Gravels
(Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 2 to 30 percent slopes) |
| 10TS1 | Boreal Mountain Toeslopes with Discontinuous Permafrost, Nenana Gravels
(Typic Historthels, loamy-skeletal-Typic Histoturbels, coarse-silty Association, 0 to 14 percent slopes) |
| 11P | Alpine Plains with Continuous Permafrost
(Typic Histoturbels, coarse-silty, 0 to 5 percent slopes) |
| 7FGA | Alpine Plains and Hills with Continuous Permafrost, Nenana Gravels
(Typic Histoturbels, coarse-silty-Typic Historthels, loamy-skeletal Association, 0 to 15 percent slopes) |

Geographically Associated Landtypes

M135A_180—Gravelly Frozen Slopes:

This site is not flooded, occurs on adjacent uplands with soils that have permafrost at moderate depths. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_358—Gravelly Slopes:

This site occurs on well drained soils that are very shallow to sand and gravel. The climax plant community is "Shrub birch-bog blueberry scrub."

M135A_405—Swales:

This site occurs on swales with seasonally wet soils. The climax plant community is "Green alder scrub mosaic."

Similar Landtypes

131B_108—Gravelly and Sandy Terraces:

This site occurs in uplands and is not flooded. The climax plant community is "Spruce/ericaceous woodland."

M135A_253—Loamy Slopes, High Elevation:

This site occurs in uplands and is not flooded. The climax plant community is "Diamondleaf willow scrub, moist."

M135A_420—Swales, High Elevation:

This site occurs in upland swales and is not flooded. The climax plant community is "Diamondleaf willow-mixed willow scrub mosaic."

M135A_502—Loamy Drainages, Frozen:

This site occurs within the boreal biome at lower elevation. The climax plant community is "Diamondleaf willow-green alder-leatherleaf scrub."

Organic Depressions, Bogs (M135A_530)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Toklat Basin Lowlands (M135A.M7)

Glaciated Lowlands (M135A.G1L)

Glaciated Uplands (M135A.G1)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	548	448 to 788
Slope Gradient (percent):	1	0 to 2

Aspect (clockwise direction): non-influencing

Landform: bogs on hills; bogs on till plains; drainageways on plains on basins

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>	<i>Depth (cm)</i>
Flooding:	None				
Ponding:	Frequent	Very long	May	Sep	0 to 20

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	488	452 to 577
Annual Air Temperature (°C):	-2.4	-2.8 to -2.2
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: grassy organic material over silty eolian deposits

mossy organic material and/or grassy organic material over silty loess over gravelly till

Rooting Depth (cm): *RV:* 101 *Range:* 37 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness	Texture	Permeability	AWC	pH	Effective CEC	CEC
<i>(cm)</i>			<i>(cm/cm)</i>		<i>(me/100g)</i>	<i>(me/100g)</i>
63 to 101	peat	moderately rapid	.34	4.2 to 6.2	30	80

Restrictive Features: permafrost at 63 to 150 cm or more
strongly contrasting textural stratification at 63 to 150 cm

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type
Sedge/sphagnum bog

Ecological Status
Climax plant community

Ecological Status-Transition Description:

A single plant community with sedge/sphagnum bog is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sedge/sphagnum bog	36	7	13	23	5

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sedge/sphagnum bog	CACH5	Carex chordorrhiza

Characteristics of Sedge/sphagnum bog

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	SAFU	Salix fuscescens	3.0	8	15	57	21
GM-GT	CAAQ	Carex aquatilis	0.1	34	65	57	44
GM-GT	ERAN6	Eriophorum angustifolium	3.0	24	60	43	32
GM	CARO7	Carex rotundata	10.0	17	20	43	27
GM	CALI7	Carex limosa	5.0	13	30	43	24
GM	CAMAI2	Carex magellanica ssp. irrigua	0.1	8	20	57	21
GM	ERRU2	Eriophorum russeolum	1.0	6	15	43	16
GM	CACA11	Carex canescens	0.1	5	15	43	15
GM	ERSC2	Eriophorum scheuchzeri	1.0	8	15	29	15
FD-FM	COPA28	Comarum palustre	0.1	5	10	43	15
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	5.0	63	95	100	79
M1	SPHAG2	Sphagnum	5.0	56	90	100	75
M1	ZZMOSS	unknown-mosses	5.0	10	15	57	24
B	WATER	water	5.0	34	65	100	58
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	26	60	100	51
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	30.0	30.0	30.0	cm	3
Dwarf shrubs	SD	10.0	13.0	20.0	cm	5
Tall and medium grasses and grass-like	GT, GM	6.0	40.2	100.0	cm	10
Tall and medium forbs	FT, FM	20.0	20.0	20.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	4.0	7.0	10.0	cm	2

Map Unit Components**Common Name (Soils Name):**

Alpine-sedge bog organic depressions, frozen (Terric Fibristels, loamy)

Boreal-sedge/sphagnum bog organic depressions (Cryofibrists, euic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

11P1	Alpine Plains and Drainages with Continuous Permafrost (Typic Histoturbels, coarse-silty-Glacial Folistels, dysic-Terric Fibristels, loamy Association, 0 to 5 percent slopes)
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Geographically Associated Landtypes

M135A_358—Gravelly Slopes:

This site occurs on well drained soils that are very shallow to sand and gravel. The climax plant community is "Shrub birch-bog blueberry scrub."

M135A_400—Loamy Frozen Slopes:

This site occurs on loamy soils with permafrost at moderate depths. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

M135A_500—Pond Margins:

This site occurs on soils with a thin organic mat and less acid reaction. The climax plant community is "Sedge wet meadow."

Similar Landtypes

M135A_500—Pond Margins:

This site has a thin surface organic mat. The climax plant community is "Sedge wet meadow."

Loamy Depressions (M135A_550)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Glaciated Lowlands (M135A.G1L)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	600	475 to 878
Slope Gradient (percent):	3	0 to 30
Aspect (clockwise direction): non-influencing		
Landform: kettles on hills; kettles on outwash plains		

	<i>Frequency</i>
Flooding:	None
Ponding:	None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	582	506 to 732
Annual Air Temperature (°C):	-2.8	-3.2 to -2.5
Frost Free Days:	70	60 to 80

Soil Features

Parent Materials: silty eolian deposits over sandy and gravelly outwash

Rooting Depth (cm): *RV:* 23 *Range:* 2 to 58

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
7	slightly decomposed plant material	moderately rapid	.34	5.1	30	
16	silt loam	moderate	.40	5.4	12	

Restrictive Features: strongly contrasting textural stratification at 58 cm

Water Table (May to September): 0 to 50 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Graminoid herbaceous meadow	Climax plant community

Ecological Status-Transition Description:

A single plant community with graminoid herbaceous meadow is identified on this site. No transitional pathways to other communities have been identified for this site. The concave surface relief typical of this site favors snow drifting during winter followed by temporary saturation of soils during early summer from snow melt

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Graminoid herbaceous meadow	15	15	15	15	1

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Graminoid herbaceous meadow	DAIN	Danthonia intermedia

Characteristics of Graminoid herbaceous meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 4. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy	Importance		
			Min.	Avg.	Max.		
GM	CACA4	Calamagrostis canadensis	15.0	37	70	75	53
GM	FEAL	Festuca altaica	25.0	48	70	50	49
GM	ZZGRAM	unknown-graminoids	35.0	35	35	25	30
GM	POA	Poa	25.0	25	25	25	25
GM	CAREX	Carex	20.0	20	20	25	22
GM	CAPO	Carex podocarpa	10.0	10	10	25	16
GM	CALAM	Calamagrostis	5.0	5	5	25	11
FM	POAC	Polemonium acutiflorum	3.0	5	7	75	19
FD	RUAR	Rubus arcticus	15.0	15	15	25	19
FD	VIEPR	Viola epipsila ssp. repens	15.0	15	15	25	19
FD	VIOLA	Viola	10.0	10	10	25	16
L	LICHEN	total lichens	0.0	9	15	100	30
M	MOSS	total bryophytes-mosses and liverworts	20.0	34	60	100	58
M1	POLYT5	Polytrichum	15.0	38	60	50	44
M1	ZZMOSS	unknown-mosses	10.0	10	10	25	16
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	46	80	100	68
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.3	0.3	0.3	m	1
Medium shrubs	SM	1.1	1.1	1.1	m	1
Low shrubs	SL	50.0	56.7	70.0	cm	3
Dwarf shrubs	SD	20.0	20.0	20.0	cm	1
Tall and medium grasses and grass-like	GT, GM	30.0	40.0	50.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	4.5	10.0	cm	4

Map Unit Components

Common Name (Soils Name):

Boreal-meadow loamy outwash slope depressions (Oxyaquic Eutrocryepts, coarse-silty over sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7P2 Boreal Glaciated Plains and Hills
(Typic Eutrocryepts, sandy-skeletal-Typic Eutrocryepts, coarse-silty over sandy-skeletal Association, 0 to 30 percent slopes)

Geographically Associated Landtypes

M135A_350—Gravelly and Sandy Slopes:

This site occurs on somewhat excessively drained soils with thin loamy surface mantles. The climax plant community is "White spruce/shrub birch woodland."

M135A_500—Pond Margins:

This site occurs on soils that are wetter. The climax plant community is "Sedge wet meadow."

Loamy Depressions, High Elevation (M135A_551)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Mountains (M135A.M2)

Physiographic Features

	RV	Range
Elevation (meters):	1,320	701 to 1,974
Slope Gradient (percent):	26	15 to 35

Aspect (clockwise direction): northwest to east

Landform: depressions on cirque floors; depressions on moraines; depressions on mountains; flood plains on alluvial fans on mountains; swales on moraines

Landform Positions: summits

	Frequency	Duration	Beginning Month	Ending Month
Flooding:	None or rare		May	Sep

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,024	552 to 2,466
Annual Air Temperature (°C):	-5.6	-10.7 to -2.5
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: gravelly till
gravelly till derived from diorite
silty eolian deposits over gravelly till derived from diorite
silty eolian deposits over sandy and gravelly alluvium

Rooting Depth (cm): RV: 52 Range: 16 to 102

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3 to 4	moderately decomposed plant material	moderately rapid	.34	5.1 to 6.1	30 to 85	80
7 to 13	silt loam	moderate	.18 to .40	5.3 to 6.1	12 to 16	16
35 to 42	extremely cobbly sandy loam; gravelly loam	moderately rapid	.03 to .10	5.9 to 7.4		2 to 6

Restrictive Features: strongly contrasting textural stratification at 10 to 24 cm in some components

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Netleaf willow-mountain avens/herbaceous dwarf alpine scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with netleaf willow-mountain avens/herbaceous dwarf scrub is identified on this site. No transitional pathways to other communities have been identified for this site. The concave surface relief typical of this site favors snow drifting during winter followed by temporary saturation of soils during early summer from snow melt.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Netleaf willow-mountain avens/herbaceous dwarf alpine scrub	127	28	44	73	8

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Netleaf willow-mountain avens/herbaceous dwarf alpine scrub	DRLOL	Draba lonchocarpa var. lonchocarpa

Characteristics of Netleaf willow-mountain avens/herbaceous dwarf alpine scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 11. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	SABA4	Salix barrattiana	10.0	13	15	18	15
SD-SL	SAAR4	Salix arctica	0.1	7	15	27	14
SD-SL	VAUL	Vaccinium uliginosum	0.1	5	15	36	13
SD	SARE2	Salix reticulata	5.0	37	65	91	58
SD	DRAL7	Dryas alaskensis	10.0	23	30	36	29
SD	SAPO	Salix polaris	0.1	10	25	64	25
SD	DROC	Dryas octopetala	0.1	6	20	45	16
GM	CAREX	Carex	30.0	40	50	18	27
GM	CAPO	Carex podocarpa	0.1	9	30	73	26
GM	CAMI4	Carex microchaeta	1.0	8	15	18	12
FD-FT	BORI2	Boykinia richardsonii	2.0	7	15	45	18
FD-FM	ANPA	Anemone parviflora	0.1	8	25	73	24
FD-FM	DOFR	Dodecatheon frigidum	0.1	6	20	55	18
L	LICHEN	total lichens	0.0	2	10	100	14
M	MOSS	total bryophytes-mosses and liverworts	5.0	49	90	100	70
M1	PLSC70	Pleurozium schreberi	10.0	35	70	45	40
M1	ZZMOSS	unknown-mosses	5.0	26	70	55	38

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M1	RACA11	Racomitrium canescens	4.0	7	10	18	11
M1	THRE7	Thuidium recognitum	4.0	7	10	18	11
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	40	75	100	63
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	2	100	0
B	WATER	water	0.0	0	3	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	0.5	0.5	0.5	m	1
Low shrubs	SL	30.0	30.0	30.0	cm	1
Dwarf shrubs	SD	2.0	6.4	20.0	cm	11
Tall and medium grasses and grass-likes	GT, GM	10.0	30.7	100.0	cm	7
Tall and medium forbs	FT, FM	10.0	38.1	120.0	cm	8
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	6.2	10.0	cm	31

Map Unit Components

Common Name (Soils Name):

Alpine-dwarf scrub gravelly diorite fans, cool (Humic Eutrogelepts, loamy-skeletal)

Alpine-dwarf scrub-meadow mosaic gravelly depressions (Humic Eutrogelepts, loamy-skeletal)

Alpine-dwarf scrub-meadow mosaic gravelly fan swales (Typic Gelorthents, sandy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7MSC Alpine Mountain Fans

(Typic Eutrogelepts, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 15 to 70 percent slopes)

Geographically Associated Landtypes

M135A_306—Gravelly Mountains, Moist:

This site occurs on moister micro-sites where snow persists later into the growing season. The climax plant community is "Cassiope-polar willow-mountain avens dwarf alpine scrub."

M135A_310—Gravelly Mountains, High Elevation:

This site occurs on colder more exposed micro-sites that have thinner accumulation of snow due to winter winds. The climax plant community is "White mountain avens-mixed ericaceous shrub dwarf alpine scrub."

M135A_ROC—Rock and Ice, Nonvegetated:

This site is interspersed with the others and is more prevalent at higher elevations. The climax plant community is "Sparsely vegetated mountain slopes, Interior."

Escarpments (M135A_800)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Teklanika Boreal Mountains & Plateaus (M135A.M6L)

Teklanika Alpine Mountains & Plateaus (M135A.M6)

Glaciated Lowlands (M135A.G1L)

Physiographic Features

	RV	Range
Elevation (meters):	611	333 to 1,005
Slope Gradient (percent):	48	30 to 70

Aspect (clockwise direction): non-influencing

Landform: escarpments on plateaus; escarpments on terraces

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	528	405 to 856
Annual Air Temperature (°C):	-2.8	-4.8 to -2.0
Frost Free Days:	67	50 to 80

Soil Features

Parent Materials: silty eolian deposits over gravelly colluvium

Rooting Depth (cm): RV: 46 Range: 21 to 78

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
5	slightly decomposed plant material	moderately rapid	.34	5.5	30	
6	loam	moderate	.18	5.6		16
14 to 21	very gravelly loamy sand; silt loam	moderate to rapid	.04 to .12	5.8 to 6.6		2 to 6

Restrictive Features: strongly contrasting textural stratification at 11 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
White spruce forest	Climax plant community
Closed aspen forest	Climax plant community on drier microsites
White spruce/alder forest	Climax plant community on wetter microsites

Ecological Status-Transition Description:

Three plant communities are identified within this more broadly defined slope influenced site including a potential community with white spruce forest, a drier potential community with closed aspen forest on more southerly slopes, and a moister potential community with white spruce/alder forest on more northerly slopes.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
White spruce forest	62	19	26	39	3
Closed aspen forest	70	32	35	40	3
White spruce/alder forest					0

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Closed aspen forest	CAAL6	Carex albonigra
	CASUS	Carex supina ssp. spaniocarpa

Characteristics of White spruce forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	3.0	24	45	57	37
TM	PIGL	Picea glauca	15.0	18	20	43	28
SD-ST	SALIX	Salix	0.1	24	50	57	37
SM-ST	ALVIC	Alnus viridis ssp. crispa	2.0	8	10	57	21
SL-SM	B EGL	Betula glandulosa	0.1	16	45	100	40
SL	ROAC	Rosa acicularis	0.1	12	35	43	23
SL	SHCA	Shepherdia canadensis	1.0	11	25	43	22
SD-SL	LEPAD	Ledum palustre ssp. decumbens	10.0	15	20	29	21
SL	LEGR	Ledum groenlandicum	5.0	12	20	29	19
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	2.0	12	40	71	29
SD	EMNI	Empetrum nigrum	0.1	8	15	29	15
SD	SARE2	Salix reticulata	5.0	8	10	29	15
SD	LIBO3	Linnaea borealis	0.1	5	10	29	12
GM-GT	CACA4	Calamagrostis canadensis	5.0	10	15	29	17
GM	FEAL	Festuca altaica	2.0	11	20	43	22
GM	CAREX	Carex	0.1	8	15	29	15
GM	CABI5	Carex bigelowii	5.0	6	6	29	13
FD-FM	GELI2	Geocaulon lividum	3.0	9	15	43	20
L	LICHEN	total lichens	0.1	12	40	100	35
L1	CLADI3	Cladina	0.1	10	20	29	17
M	MOSS	total bryophytes-mosses and liverworts	10.0	56	90	100	75
M1	HYSP70	Hylocomium splendens	15.0	30	40	43	36
M1	SPHAG2	Sphagnum	0.1	30	90	43	36
M1	PLSC70	Pleurozium schreberi	5.0	13	20	43	24
M1	ZZMOSS	unknown-mosses	0.1	6	10	71	21
M1	RHRU70	Rhytidium rugosum	1.0	10	20	29	17
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	20	35	100	45
B	LITTER2	litter-woody debris >2.5 cm	2.0	8	20	100	28
B	SOIL	mineral-bare soil	0.0	4	20	100	20
B	ROCK	mineral-surface rock fragments	0.0	4	20	100	20
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	3.6	9.9	21.0	m	11
Tree regeneration	TR	1.0	1.9	3.0	m	4
Tall shrubs	ST	3.0	4.5	5.5	m	4

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.4	2.0	m	7
Low shrubs	SL	30.0	61.1	100.0	cm	9
Dwarf shrubs	SD	8.0	14.8	20.0	cm	8
Tall and medium grasses and grass-likes	GT, GM	30.0	50.0	90.0	cm	3
Tall and medium forbs	FT, FM	30.0	40.0	50.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	6.1	10.0	cm	7

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements
Picea glauca	64	18.0	8.5	7	B
	115	26.3	14.1		
	149	35.6	19.5		

Tree Basal Area (all trees >1.5 m tall):

Min.	Avg.	Max.	Number of Stands
----- m ² / ha -----			
6.9	22.2	32.2	3

Characteristics of Closed aspen forest

Ecological Status: Climax plant community on drier microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	1.0	6	10	33	14
TM	POTR5	Populus tremuloides	35.0	72	95	83	77
TM	POBA2	Populus balsamifera	30.0	35	40	33	34
TR	POTR5	Populus tremuloides	0.1	8	20	67	23
SL-SM	ROAC	Rosa acicularis	1.0	13	25	67	30
SL-SM	VIED	Viburnum edule	20.0	22	25	33	27
SM	ALVIC	Alnus viridis ssp. crispa	3.0	5	7	33	13
SL-SM	SHCA	Shepherdia canadensis	0.1	5	10	33	13
SL	VAUL	Vaccinium uliginosum	3.0	13	25	50	25
SL	PEFL15	Pentaphylloides floribunda	5.0	5	5	17	9
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	10.0	24	35	83	45
SD	LIBO3	Linnaea borealis	0.1	10	30	50	22
SD	EMNI	Empetrum nigrum	3.0	12	20	33	20
GT	CACA4	Calamagrostis canadensis	7.0	7	7	17	11
GT	CAPU	Calamagrostis purpurascens	7.0	7	7	17	11
FM-FT	EPAN2	Epilobium angustifolium	2.0	6	20	100	24
FT	HEAL	Hedysarum alpinum	20.0	20	20	17	18
FM	ASSI	Aster sibiricus	5.0	8	10	33	16
FD	COCA13	Cornus canadensis	1.0	21	60	50	32
FD	CYGU	Cypripedium guttatum	5.0	5	5	17	9
L	LICHEN	total lichens	0.0	1	5	100	10
M	MOSS	total bryophytes-mosses and liverworts	5.0	21	35	100	46
M1	ZZMOSS	unknown-mosses	4.0	8	15	50	20
M1	HYSPT0	Hylocomium splendens	2.0	11	20	33	19
M1	RHRU70	Rhytidium rugosum	5.0	10	15	33	18
M1	PLSC70	Pleurozium schreberi	5.0	5	5	17	9
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	65.0	81	95	100	90
B	LITTER2	litter-woody debris >2.5 cm	2.0	10	15	100	32
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	5.0	9.6	20.0	m	10
Tree regeneration	TR	0.5	1.5	3.0	m	5
Tall shrubs	ST	4.0	4.0	4.0	m	1
Medium shrubs	SM	1.5	2.2	3.0	m	2
Low shrubs	SL	50.0	73.3	100.0	cm	3
Dwarf shrubs	SD	7.0	7.0	7.0	cm	1
Tall and medium grasses and grass-likes	GT, GM	80.0	90.0	100.0	cm	2
Tall and medium forbs	FT, FM	30.0	52.0	80.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.0	5.0	cm	6

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)	Number of Trees	Height of Measurements	
Picea glauca	83	38.9	23.2	Min.	1	B
	83	38.9	23.2	Avg.		
	83	38.9	23.2	Max.		

Characteristics of White spruce/alder forest

Ecological Status: Climax plant community on wetter microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TT	PIGL	Picea glauca	5.0	15	25	100	39
TT	BENE4	Betula neoalaskana	5.0	5	5	50	16
TM	PIGL	Picea glauca	5.0	5	5	100	22
TR	PIGL	Picea glauca	0.1	8	15	100	28
SM-ST	ALVIC	Alnus viridis ssp. crispa	10.0	20	30	100	45
SL	LEPAD	Ledum palustre ssp. decumbens	15.0	15	15	50	27
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	3.0	9	15	100	30
FM	GELI2	Geocaulon lividum	20.0	20	20	50	32
FM	MEPA	Mertensia paniculata	10.0	10	10	50	22
L	LICHEN	total lichens	0.1	2	3	100	14
M	MOSS	total bryophytes-mosses and liverworts	45.0	65	85	100	81
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	32	50	100	57
B	LITTER2	litter-woody debris >2.5 cm	5.0	8	10	100	28
B	SOIL	mineral-bare soil	0.0	2	5	100	14
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	6.0	13.7	25.0	m	7
Tree regeneration	TR	1.0	2.0	3.0	m	3
Tall shrubs	ST	3.0	3.5	4.0	m	2
Medium shrubs	SM	2.5	2.5	2.5	m	1
Low shrubs	SL	30.0	30.0	30.0	cm	4
Dwarf shrubs	SD	10.0	15.0	20.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	20.0	20.0	20.0	cm	1
Tall and medium forbs	FT, FM	20.0	25.0	30.0	cm	4

Site Tree Measurements:

Only dominant, codominant, and open grown trees were measured. Height of Measurements = height above ground at which age and diameter was measured. G = ground level, B = breast height (ca 1.5 m).

Tree Species	Age (years)	Diameter (cm)	Height (m)		Number of Trees	Height of Measurements
Picea glauca	55	18.3	10.7	Min.	2	B
	55	23.0	12.8	Avg		
	55	27.7	14.9	Max.		

Map Unit Components**Common Name (Soils Name):**

Boreal-forested gravelly colluvial slopes, dissected (Typic Eutrocryepts, coarse-loamy)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

10ES	Subalpine and Alpine Plateau Escarpments with Discontinuous Permafrost (Typic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Complex, 10 to 70 percent slopes)
10ES1	Boreal Terrace Escarpments with Discontinuous Permafrost (Typic Eutrocryepts, coarse-loamy-Typic Historthels, coarse-silty-Typic Historthels, loamy-skeletal Complex, 5 to 70 percent slopes)
7ES	Boreal and Alpine Escarpments (Typic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal-Nonvegetated Talus Complex, 30 to 70 percent slopes)

Geographically Associated Landtypes**M135A_113—Loamy Frozen Slopes, Ice Cored:**

This site occurs on gentle sloping positions with well drained soils with thick loamy surface textures and permafrost at moderate depths. The climax plant community is "Black spruce/green alder woodland."

M135A_180—Gravelly Frozen Slopes:

This site occurs on soils that are wetter and have permafrost at moderate depths. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_400—Loamy Frozen Slopes:

This site occurs on adjacent lesser slopes with poorly drained soils that are shallow over permafrost. The climax plant community is "Black spruce/bog blueberry-Labrador tea woodland."

Similar Landtypes**M135A_151—Loamy High Flood Plains:**

This site occurs on flood plains with a thick loamy surface mantle. The climax plant community is "White spruce/bog blueberry/feathermoss forest."

M135A_355—Gravelly Mountains, Warm:

This is occurs on less steep, more moist slopes. The climax plant community is "White spruce/green alder forest."

M135A_801—Escarpments, Cool:

This site occurs at slightly higher elevations. The climax plant community is "Dwarf poplar-aspen forest."

Escarpments, Cool (M135A_801)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Teklanika Alpine Mountains & Plateaus (M135A.M6)

Alpine Mountains (M135A.M2)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	707	415 to 1,005
Slope Gradient (percent):	45	30 to 70

Aspect (clockwise direction): non-influencing

Landform: escarpments on plateaus; mountains

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	540	426 to 856
Annual Air Temperature (°C):	-3.0	-4.8 to -2.0
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: gravelly colluvium

silty eolian deposits over gravelly colluvium

Rooting Depth (cm): *RV:* 60 *Range:* 23 to 82

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
6	moderately decomposed plant material	moderately rapid	.34	4.8	30	
4 to 13	very cobbly loam; silt loam	moderate	.18	4.5 to 5.8	6	16
6 to 41	very flaggy sandy loam; very cobbly sandy loam; very channery sandy loam; very channery loam; bedrock	moderate to rapid	.04 to .12	6.4	6	2 to 6

Restrictive Features: bedrock (paralithic) at 54 to 150 cm or more

strongly contrasting textural stratification at 4 cm in some components

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Dwarf poplar-aspen forest

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community with dwarf poplar-aspen forest is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Dwarf poplar-aspen forest	79	30	38	45	4

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Dwarf poplar-aspen forest	ASAB	Astragalus aboriginorum
	BOAL99	Botrychium alaskense
	DOGO	Douglasia gormanii
	FEBR2	Festuca brevissima
	SESI	Selaginella sibirica

Characteristics of Dwarf poplar-aspen forest

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TS	POTR5	Populus tremuloides	30.0	58	80	71	64
TS	POBA2	Populus balsamifera	0.1	24	55	86	45
SL-SM	BEGL	Betula glandulosa	0.1	17	65	100	41
SM	SAGL	Salix glauca	0.1	5	15	43	15
SL	VAUL	Vaccinium uliginosum	0.1	9	20	71	25
SL	PEFL15	Pentaphylloides floribunda	1.0	6	10	29	13
SL	SHCA	Shepherdia canadensis	2.0	6	10	29	13
SD	ARUV	Arctostaphylos uva-ursi	0.1	15	30	71	33
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	11	35	57	25
SD	LIBO3	Linnaea borealis	2.0	11	20	29	18
SD	DROC	Dryas octopetala	0.1	5	15	43	15
SD	EMNI	Empetrum nigrum	5.0	5	5	29	12
GM	FEAL	Festuca altaica	0.1	8	20	43	19
FM-FT	EPAN2	Epilobium angustifolium	0.1	6	10	71	21
FD	COCA13	Cornus canadensis	0.1	15	35	43	25
L	LICHEN	total lichens	0.0	18	75	100	42
M	MOSS	total bryophytes-mosses and liverworts	0.0	14	55	100	37
M1	RHRU70	Rhytidium rugosum	3.0	16	35	43	26
M1	ZZMOSS	unknown-mosses	2.0	10	20	57	24
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	45	85	100	67
B	ROCK	mineral-surface rock fragments	0.1	16	65	100	40
B	SOIL	mineral-bare soil	0.1	13	35	100	36
B	LITTER2	litter-woody debris >2.5 cm	0.0	6	15	100	24
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.3	2.4	4.5	m	9
Tall shrubs	ST	3.3	3.3	3.3	m	1
Medium shrubs	SM	1.4	1.6	1.9	m	3
Low shrubs	SL	25.0	59.2	100.0	cm	6
Dwarf shrubs	SD	3.0	5.0	8.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	40.0	50.0	60.0	cm	2
Tall and medium forbs	FT, FM	20.0	33.3	40.0	cm	3
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	1.5	5.0	cm	7

Map Unit Components

Common Name (Soils Name):

Subalpine-forested hardwood gravelly colluvial slopes (Typic Eutrogelepts, loamy-skeletal)
 Subalpine-scrub gravelly colluvial slopes, dry (Typic Eutrocryepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

10ES Subalpine and Alpine Plateau Escarpments with Discontinuous Permafrost
 (Typic Eutrocryepts, coarse-loamy-Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal
 Complex, 10 to 70 percent slopes)

Geographically Associated Landtypes

M135A_180—Gravelly Frozen Slopes:

This site occurs on less sloping areas with wetter soils that have permafrost at moderate depths. The climax plant community is "Shrub birch-mixed ericaceous shrub/sedge scrub."

M135A_358—Gravelly Slopes:

This site occurs on less sloping areas. The climax plant community is "Shrub birch-bog blueberry scrub."

M135A_405—Swales:

This site occurs on swales with seasonally wet soils that are moderately deep to very deep to bedrock. The climax plant community is "Green alder scrub mosaic."

M135A_800—Escarpments:

This site occurs on slightly lower elevations. The climax plant community is "White spruce forest."

Moraines, Ice Cored (M135A_802)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Mountains (M135A.M2)

Physiographic Features

	RV	Range
Elevation (meters):	1,126	758 to 1,683
Slope Gradient (percent):	26	10 to 45

Aspect (clockwise direction): non-influencing

Landform: moraines

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,024	552 to 2,466
Annual Air Temperature (°C):	-5.6	-10.7 to -2.5
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: gravelly drift derived from diorite
 gravelly till

Rooting Depth (cm): RV: 31 Range: 8 to 68

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
1	moderately decomposed plant material	moderately rapid	.34	4.2 to 7.6	30	80
6 to 8	very cobbly sandy loam; silt loam	moderately rapid	.10	6.2 to 7.7		6 to 8
22 to 24	extremely cobbly loamy coarse sand; extremely cobbly loam	moderately rapid or rapid	.04 to .10	6.6 to 8.5		6

Water Table (May to September): none

Drainage Class: excessively drained to well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Moraine mountain avens dwarf scrub	Climax plant community
Moraine poplar forest	Post climax plant community
Moraine mixed forb meadow	Early stage of primary succession on moraines
Moraine soapberry-barrenground willow-grayleaf willow scrub	Mid stage of primary succession on moraines

Ecological Status-Transition Description:

Three plant communities are identified on this site including a potential community with mountain avens dwarf scrub, moraine on more extensive meta-stable moraines, a mid-successional community with mixed forb meadow, moraine on recent, unstable moraine deposits, and a post potential community with poplar forest, moraine on extensive and relatively stable moraines.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Moraine mountain avens dwarf scrub	93	20	32	45	5
Moraine poplar forest	18	18	18	18	1
Moraine mixed forb meadow	12	12	12	12	1
Moraine soapberry-barrenground willow-grayleaf willow scrub	81	16	26	36	5

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Moraine soapberry-barrenground willow-grayleaf willow scrub	POPA2	Poa palustris

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Moraine mountain avens dwarf scrub	CAAL6	Carex albonigra
Moraine soapberry-barrenground willow-grayleaf willow scrub	FEBR2	Festuca brevissima
	SASE4	Salix setchelliana

Characteristics of Moraine mountain avens dwarf scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	VAUL	Vaccinium uliginosum	0.1	10	30	50	22
SL	SANI10	Salix niphoclada	5.0	5	5	17	9
SD	DROC	Dryas octopetala	10.0	35	50	83	54
SD	DRIN4	Dryas integrifolia	0.1	22	60	50	33
SD	CATE11	Cassiope tetragona	10.0	12	15	33	20
SD	DRAL7	Dryas alaskensis	0.1	8	15	33	16
GM	FEAL	Festuca altaica	1.0	6	10	33	14
GM	KOMY	Kobresia myosuroides	5.0	5	5	17	9
L	LICHEN	total lichens	10.0	26	45	100	51
L1	STERE2	Stereocaulon	0.1	5	10	83	20
L1	CLMI61	Cladina mitis group	3.0	7	10	50	19
L1	CLADO3	Cladonia	0.1	6	15	50	17
L2	L2ALL	total lichens-crustose and soil crust	20.0	25	30	33	29
L2	ZZCRUST	unknown-crustose and soil crust lichens	2.0	5	7	50	16
M	MOSS	total bryophytes-mosses and liverworts	5.0	28	55	100	53
M1	ZZMOSS	unknown-mosses	7.0	13	25	83	33
M1	RACOM	Racomitrium	5.0	13	30	50	25
M1	PLSC70	Pleurozium schreberi	15.0	15	15	17	16
M1	POJU70	Polytrichum juniperinum	5.0	5	5	33	13
M1	RALA70	Racomitrium lanuginosum	0.1	5	10	33	13
B	ROCK	mineral-surface rock fragments	10.0	24	40	100	49
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.1	21	50	100	46
B	SOIL	mineral-bare soil	0.0	3	10	100	17
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	10.0	64.0	110.0	cm	5
Dwarf shrubs	SD	1.0	4.6	10.0	cm	6
Tall and medium grasses and grass-likes	GT, GM	17.0	29.0	40.0	cm	3
Tall and medium forbs	FT, FM	15.0	23.8	40.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.1	5.0	10.0	cm	23

Characteristics of Moraine poplar forest

Ecological Status: Post climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 1. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TM	POBA2	Populus balsamifera	65.0	65	65	100	81
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	15.0	15	15	100	39
FM	HEAL	Hedysarum alpinum	40.0	40	40	100	63
L	LICHEN	total lichens	0.1	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	40.0	40	40	100	63
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	60.0	60	60	100	77
B	LITTER2	litter-woody debris >2.5 cm	5.0	5	5	100	22
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	10.0	10.0	10.0	m	1
Low shrubs	SL	100.0	100.0	100.0	cm	1
Dwarf shrubs	SD	9.0	9.0	9.0	cm	1
Tall and medium forbs	FT, FM	40.0	40.0	40.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	2.0	2.0	cm	1

Characteristics of Moraine mixed forb meadow

Ecological Status: Early stage of primary succession on moraines

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 2. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	DROC	Dryas octopetala	2.0	16	30	100	40
GM	ZZGRAM	unknown-graminoids	15.0	15	15	50	27
FD	ANPA	Anemone parviflora	10.0	10	10	50	22
FD	ARAR9	Artemisia arctica	5.0	5	5	50	16
L	LICHEN	total lichens	2.0	4	5	100	20
M	MOSS	total bryophytes-mosses and liverworts	30.0	35	40	100	59
M1	POJU70	Polytrichum juniperinum	40.0	40	40	50	45
M1	ZZMOSS	unknown-mosses	25.0	25	25	50	35
M1	RACOM	Racomitrium	5.0	5	5	50	16
B	ROCK	mineral-surface rock fragments	10.0	30	50	100	55
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	18	30	100	42
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Dwarf shrubs	SD	3.0	7.7	10.0	cm	3
Tall and medium forbs	FT, FM	20.0	20.0	20.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	9.3	10.0	cm	12

Characteristics of Moraine soapberry-barrenground willow-grayleaf willow scrub

Ecological Status: Mid stage of primary succession on moraines

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 6. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
TS	POBA2	Populus balsamifera	7.0	7	7	17	11
SL-ST	SAAL	Salix alaxensis	5.0	9	15	83	27
SL-SM	SHCA	Shepherdia canadensis	15.0	22	30	67	38
SL-SM	SANI10	Salix niphoclada	10.0	15	20	50	27
SL-SM	SAGL	Salix glauca	5.0	10	15	67	26
SM	SARI4	Salix richardsonii	0.1	15	30	33	22
SM	SAPS	Salix pseudomonticola	5.0	5	5	17	9
SL	PEFL15	Pentaphylloides floribunda	0.1	5	10	33	13
SL	BEGL	Betula glandulosa	5.0	5	5	17	9
SD	DRIN4	Dryas integrifolia	10.0	18	30	50	30
SD	EMNI	Empetrum nigrum	0.1	13	35	50	25
SD	ARRU6	Arctous rubra	15.0	15	15	17	16

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	DROC	Dryas octopetala	5.0	8	10	33	16
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	8	15	33	16
GM	ZZGRAM	unknown-graminoids	30.0	30	30	17	23
L	LICHEN	total lichens	0.0	8	20	100	28
L2	L2ALL	total lichens-crustose and soil crust	10.0	15	20	33	22
M	MOSS	total bryophytes-mosses and liverworts	5.0	48	80	100	69
M1	PLSC70	Pleurozium schreberi	10.0	19	30	67	36
M1	ZZMOSS	unknown-mosses	10.0	15	20	83	35
M1	HYSP70	Hylocomium splendens	20.0	25	30	33	29
M1	RALA70	Racomitrium lanuginosum	0.1	12	30	50	24
M1	RACOM	Racomitrium	0.1	5	10	50	16
M1	THRE7	Thuidium recognitum	15.0	15	15	17	16
M1	DICRA8	Dicranum	5.0	5	5	17	9
B	ROCK	mineral-surface rock fragments	3.0	17	60	100	41
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	2.0	16	35	100	40
B	SOIL	mineral-bare soil	0.0	7	15	100	26
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	2.0	2.0	2.0	m	1
Tree regeneration	TR	5.0	5.0	5.0	m	1
Tall shrubs	ST	4.0	4.0	4.0	m	1
Medium shrubs	SM	1.0	1.8	2.5	m	6
Low shrubs	SL	20.0	78.8	110.0	cm	8
Dwarf shrubs	SD	1.0	5.5	10.0	cm	4
Tall and medium grasses and grass-likes	GT, GM	17.0	28.5	40.0	cm	2
Tall and medium forbs	FT, FM	20.0	37.5	90.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.1	5.3	10.0	cm	18

Map Unit Components

Common Name (Soils Name):

Alpine-dwarf scrub gravelly diorite moraines (Typic Gelorthents, sandy-skeletal)

Alpine-scrub gravelly moraines, calcareous (Typic Gelorthents, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

7CE	Alpine Recent Moraines (Typic Gelorthents, loamy-skeletal-Nonvegetated Drift Association 10 to 45 percent slopes)
7CEF	Alpine Recent Moraines, Diorite (Typic Gelorthents, sandy-skeletal-Nonvegetated Drift Association, 0 to 45 percent slopes)

Geographically Associated Landtypes

M135A_551—Loamy Depressions, High Elevation:

This site occurs in depressions with soils with thick dark surface horizons. The climax plant community is "Netleaf willow-mountain avens/herbaceous dwarf alpine scrub."

M135A_ROC—Rock and Ice, Nonvegetated:

This site occurs on recent nonvegetated moraines. The climax plant community is "Sparsely vegetated mountain slopes, Interior."

Rock and Ice, Nonvegetated (M135A_ROC)

Ecoregion Classification

Section: Alaska Mountains (M135A)

Subsection(s): Alpine Mountains (M135A.M2)

Alpine Outer Range & Kantishna Hills (M135A.M1)

Glaciated Lowlands (M135A.G1L)

Nonvegetated Alpine Mountains (M135A.B1)

Physiographic Features

	RV	Range
Elevation (meters):	1,096	417 to 6,125
Slope Gradient (percent):	70	20 to 150

Aspect (clockwise direction): non-influencing

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	996	446 to 2,939
Annual Air Temperature (°C):	-5.3	-21.6 to -2.4
Frost Free Days:	59	20 to 80

Soil Features

Parent Materials: rockfall deposits and/or scree and/or talus

Rooting Depth (cm): not applicable

Water Table (May to September): none

Drainage Class: not applicable

Vegetation Features

Common Vegetation Types:

Vegetation Type

Sparsely vegetated mountain slopes, Interior

Ecological Status

Climax plant community

Ecological Status-Transition Description:

This site consists of nonvegetated slopes. No transitional pathways to other communities have been identified for this type.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

		Per Stand			Number of
Vegetation Type	Total	Min.	Avg.	Max.	Stands
Sparsely vegetated mountain slopes, Interior	137	20	33	52	13

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sparsely vegetated mountain slopes, Interior	DOAL2	Douglasia alaskana
	DOGO	Douglasia gormanii
	DRLO	Draba lonchocarpa
	DRLOL	Draba lonchocarpa var. lonchocarpa
	DRRU	Draba ruaxes
	DRST3	Draba stenopetala
	FEBA	Festuca baffinensis
	FEBR2	Festuca brevissima
	OXHU	Oxytropis huddelsonii
	STAL3	Stellaria alaskana
	STDI4	Stellaria dicranoides
	THAR4	Thlaspi arcticum

Characteristics of Sparsely vegetated mountain slopes, Interior

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 13. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
L	LICHEN	total lichens	0.0	2	20	100	14
M	MOSS	total bryophytes-mosses and liverworts	0.0	2	20	100	14
M1	ZZMOSS	unknown-mosses	0.1	7	20	23	13
B	ROCK	mineral-surface rock fragments	80.0	92	100	100	96
B	SOIL	mineral-bare soil	0.0	7	20	100	26
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	0	0	100	0
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	1.5	2.0	cm	4

Map Unit Components**Common Name (Soils Name):**

Interior-nonvegetated rock outcrop, ice, talus, and/or drift (Nonvegetated rock outcrop, ice, talus, and/or drift)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

5SA1	Alpine Schist Mountains (Typic Dystrogelepts, loamy-skeletal-Rock Outcrop Association, 12 to 55 percent slopes)
7CE	Alpine Recent Moraines (Typic Gelorthents, loamy-skeletal-Nonvegetated Drift Association 10 to 45 percent slopes)
7CEF	Alpine Recent Moraines, Diorite (Typic Gelorthents, sandy-skeletal-Nonvegetated Drift Association, 0 to 45 percent slopes)
7ES	Boreal and Alpine Escarpments (Typic Eutrocryepts, coarse-loamy-Typic Haplogelods, loamy-skeletal-Nonvegetated Talus Complex, 30 to 70 percent slopes)
7MS1D	Alpine Dark Sedimentary Mountains (Typic Haplogelolls, loamy-skeletal-Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes)
7MS1L	Alpine Mixed Lithology Mountains (Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes)

7MSA	Alpine Diorite Mountains, Interior (Typic Dystrogelepts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes)
7MSHD	Alpine Dark Sedimentary Mountains, High Elevation (Rock Outcrop-Typic Haplogelolls, loamy-skeletal Association, 25 to 150 percent slopes)
7MSHL	Alpine Mixed Lithology Mountains, High Elevation (Rock Outcrop-Typic Eutrogelepts, loamy-skeletal Association, 25 to 70 percent slopes)
7MSHS	Alpine Schist Mountains, High Elevation (Rock Outcrop-Typic Dystrogelepts, loamy-skeletal Association, 0 to 150 percent slopes)
7SA1	Alpine and Subalpine Mountains (Rock Outcrop-Typic Haplogelolls, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 25 to 85 percent slopes)
8MS	Alpine Schist Mountain Ridges with Discontinuous Permafrost (Typic Dystrogelepts, loamy-skeletal-Rock Outcrop-Typic Aquiturbels, loamy-skeletal Association, 8 to 45 percent slopes)
NV1	Nonvegetated Mountains-Alaska Range-Interior (Nonvegetated Mountains)

Geographically Associated Landtypes

M135A_306—Gravelly Mountains, Moist:

This site occurs on moister vegetated micro-sites where snow persists later into the growing season. The climax plant community is "Cassiope-polar willow-mountain avens dwarf alpine scrub".

M135A_310—Gravelly Mountains, High Elevation:

This site occurs on vegetated micro-sites. The climax plant community is "White mountain avens-mixed ericaceous shrub dwarf alpine scrub".

Gravelly Mountains, Moist (M135S_307)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Alpine Mountains (M135S.M5)

Nonvegetated Alpine Mountains (M135S.B2)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	1,125	406 to 2,018
Slope Gradient (percent):	39	20 to 70

Aspect (clockwise direction): non-influencing

Landform: mountains

Landform Positions: backslopes; footslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,568	509 to 3,285
Annual Air Temperature (°C):	-5.9	-11.4 to -1.7
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty volcanic ash and/or eolian deposits over gravelly till
silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from diorite
silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock

Rooting Depth (cm): RV: 40 Range: 4 to 79

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 3	slightly decomposed plant material; moderately decomposed plant material	moderately rapid	.34	3.3 to 4.0	30	
4 to 6	silt loam; gravelly loam	moderate	.12 to .40	3.6 to 4.6	12 to 25	
6 to 25	very channery loam; extremely channery loam; very cobbly sandy loam; extremely cobbly sandy loam	moderate or moderately rapid	.10 to .34	4.3 to 5.7	6 to 25	6

Restrictive Features: bedrock (paralithic) at 72 to 150 cm or more
strongly contrasting textural stratification at 6 to 15 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Steller cassiope-crowberry dwarf alpine scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with Steller cassiope-crowberry dwarf scrub is identified as the potential on this site. No transitional pathways to other communities have been identified for this site. This site has been designated as "moist" due to snow drifting which covers the ground into early summer, shortening the effective growing season, and maintains relatively high soil moisture into summer. The vegetation on this site, however, is very similar to that of 169Xy363, with slightly more Steller cassiope and a slightly more variable composition. The ground surface here also lacks hummocky micro-relief.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Steller cassiope-crowberry dwarf alpine scrub	127	11	25	49	21

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Steller cassiope-crowberry dwarf alpine scrub	CAFO3	Carex foenea
	DISI6	Diphasiastrum sitchense
	PHAL4	Phyllodoce aleutica
	PHCA10	Phyllodoce caerulea

Characteristics of Steller cassiope-crowberry dwarf alpine scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 22. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	CAST33	Cassiope stelleriana	1.0	34	75	86	54
SD	EMNI	Empetrum nigrum	0.1	19	60	86	40
SD	LUPE	Luetkea pectinata	0.1	19	40	86	40
SD	VAUL	Vaccinium uliginosum	0.0	7	20	59	20
SD	CATE11	Cassiope tetragona	0.1	15	30	18	16

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	VACE	Vaccinium cespitosum	0.1	6	15	32	14
SD	SARE2	Salix reticulata	0.1	8	20	18	12
FD	DIAL5	Diphasiastrum alpinum	0.1	6	20	73	21
L	LICHEN	total lichens	0.0	13	60	100	36
L1	CLST60	Cladina stellaris	0.1	7	25	23	13
M	MOSS	total bryophytes-mosses and liverworts	10.0	49	80	100	70
M1	ZZMOSS	unknown-mosses	10.0	31	55	73	48
M1	DICRA8	Dicranum	5.0	14	40	59	29
M1	PLSC70	Pleurozium schreberi	0.1	11	30	32	19
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	39	85	100	62
B	ROCK	mineral-surface rock fragments	0.0	2	10	100	14
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	20.0	26.7	30.0	cm	3
Dwarf shrubs	SD	1.0	4.9	10.0	cm	27
Tall and medium grasses and grass-likes	GT, GM	6.0	17.1	40.0	cm	9
Tall and medium forbs	FT, FM	13.0	30.7	70.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.5	10.0	cm	60

Map Unit Components**Common Name (Soils Name):**

- Alpine-dwarf scrub gravelly colluvial slopes, cool (Andic Dystricrypts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite colluvial slopes, cool (Andic Dystricrypts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite colluvial slopes, warm (Andic Dystricrypts, loamy-skeletal)
- Alpine-dwarf scrub gravelly diorite till slopes, cool (Typic Haplocryods, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 9MSA Alpine Diorite Mountains
(Andic Dystricrypts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes)
- 9MSH Alpine Mountains
(Rock Outcrop-Andic Dystricrypts, loamy-skeletal Association, 20 to 150 percent slopes)

Geographically Associated Landtypes**M135S_310—Gravelly Mountains:**

This site occurs on colder more exposed micro-sites that have thinner accumulation of snow due to winter winds. The climax plant community is "Lichen/mixed ericaceous shrub dwarf alpine scrub."

M135S_421—Gravelly Colluvial Slopes:

This site occurs on plain colluvial slopes. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

M135S_ROC—South Central Rock and Ice, Nonvegetated:

This site is interspersed with the others and is more prevalent at higher elevations. The climax plant community is "Sparsely vegetated mountain slopes, South Central."

Similar Landtypes**M135S_363—Hummocks:**

This site has a thick loamy surface layer and hummocky surface micro-relief. The climax plant community is "Steller cassiope-crowberry-partridge foot alpine dwarf scrub."

Gravelly Mountains (M135S_310)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Alpine Mountains (M135S.M5)

Nonvegetated Alpine Mountains (M135S.B2)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	974	395 to 2,018
Slope Gradient (percent):	30	2 to 80

Aspect (clockwise direction): non-influencing

Landform: fan terraces on alluvial fans on mountains; hummocks on mountains; mountains

Landform Positions: backslopes; footslopes; shoulders

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,568	509 to 3,285
Annual Air Temperature (°C):	-5.9	-11.4 to -1.7
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock
 silty volcanic ash and/or gravelly till over gravelly till
 silty volcanic ash and/or silty eolian deposits over sandy and gravelly alluvium
 silty volcanic ash and/or silty eolian deposits over gravelly till derived from diorite

Rooting Depth (cm): *RV:* 33 *Range:* 5 to 92

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2	slightly decomposed plant material; moderately decomposed plant material	moderately rapid	.34	3.3 to 4.7	30	
4 to 12	silt loam	moderate	.18 to .40	3.3 to 5.4	25	
4 to 17	gravelly loam; extremely channery loam; very cobbly sandy loam; silt loam	moderate to rapid	.03 to .40	3.3 to 7.1	6 to 25	2

Restrictive Features: bedrock (paralithic) at 63 to 150 cm or more
 strongly contrasting textural stratification at 6 to 23 cm

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Lichen/mixed ericaceous shrub dwarf alpine scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community of lichen/mixed ericaceous dwarf scrub, with a significant percentage of white mountain avens, is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Lichen/mixed ericaceous shrub dwarf alpine scrub	163	16	27	60	26

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Lichen/mixed ericaceous shrub dwarf alpine scrub	BOMI	Botrychium minganense
	CARO5	Carex rossii
	DOAL2	Douglasia alaskana
	FEBR2	Festuca brevissima
	OXHU	Oxytropis huddelsonii
	PHAL4	Phyllodoce aleutica

Characteristics of Lichen/mixed ericaceous shrub dwarf alpine scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 26. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	VAUL	Vaccinium uliginosum	0.1	20	45	77	39
SD	EMNI	Empetrum nigrum	0.1	10	20	96	31
SD	DROC	Dryas octopetala	0.1	24	45	15	19
SD	ARAL13	Arctous alpina	0.1	6	25	50	17
SD	SAPO	Salix polaris	0.1	5	15	46	15
SD	SARE2	Salix reticulata	0.1	15	35	15	15
SD	LUPE	Luetkea pectinata	0.1	5	15	38	14
GM	CAMI4	Carex microchaeta	0.1	5	35	85	21
FM-FT	EPAN2	Epilobium angustifolium	0.1	6	25	15	9
FD-FM	GEER2	Geranium erianthum	0.1	8	30	15	11
FD	ANPA	Anemone parviflora	0.1	7	15	15	10
L	LICHEN	total lichens	0.1	54	85	100	73
L1	CLMI61	Cladina mitis group	5.0	18	40	81	38
L1	CLADO3	Cladonia	0.1	12	25	92	33
L1	CLADI3	Cladina	0.1	9	25	77	26
L1	STERE2	Stereocaulon	0.1	7	35	88	25
L1	CLST60	Cladina stellaris	2.0	13	30	23	17
L1	FLNI	Flavocetraria nivalis	0.1	5	20	31	12
L2	ZZCRUST	unknown-crustose and soil crust lichens	0.1	5	25	85	21
M	MOSS	total bryophytes-mosses and liverworts	10.0	26	60	100	51
M1	ZZMOSS	unknown-mosses	5.0	20	50	77	39
M1	RALA70	Racomitrium lanuginosum	0.1	7	15	19	12
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	5.0	24	85	100	49
B	ROCK	mineral-surface rock fragments	0.0	7	45	100	26
B	SOIL	mineral-bare soil	0.0	1	10	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.0	1.0	1.0	m	1
Medium shrubs	SM	1.5	1.6	1.7	m	2
Low shrubs	SL	20.0	27.5	40.0	cm	4
Dwarf shrubs	SD	1.0	4.0	20.0	cm	24
Tall and medium grasses and grass-likes	GT, GM	4.0	19.1	50.0	cm	15
Tall and medium forbs	FT, FM	13.0	26.5	40.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.7	20.0	cm	63

Map Unit Components**Common Name (Soils Name):**

Alpine-dwarf scrub gravelly colluvial slopes, warm (Andic Dystricryepts, loamy-skeletal)

Alpine-dwarf scrub gravelly diorite till slopes, warm (Typic Haplocryods, loamy-skeletal)

Alpine-dwarf scrub gravelly fan terraces, warm (Typic Eutrocryepts, sandy-skeletal)

Alpine-dwarf scrub gravelly till hummocks (Andic Dystricryepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9MSH	Alpine Mountains (Rock Outcrop-Andic Dystricryepts, loamy-skeletal Association, 20 to 150 percent slopes)
9MSH1	Alpine Low Mountains (Andic Humicryods, medial over loamy-skeletal-Andic Dystricryepts, loamy-skeletal-Humic Vitricryands, medial-skeletal Association, 10 to 80 percent slopes)
9SA44	Alpine Glaciated Lower Mountain Slopes (Andic Dystricryepts, loamy-skeletal Association, 20 to 70 percent slopes)
9TM3	Alpine Cirque Valleys (Andic Humicryods, medial over loamy-skeletal-Andic Dystricryepts, loamy-skeletal-Aquandic Cryaquepts, loamy-skeletal Complex, 8 to 60 percent slopes)
9TM4	Alpine Diorite Cirque Valleys (Andic Humicryods, medial over loamy-skeletal-Typic Haplocryods, loamy-skeletal-Andic Dystricryepts, loamy-skeletal Complex, 10 to 80 percent slopes)
9V12	Alpine Fans and Flood Plains, High Elevation (Typic Eutrocryepts, sandy-skeletal-Riverwash-Typic Eutrogelepts, sandy-skeletal Complex, 0 to 30 percent slopes)

Geographically Associated Landtypes**M135S_307—Gravelly Mountains, Moist:**

This site occurs on moister micro-sites where snow persists later into the growing season. The climax plant community is "Steller cassiope-crowberry dwarf alpine scrub."

M135S_421—Gravelly Colluvial Slopes:

This site occurs on plain colluvial slopes. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

M135S_ROC—South Central Rock and Ice, Nonvegetated:

This site is interspersed with the others and is more prevalent at higher elevations. The climax plant community is "Sparsely vegetated mountain slopes, South Central."

Gravelly Slopes (M135S_358)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Subalpine Mountains (M135S.M5L)

Alpine Mountains (M135S.M5)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	695	103 to 1,408
Slope Gradient (percent):	39	15 to 75

Aspect (clockwise direction): northeast to southwest

Landform: mountains

Landform Positions: backslopes; footslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,486	408 to 3,285
Annual Air Temperature (°C):	-4.7	-11.4 to 0.7
Frost Free Days:	65	50 to 90

Soil Features

Parent Materials: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock
silty volcanic ash and/or gravelly till over gravelly till

Rooting Depth (cm): *RV:* 32 *Range:* 10 to 78

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
3 to 4	slightly decomposed plant material	moderately rapid	.34	3.4 to 3.9	30	
8 to 15	silt loam	moderate or moderately rapid	.10 to .34	4.2 to 4.9	6 to 25	
6 to 15	very gravelly sandy loam; silt loam; extremely channery loam	moderate or moderately rapid	.10 to .18	4.2 to 5.2	6 to 25	

Restrictive Features: bedrock (paralithic) at 88 to 150 cm or more
strongly contrasting textural stratification at 19 to 26 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Bog blueberry dwarf alpine scrub

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community with bog blueberry dwarf scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Bog blueberry dwarf alpine scrub	118	12	26	45	15

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Bog blueberry dwarf alpine scrub	PHAL4	Phyllodoce aleutica

Characteristics of Bog blueberry dwarf alpine scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 15. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SM	BEGL	Betula glandulosa	0.1	24	40	53	36
SL-SM	SABA3	Salix barclayi	0.1	5	15	47	15
SD-SL	VAUL	Vaccinium uliginosum	25.0	48	80	93	67
SD	EMNI	Empetrum nigrum	5.0	22	45	100	47
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	3.0	12	60	87	32
SD	ARAL13	Arctous alpina	0.1	10	20	60	24
SD	LEPAD	Ledum palustre ssp. decumbens	0.1	6	15	60	19
SD	LUPE	Luetkea pectinata	0.1	5	15	33	13
FD	COCA13	Cornus canadensis	0.1	6	30	67	20
L	LICHEN	total lichens	0.1	14	40	100	37
L1	CLMI61	Cladina mitis group	10.0	15	20	20	17
M	MOSS	total bryophytes-mosses and liverworts	15.0	56	95	100	75
M1	ZZMOSS	unknown-mosses	10.0	24	85	100	49
M1	HYSP70	Hylocomium splendens	10.0	27	50	47	36
M1	PLSC70	Pleurozium schreberi	1.0	15	40	80	35
M1	DICRA8	Dicranum	0.1	5	10	60	17
M1	PTCR70	Ptilium crista-castrensis	0.1	5	20	40	14
M1	RACOM	Racomitrium	1.0	6	15	20	11
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	7.0	37	75	100	61
B	ROCK	mineral-surface rock fragments	0.0	1	5	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	0.5	0.5	0.5	m	1
Medium shrubs	SM	1.0	1.2	1.3	m	3
Low shrubs	SL	20.0	42.8	80.0	cm	9
Dwarf shrubs	SD	3.0	8.1	20.0	cm	15
Tall and medium grasses and grass-likes	GT, GM	10.0	44.1	100.0	cm	11
Tall and medium forbs	FT, FM	20.0	42.0	70.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.8	5.0	cm	30

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub gravelly colluvial slopes, warm (Andic Dystrocryepts, loamy-skeletal)

Alpine-scrub gravelly till slopes, warm (Andic Dystrocryepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 9SA44 Alpine Glaciated Lower Mountain Slopes
(Andic Dystricrypts, loamy-skeletal Association, 20 to 70 percent slopes)
- 9SA5 Subalpine Mountain Colluvial Slopes
(Andic Humicryods, medial-skeletal-Andic Dystricrypts, loamy-skeletal-Rock Outcrop-Association, 25 to 70 percent slopes)
- 9SA66 Subalpine Glaciated Lower Mountain Backslopes
(Andic Humicryods, medial-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystricrypts, loamy-skeletal Complex, 20 to 70 percent slopes)
- 9TM Alpine and Subalpine Glaciated Mountain Backslopes
(Andic Dystricrypts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystricrypts, loamy-skeletal Association, 10 to 55 percent slopes)

Geographically Associated Landtypes

M135S_363—Hummocks:

This site has a thick loamy surface layer and hummocky surface micro-relief. The climax plant community is "Steller cassiope-crowberry-partridge foot alpine dwarf scrub."

M135S_421—Gravelly Colluvial Slopes:

This site occurs on plain colluvial slopes. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

Hummocks (M135S_363)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Subalpine Mountains (M135S.M5L)
Alpine Mountains (M135S.M5)

Physiographic Features

	RV	Range
Elevation (meters):	917	395 to 1,614
Slope Gradient (percent):	21	0 to 45

Aspect (clockwise direction): southeast to southwest

Landform: earth hummocks on hills; earth hummocks on mountains; earth hummocks on till plains; earth hummocks on mountains

Landform Positions: backslopes; footslopes; shoulders

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,568	509 to 3,285
Annual Air Temperature (°C):	-5.9	-11.4 to -1.7
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty volcanic ash and/or loess over gravelly colluvium derived from diorite
silty volcanic ash and/or loess over gravelly colluvium derived from sedimentary rock
silty volcanic ash and/or loess over gravelly till

Rooting Depth (cm): RV: 32 Range: 3 to 68

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4	slightly decomposed plant material	moderately rapid	.34	3.1 to 4.3	30	
7 to 21	silt loam	moderate	.34	3.3 to 5.3	25	

Restrictive Features: bedrock (paralithic) at 66 to 150 cm or more
strongly contrasting textural stratification at 36 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Steller cassiope-crowberry-partridge foot alpine dwarf scrub	Climax plant community
Blueberry-crowberry/dwarf dogwood dwarf alpine scrub	Climax plant community on wetter microsites

Ecological Status-Transition Description:

Two plant communities are identified on this site. The potential community of Steller cassiope-crowberry-partridge foot dwarf scrub is very similar to 169Xy307 but has a characteristic pattern of hummocky micro-relief. Of minor extent where slightly more moist conditions occur is a community of blueberry-crowberry/dwarf dogwood dwarf scrub. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Steller cassiope-crowberry-partridge foot alpine dwarf scrub	116	16	26	45	23
Blueberry-crowberry/dwarf dogwood dwarf alpine scrub	58	20	30	36	3

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Steller cassiope-crowberry-partridge foot alpine dwarf scrub	CAFO3	Carex foenea
	DISI6	Diphasiastrum sitchense
	PHAL4	Phyllodoce aleutica

Characteristics of Steller cassiope-crowberry-partridge foot alpine dwarf scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 23. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	LUPE	Luetkea pectinata	2.0	28	70	96	52
SD	CAST33	Cassiope stelleriana	1.0	30	50	87	51
SD	EMNI	Empetrum nigrum	0.1	24	70	91	47
SD	VAUL	Vaccinium uliginosum	0.1	9	60	52	22
SD	VACE	Vaccinium cespitosum	1.0	5	10	30	12
SD	SAST2	Salix stolonifera	0.1	5	7	22	10
FD-FM	GYDR	Gymnocarpium dryopteris	0.1	12	40	17	14
FD	DIAL5	Diphasiastrum alpinum	0.1	8	20	87	26
FD	COCA13	Cornus canadensis	1.0	19	60	17	18
L	LICHEN	total lichens	0.1	12	35	100	35
L1	CLADO3	Cladonia	0.1	6	20	91	23

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M	MOSS	total bryophytes-mosses and liverworts	25.0	54	85	100	73
M1	ZZMOSS	unknown-mosses	10.0	34	55	74	50
M1	PLSC70	Pleurozium schreberi	7.0	18	40	35	25
M1	DICRA8	Dicranum	0.1	10	20	57	24
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	40	80	100	63
B	ROCK	mineral-surface rock fragments	0.0	1	15	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	1	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.0	1.0	1.0	m	1
Low shrubs	SL	20.0	30.0	40.0	cm	4
Dwarf shrubs	SD	1.0	4.1	15.0	cm	31
Tall and medium grasses and grass-likes	GT, GM	4.0	30.0	90.0	cm	9
Tall and medium forbs	FT, FM	12.0	31.0	50.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.1	8.0	cm	52

Characteristics of Blueberry-crowberry/dwarf dogwood dwarf alpine scrub

Ecological Status: Climax plant community on wetter microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 3. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	VAUL	Vaccinium uliginosum	30.0	45	55	100	67
SD	EMNI	Empetrum nigrum	10.0	18	30	100	42
SD	VAVIM99	Vaccinium vitis-idaea spp. Minus	0.1	15	30	67	32
SD	CATE11	Cassiope tetragona	25.0	25	25	33	29
SD	BEGL	Betula glandulosa	7.0	7	7	33	15
FM-FT	EPAN2	Epilobium angustifolium	0.1	10	20	67	26
FM	GEER2	Geranium erianthum	5.0	5	5	33	13
FD	COCA13	Cornus canadensis	0.1	17	25	100	41
FD	RUST6	Rubus stellatus	5.0	8	10	67	23
FD	GYDR	Gymnocarpium dryopteris	5.0	5	5	33	13
L	LICHEN	total lichens	0.1	20	40	100	45
L1	CLADI3	Cladina	5.0	8	10	67	23
L1	MARI60	Masonhalea richardsonii	15.0	15	15	33	22
L1	CEIS61	Cetraria islandica group	1.0	6	10	67	20
L1	CLADO3	Cladonia	5.0	5	5	67	18
L1	CLRA61	Cladina rangiferina group	5.0	5	5	33	13
M	MOSS	total bryophytes-mosses and liverworts	35.0	45	50	100	67
M1	PLSC70	Pleurozium schreberi	10.0	18	30	100	42
M1	ZZMOSS	unknown-mosses	5.0	13	20	100	36
M1	DICRA8	Dicranum	25.0	25	25	33	29
M1	HYSP70	Hylocomium splendens	5.0	5	5	33	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	20.0	45	60	100	67
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	40.0	60.0	80.0	cm	2
Dwarf shrubs	SD	6.0	9.4	20.0	cm	5
Tall and medium grasses and grass-like	GT, GM	100.0	100.0	100.0	cm	1
Tall and medium forbs	FT, FM	60.0	70.0	80.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	3.0	4.2	8.0	cm	6

Map Unit Components**Common Name (Soils Name):**

Alpine-dwarf scrub silty hummocks (Andic Humicryods, medial over loamy-skeletal)

Alpine-dwarf scrub silty till hummocks (Andic Humicryods, medial over loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9MSH1	Alpine Low Mountains (Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Humic Vitricryands, medial-skeletal Association, 10 to 80 percent slopes)
9TM3	Alpine Cirque Valleys (Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Aquandic Cryaquepts, loamy-skeletal Complex, 8 to 60 percent slopes)
9TM4	Alpine Diorite Cirque Valleys (Andic Humicryods, medial over loamy-skeletal-Typic Haplocryods, loamy-skeletal-Andic Dystrocryepts, loamy-skeletal Complex, 10 to 80 percent slopes)
9TP	Alpine Till Plains and Hills (Andic Dystrocryepts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy-skeletal Association, 0 to 30 percent slopes)

Similar Landtypes**M135S_307—Gravelly Mountains, Moist:**

This site lacks hummocky surface micro-relief and is very shallow to gravelly till material. The climax plant community is "Steller cassiope-crowberry dwarf alpine scrub."

M135S_358—Gravelly Slopes:

This site lacks hummocky surface micro-relief and is very shallow to gravelly till material. The climax plant community is "Bog blueberry dwarf alpine scrub."

Hummocks, Moderately Wet (M135S_364)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Alpine Mountains (M135S.M5)

Physiographic Features

	RV	Range
Elevation (meters):	707	425 to 1,116
Slope Gradient (percent):	3	2 to 10

Aspect (clockwise direction): non-influencing

Landform: earth hummocks on till plains

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,568	509 to 3,285
Annual Air Temperature (°C):	-5.9	-11.4 to -1.7
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty cryoturbate over gravelly till

Rooting Depth (cm): RV: 39 Range: 11 to 56

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
13	slightly decomposed plant material	moderately rapid	.34	3.1	30	
21	silt loam	moderate	.34	4.9	12	
5	cobbly loam	moderately rapid	.10	5.4	3	

Restrictive Features: strongly contrasting textural stratification at 34 cm

Water Table (May to September): 50 to 80 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Shrub birch-willow/crowberry scrub

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community with shrub birch-willow/crowberry scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Min.	Avg.	Max.	Number of Stands
Shrub birch-willow/crowberry scrub	59	16	26	32	5

Characteristics of Shrub birch-willow/crowberry scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 5. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	SAPU15	Salix pulchra	0.1	13	55	100	36
SD-SL	B EGL	Betula glandulosa	10.0	49	80	80	63
SD-SL	VAUL	Vaccinium uliginosum	10.0	21	35	80	41
SD-SL	LEPAD	Ledum palustre ssp. decumbens	0.1	10	20	80	28
SD	EMNI	Empetrum nigrum	10.0	35	55	100	59
FD	COSU4	Cornus suecica	20.0	20	20	20	20
L	LICHEN	total lichens	0.1	11	35	100	33
L1	STERE2	Stereocaulon	0.1	6	20	80	22
L1	CLMI61	Cladina mitis group	10.0	10	10	20	14
M	MOSS	total bryophytes-mosses and liverworts	40.0	63	90	100	79
M1	PLSC70	Pleurozium schreberi	15.0	36	70	100	60
M1	ZZMOSS	unknown-mosses	5.0	8	10	100	28
M1	HYSP70	Hylocomium splendens	15.0	18	20	40	27
M1	POCO38	Polytrichum commune	3.0	6	10	60	19
M1	POLYT5	Polytrichum	0.1	5	10	40	14
M1	SPHAG2	Sphagnum	5.0	5	5	20	10
M1	THRE7	Thuidium recognitum	5.0	5	5	20	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	33	50	100	57
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.3	1.3	1.3	m	1
Low shrubs	SL	25.0	76.2	100.0	cm	4
Dwarf shrubs	SD	4.0	10.7	20.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	12.0	46.0	80.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	2.0	3.2	5.0	cm	12

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub gravelly till hummocks (Aquandic Haplocryods, loamy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

9TP Alpine Till Plains and Hills

(Andic Dystrocryepts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy-skeletal Association, 0 to 30 percent slopes)

Geographically Associated Landtypes**M135S_310—Gravelly Mountains:**

This site occurs on hill summits and shoulders and soils are drier. The climax plant community is "Lichen/mixed ericaceous shrub dwarf alpine scrub."

M135S_421—Gravelly Colluvial Slopes:

This site occurs on hills and soils are drier. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

M135S_536—Organic Depressions:

This site occurs in depressions and soils are wetter and have a thick organic surface layer. The climax plant community is "Water sedge-tufted bulrush-forb wet meadow."

Silty Slopes, High Elevation (M135S_405)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Subalpine Mountains (M135S.M5L)

Alpine Mountains (M135S.M5)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	528	63 to 1,408
Slope Gradient (percent):	21	2 to 70

Aspect (clockwise direction): north to southwest

Landform: benches on mountains; fan terraces on alluvial fans on mountains; mountains

Landform Positions: backslopes; footslopes

	<i>Frequency</i>	<i>Duration</i>	<i>Beginning Month</i>	<i>Ending Month</i>
Flooding:	Rare		Jan	Dec
Ponding:	None			

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,421	408 to 3,285
Annual Air Temperature (°C):	-3.7	-11.4 to 0.7
Frost Free Days:	69	50 to 90

Soil Features

Parent Materials: silty volcanic ash and/or loess over sandy and gravelly alluvium
 silty volcanic ash and/or gravelly colluvium over gravelly till
 silty volcanic ash and/or loess over gravelly till
 silty volcanic ash over gravelly volcanic ash over gravelly colluvium and/or gravelly till

Rooting Depth (cm): *RV:* 45 *Range:* 11 to 110

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

	Thickness <i>(cm)</i>	Texture	Permeability	AWC <i>(cm/cm)</i>	pH	Effective CEC <i>(me/100g)</i>	CEC <i>(me/100g)</i>
	4 to 10	slightly decomposed plant material	moderately rapid	.34	3.1 to 4.4	30	
	4 to 10	silt loam	moderate	.15 to .34	3.1 to 4.3	25	
	4 to 31	silt loam; fine sandy loam	moderate to rapid	.03 to .34	4.0 to 5.0	3 to 25	

Restrictive Features: strongly contrasting textural stratification at 4 to 48 cm
 bedrock (paralithic) at 92 to 150 cm or more

Water Table (May to September): none

Drainage Class: somewhat excessively drained or well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Sitka alder/shield fern scrub mosaic	Climax plant community
Bluejoint-tall forb meadow mosaic	Climax plant community on wetter microsites

Ecological Status-Transition Description:

Two intricately associated but distinct plant communities occur as a complex mosaic on this site. A potential plant community is described for the typical site with Sitka alder/shield fern scrub mosaic and a second potential is described for a moist micro-site with bluejoint-tall forb meadow mosaic. No transitional pathways between these two vegetation types or other plant communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sitka alder/shield fern scrub mosaic	71	6	13	26	23
Bluejoint-tall forb meadow mosaic	148	14	30	57	22

Alien Plants:

Alien plants include plants on Alaska Exotic Plant Information Clearinghouse Weed List, 2002.

Vegetation Type	Symbol	Scientific Name
Bluejoint-tall forb meadow mosaic	POPR	Poa pratensis

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sitka alder/shield fern scrub mosaic	CIAL	Circaea alpina
	WISE2	Viola selkirkii
Bluejoint-tall forb meadow mosaic	BOMI	Botrychium minganense
	CASP5	Carex spectabilis
	COCO9	Conocephalum conicum
	DAIN	Danthonia intermedia
	POAE	Podagrostis aequalis
	POLO4	Polystichum lonchitis
	VIGL	Viola glabella
	WISE2	Viola selkirkii

Characteristics of Sitka alder/shield fern scrub mosaic

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 23. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	ALSI3	Alnus sinuata	45.0	81	95	100	90
SM	OPHO	Oplopanax horridus	0.1	16	75	52	29
SL	RILA3	Ribes laxiflorum	0.1	8	35	22	13
GT	CACA4	Calamagrostis canadensis	0.1	10	40	96	31
FT	DRDI2	Dryopteris dilatata	0.1	49	85	100	70
FT	ATFIC	Athyrium filix-femina ssp. cyclosorum	0.1	13	40	39	23
FM-FT	EQSY	Equisetum sylvaticum	1.0	8	25	17	12
FD-FM	GYDR	Gymnocarpium dryopteris	0.1	10	25	65	25
FD-FM	THPH	Thelypteris phegopteris	2.0	10	20	30	17
L	LICHEN	total lichens	0.1	0	5	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.1	7	40	100	26
M1	ZZMOSS	unknown-mosses	0.1	8	30	22	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	90.0	95	100	100	97
B	LITTER2	litter-woody debris >2.5 cm	0.1	5	30	100	22
B	ROCK	mineral-surface rock fragments	0.0	1	5	100	10
B	SOIL	mineral-bare soil	0.0	0	5	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall shrubs	ST	3.0	3.9	5.0	m	21
Medium shrubs	SM	1.2	1.8	3.0	m	20
Low shrubs	SL	20.0	59.3	90.0	cm	14
Dwarf shrubs	SD	10.0	10.0	10.0	cm	2
Tall and medium grasses and grass-likes	GT, GM	90.0	127.6	180.0	cm	17
Tall and medium forbs	FT, FM	15.0	96.2	170.0	cm	30
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.5	3.8	10.0	cm	30

Characteristics of Bluejoint-tall forb meadow mosaic

Ecological Status: Climax plant community on wetter microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 22. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent			Importance Value	
			Canopy Cover	Constancy			
			Min.	Avg.	Max.		
SL-SM	SPST3	Spiraea stevenii	0.1	7	20	82	24
SL-SM	SAPU15	Salix pulchra	0.1	7	15	18	11
SD-SL	VAUL	Vaccinium uliginosum	0.1	9	35	23	14
GT	CACA4	Calamagrostis canadensis	1.0	28	85	100	53
FM-FT	ATFIC	Athyrium filix-femina ssp. cyclosorum	1.0	31	70	77	49
FT	EPAN2	Epilobium angustifolium	1.0	15	45	100	39
FT	VEVIE2	Veratrum viride ssp. eschscholtzii	0.1	14	45	82	34
FT	DRDI2	Dryopteris dilatata	0.1	16	60	68	33
FM-FT	SAST11	Sanguisorba stipulata	1.0	11	30	55	25
FM-FT	GEER2	Geranium erianthum	0.1	6	20	73	21
FD-FM	GYDR	Gymnocarpium dryopteris	0.1	12	40	73	30
FD-FM	THPH	Thelypteris phegopteris	0.1	9	35	73	26
FD-FM	COCA13	Cornus canadensis	0.1	12	35	32	20
FD	VILA6	Viola langsdorfii	0.1	7	20	59	20
FD	RUST6	Rubus stellatus	0.1	5	10	32	13
L	LICHEN	total lichens	0.0	0	3	100	0
M	MOSS	total bryophytes-mosses and liverworts	0.1	15	80	100	39
M1	ZZMOSS	unknown-mosses	0.1	14	80	68	31
M1	PLSC70	Pleurozium schreberi	0.1	6	30	27	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	35.0	90	100	100	95
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	SOIL	mineral-bare soil	0.0	0	7	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	5	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tree regeneration	TR	4.0	4.0	4.0	m	1
Tall shrubs	ST	3.0	3.6	4.0	m	5
Medium shrubs	SM	1.1	1.6	3.0	m	17
Low shrubs	SL	25.0	60.7	100.0	cm	7
Dwarf shrubs	SD	2.0	8.2	15.0	cm	5
Tall and medium grasses and grass-likes	GT, GM	25.0	129.8	170.0	cm	21
Tall and medium forbs	FT, FM	15.0	107.0	200.0	cm	37
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.1	3.9	12.0	cm	31

Map Unit Components

Common Name (Soils Name):

- Subalpine-scrub gravelly fan terraces (Spodic Dystricrypts, sandy-skeletal)
- Subalpine-scrub-meadow mosaic gravelly colluvial slopes (Andic Humicryods, medial-skeletal)
- Subalpine-scrub-meadow mosaic silty till slopes (Andic Humicryods, medial over loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

- 9AF Subalpine Fans
(Spodic Dystricrypts, sandy-skeletal, 4 to 22 percent slopes)
- 9SA5 Subalpine Mountain Colluvial Slopes
(Andic Humicryods, medial-skeletal-Andic Dystricrypts, loamy-skeletal-Rock Outcrop-Association, 25 to 70 percent slopes)
- 9SA6 Subalpine Glaciated Mountains
(Andic Humicryods, medial over loamy-skeletal, 15 to 50 percent slopes)
- 9SA61 Subalpine Glaciated Benches on Lower Mountain Slopes
(Andic Humicryods, medial over loamy-skeletal-Cryohemists, euc-Typic Cryaquands, medial over loamy Association, 0 to 20 percent slopes)
- 9SA62 Subalpine and Alpine Glaciated Benches on Lower Mountain Slopes
(Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy Association, 2 to 40 percent slopes)
- 9SA66 Subalpine Glaciated Lower Mountain Backslopes
(Andic Humicryods, medial-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystricrypts, loamy-skeletal Complex, 20 to 70 percent slopes)
- 9TM Alpine and Subalpine Glaciated Mountain Backslopes
(Andic Dystricrypts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystricrypts, loamy-skeletal Association, 10 to 55 percent slopes)
- 9TMF Boreal and Subalpine Lower Mountain Slopes
(Andic Humicryods, medial over loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal Complex, 2 to 30 percent slopes)

Geographically Associated Landtypes

135A_359—Till Slopes:

This site occurs on well drained soils at slightly lower elevations. The climax plant community is "Mixed paper birch-white spruce forest."

135A_362—Till Slopes, Wet:

This site occurs on slightly lower elevations with wetter soils. The climax plant community is "Mixed white spruce-paper birch/Sitka alder forest."

M135S_363—Hummocks:

This site has a thick loamy surface layer and hummocky surface micro-relief at slight higher elevation. The climax plant community is "Steller cassiope-crowberry-partridge foot alpine dwarf scrub."

M135S_536—Organic Depressions:

This site occurs on depressions and soils are wetter with thick organic surface horizons. The climax plant community is "Water sedge-tufted bulrush-forb wet meadow."

Gravelly Colluvial Slopes (M135S_421)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Subalpine Mountains (M135S.M5L)

Alpine Mountains (M135S.M5)

Physiographic Features

	RV	Range
Elevation (meters):	905	273 to 1,660
Slope Gradient (percent):	40	7 to 80

Aspect (clockwise direction): east to west

Landform: hills; mountains; till plains

Landform Positions: backslopes; footslopes

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,568	509 to 3,285
Annual Air Temperature (°C):	-5.9	-11.4 to -1.7
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty volcanic ash and/or gravelly colluvium derived from sedimentary rock
 silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from diorite
 silty volcanic ash and/or gravelly till over gravelly till

Rooting Depth (cm): RV: 53 Range: 18 to 96

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity.
 CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
1 to 3	slightly decomposed plant material; moderately decomposed plant material	moderately rapid	.34	4.6 to 5.0	30	
22 to 39	silt loam; gravelly loam	moderate or moderately rapid	.10 to .34	4.3 to 5.2	12 to 25	
12 to 27	very cobbly sandy loam; gravelly loam	moderate or moderately rapid	.10 to .18	4.4 to 5.2	5 to 20	

Restrictive Features: bedrock (paralithic) at 107 to 150 cm or more
 strongly contrasting textural stratification at 25 cm in some components

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Barclay willow/mixed forb scrub mosaic	Climax plant community
Mixed forb meadow mosaic	Climax plant community on wetter microsites

Ecological Status-Transition Description:

Two intricately associated but distinct plant communities occur as a complex mosaic on this site. A primary potential plant community is described for the typical site with Barclay willow/mixed forb scrub mosaic. A second potential for moist microsites is a mixed forb meadow mosaic. No other transitional pathways between these two communities, or other sites, have been identified.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Barclay willow/mixed forb scrub mosaic	198	24	37	51	46
Mixed forb meadow mosaic	216	24	48	77	27

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Barclay willow/mixed forb scrub mosaic	AGAL2	Agrostis alaskana
	BOAL99	Botrychium alaskense
	BOMI	Botrychium minganense
	CAFO3	Carex foenea
	CAMA1	Carex macrochaeta
	CARO5	Carex rossii
	CYMO3	Cystopteris montana
	POLO4	Polystichum lonchitis
	VIGL	Viola glabella
	WISE2	Viola selkirkii
Mixed forb meadow mosaic	BOMI	Botrychium minganense
	CASP5	Carex spectabilis
	COCO9	Conocephalum conicum
	MIBI9	Minuartia biflora
	POAE	Podagrostis aequivalvis
	POLO4	Polystichum lonchitis
	WISE2	Viola selkirkii

Characteristics of Barclay willow/mixed forb scrub mosaic

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 46. Only those vascular, lichen, and bryophyte species with average cover >=5% and constancy >=15% are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SL-SM	SABA3	Salix barclayi	0.1	54	90	98	73
SL-SM	SAPU15	Salix pulchra	0.1	23	65	37	29
SD-SL	VACE	Vaccinium cespitosum	2.0	17	65	48	29
SD-SL	VAUL	Vaccinium uliginosum	0.1	10	45	48	22
SD	LUPE	Luetkea pectinata	0.1	7	25	37	16
SD	EMNI	Empetrum nigrum	0.1	5	20	48	15
SD	SARE2	Salix reticulata	0.1	8	35	28	15
FM-FT	SAST11	Sanguisorba stipulata	0.1	11	40	96	32
FM-FT	EPAN2	Epilobium angustifolium	0.1	8	35	98	28
FT	VEVIE2	Veratrum viride ssp. eschscholtzii	0.1	7	25	78	23
FM-FT	ATFIC	Athyrium filix-femina ssp. cyclosorum	0.1	6	35	61	19
FM-FT	MEPA	Mertensia paniculata	0.1	5	45	33	13
FM	GEER2	Geranium erianthum	0.1	13	40	91	34
FD-FM	GYDR	Gymnocarpium dryopteris	1.0	19	40	61	34
FD-FM	THPH	Thelypteris phegopteris	0.1	18	40	37	26
FD-FM	RUST6	Rubus stellatus	0.1	5	20	91	21
FD	VILA6	Viola langsdorfii	0.1	8	30	78	25
FD	COCA13	Cornus canadensis	1.0	16	35	33	23

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	2.0	24	80	100	49
M1	ZZMOSS	unknown-mosses	2.0	20	80	78	39
M1	DICRA8	Dicranum	0.1	5	10	22	10
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	4.0	78	95	100	88
B	SOIL	mineral-bare soil	0.0	3	15	100	17
B	ROCK	mineral-surface rock fragments	0.0	2	55	100	14
B	LITTER2	litter-woody debris >2.5 cm	0.0	1	7	100	10
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall shrubs	ST	3.2	3.8	5.0	m	5
Medium shrubs	SM	1.0	1.6	3.0	m	35
Low shrubs	SL	20.0	70.0	110.0	cm	25
Dwarf shrubs	SD	0.8	10.3	20.0	cm	26
Tall and medium grasses and grass-likes	GT, GM	4.0	84.3	130.0	cm	30
Tall and medium forbs	FT, FM	15.0	75.3	170.0	cm	59
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.2	3.9	10.0	cm	64

Characteristics of Mixed forb meadow mosaic

Ecological Status: Climax plant community on wetter microsites

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 27. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	VAUL	Vaccinium uliginosum	1.0	5	10	52	16
SD	SARE2	Salix reticulata	0.1	24	50	56	37
SD	LUPE	Luetkea pectinata	0.1	14	55	37	23
SD	SAPO	Salix polaris	5.0	21	50	26	23
SD	EMNI	Empetrum nigrum	0.1	5	20	70	19
SD	LIBO3	Linnaea borealis	0.1	9	40	26	15
GT	CACA4	Calamagrostis canadensis	0.1	17	60	67	34
GM-GT	FEAL	Festuca altaica	0.1	10	40	89	30
GM-GT	CAPO	Carex podocarpa	0.1	10	40	74	27
FM-FT	EPAN2	Epilobium angustifolium	1.0	17	50	85	38
FD-FT	ARAR9	Artemisia arctica	0.1	5	15	93	22
FM-FT	HELA4	Heracleum lanatum	0.1	9	50	52	22
FD-FT	ATFIC	Athyrium filix-femina ssp. cyclosorum	0.1	5	30	30	12
FD-FM	SAST11	Sanguisorba stipulata	0.1	19	80	70	36
FD-FM	GEER2	Geranium erianthum	0.1	11	35	74	29
FD-FM	ASUM2	Astragalus umbellatus	0.1	5	15	19	10
FM	ERPE3	Erigeron peregrinus	0.1	5	20	22	10
FD	RUST6	Rubus stellatus	0.1	6	15	70	20
FD	ANPA	Anemone parviflora	0.1	5	15	67	18
FD	VILA6	Viola langsdorfii	0.1	6	15	48	17
FD	COCA13	Cornus canadensis	0.1	9	30	22	14
FD	GYDR	Gymnocarpium dryopteris	0.1	9	25	22	14
L	LICHEN	total lichens	0.0	2	15	100	14
M	MOSS	total bryophytes-mosses and liverworts	10.0	40	80	100	63
M1	ZZMOSS	unknown-mosses	7.0	31	65	70	47
M1	PLSC70	Pleurozium schreberi	5.0	11	15	22	16
M1	DICRA8	Dicranum	5.0	10	20	19	14

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
M1	POLYT5	Polytrichum	0.1	5	15	33	13
M1	POCO38	Polytrichum commune	2.0	7	10	26	13
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	30.0	68	95	100	82
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	ROCK	mineral-surface rock fragments	0.0	1	7	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	5	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.3	1.3	m	3
Low shrubs	SL	30.0	70.0	110.0	cm	11
Dwarf shrubs	SD	1.0	4.9	15.0	cm	15
Tall and medium grasses and grass-likes	GT, GM	5.0	67.3	130.0	cm	13
Tall and medium forbs	FT, FM	20.0	78.9	160.0	cm	19
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.3	10.0	cm	40

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub-meadow mosaic gravelly colluvial slopes (Humic Vitricryands, medial-skeletal)

Alpine-scrub-meadow mosaic gravelly diorite colluvial slopes (Andic Dystrocryepts, loamy-skeletal)

Alpine-scrub-meadow mosaic silty till slopes (Andic Dystrocryepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9MSH1	Alpine Low Mountains (Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Humic Vitricryands, medial-skeletal Association, 10 to 80 percent slopes)
9SA4	Alpine Lower Mountain Colluvial Slopes (Humic Vitricryands, medial-skeletal-Rock Outcrop-Andic Dystrocryepts, loamy-skeletal Association, 35 to 75 percent slopes)
9SA44	Alpine Glaciated Lower Mountain Slopes (Andic Dystrocryepts, loamy-skeletal Association, 20 to 70 percent slopes)
9TM	Alpine and Subalpine Glaciated Mountain Backslopes (Andic Dystrocryepts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal Association, 10 to 55 percent slopes)
9TM4	Alpine Diorite Cirque Valleys (Andic Humicryods, medial over loamy-skeletal-Typic Haplocryods, loamy-skeletal-Andic Dystrocryepts, loamy-skeletal Complex, 10 to 80 percent slopes)
9TP	Alpine Till Plains and Hills (Andic Dystrocryepts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy-skeletal Association, 0 to 30 percent slopes)

Geographically Associated Landtypes**M135S_307—Gravelly Mountains, Moist:**

This site occurs on moister micro-sites where snow persists later into the growing season. The climax plant community is "Steller cassiope-crowberry dwarf alpine scrub."

M135S_310—Gravelly Mountains:

This site occurs on colder more exposed micro-sites that have thinner accumulation of snow due to winter winds. The climax plant community is "Lichen/mixed ericaceous shrub dwarf alpine scrub."

M135S_ROC—South Central Rock and Ice, Nonvegetated:

This site is interspersed with the others and is more prevalent at higher elevations. The climax plant community is "Sparsely vegetated mountain slopes, South Central."

Similar Landtypes**M135S_422—Swales:**

This site has similar vegetation but the soils are wetter during early summer due to persistent snow beds and soils also have a thick mucky silt loam surface texture. The climax plant community is "Barclay willow-diamondleaf willow scrub."

M135S_551—Loamy Depressions:

This site has similar vegetation but the soils are wetter during early summer due to persistent snow beds and soils also have a thick mucky silt loam surface texture. The climax plant community is "Partridge foot-dwarf willow/mixed forb dwarf alpine scrub."

Swales (M135S_422)**Ecoregion Classification**

Section: South Central Mountains (M135S)

Subsection(s): Subalpine Mountains (M135S.M5L)

Alpine Mountains (M135S.M5)

Physiographic Features

	RV	Range
Elevation (meters):	567	164 to 1,117
Slope Gradient (percent):	11	2 to 30

Aspect (clockwise direction): non-influencing

Landform: depressions on alluvial fans on mountains; depressions on benches on mountains; depressions on hills; depressions on mountains; depressions on till plains; drainageways on mountains

Landform Positions: backslopes; footslopes

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,458	408 to 3,285
Annual Air Temperature (°C):	-4.2	-11.4 to 0.7
Frost Free Days:	67	50 to 90

Soil Features

Parent Materials: silty volcanic ash and/or silty eolian deposits over gravelly till

Rooting Depth (cm): RV: 35 Range: 16 to 89

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
9	slightly decomposed plant material	moderately rapid	.34	5.2	30	
26	silt loam	moderate	.40	5.2	25	

Restrictive Features: strongly contrasting textural stratification at 42 cm

Water Table (May to September): 0 to 25 cm

Drainage Class: poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Barclay willow-diamondleaf willow scrub	Climax plant community

Ecological Status-Transition Description:

A single plant community with Barclay willow-diamondleaf willow scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Barclay willow-diamondleaf willow scrub	175	24	38	61	23

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Barclay willow-diamondleaf willow scrub	BOMI	Botrychium minganense
	COCO9	Conocephalum conicum
	CYMO3	Cystopteris montana
	WISE2	Viola selkirkii

Characteristics of Barclay willow-diamondleaf willow scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 24. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SM-ST	SAAL	Salix alaxensis	0.1	8	40	25	14
SM	SABA3	Salix barclayi	5.0	45	80	83	61
SL-SM	SAPU15	Salix pulchra	5.0	34	80	71	49
SM	SARI4	Salix richardsonii	5.0	30	80	29	29
SL-SM	SPST3	Spiraea stevenii	0.1	5	15	29	12
SL	BEG1	Betula glandulosa	0.1	5	10	17	9
SD	SARE2	Salix reticulata	0.1	22	60	25	23
GT	CACA4	Calamagrostis canadensis	0.1	10	50	88	30
GM	CABI5	Carex bigelowii	1.0	5	10	21	10
FM-FT	SAST11	Sanguisorba stipulata	1.0	18	35	88	40
FM-FT	ATFIC	Athyrium filix-femina ssp. cyclosorum	0.1	12	35	54	25
FD-FM	EQAR	Equisetum arvense	0.1	11	30	83	30
FD-FM	GYDR	Gymnocarpium dryopteris	1.0	9	20	33	17
FD-FM	THPH	Thelypteris phegopteris	0.1	5	10	17	9
FD	ANRI	Anemone richardsonii	0.1	7	15	83	24
FD	VIEPR	Viola epipsila ssp. repens	0.1	6	25	67	20
FD	VILA6	Viola langsdorfii	0.1	5	15	50	16
FD	COCA13	Cornus canadensis	1.0	7	10	21	12
FD	RUAR	Rubus arcticus	2.0	5	10	17	9
L	LICHEN	total lichens	0.0	0	5	96	0
M	MOSS	total bryophytes-mosses and liverworts	2.0	55	90	96	73
M1	ZZMOSS	unknown-mosses	10.0	40	70	92	61
M1	SPHAG2	Sphagnum	0.1	13	50	46	24
M1	PLSC70	Pleurozium schreberi	1.0	13	40	25	18
M1	CLDE70	Climacium dendroides	0.1	5	20	42	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	10.0	50	95	96	69

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	LITTER2	litter-woody debris >2.5 cm	0.0	2	10	96	14
B	WATER	water	0.0	2	20	96	14
B	SOIL	mineral-bare soil	0.0	1	5	96	10
B	ROCK	mineral-surface rock fragments	0.0	0	0	96	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Trees	TT, TM, TS	1.5	1.5	1.5	m	1
Tall shrubs	ST	3.0	3.8	4.5	m	2
Medium shrubs	SM	1.2	1.9	3.0	m	24
Low shrubs	SL	30.0	64.3	80.0	cm	7
Dwarf shrubs	SD	2.0	7.4	20.0	cm	7
Tall and medium grasses and grass-likes	GT, GM	30.0	96.4	150.0	cm	14
Tall and medium forbs	FT, FM	18.0	79.1	180.0	cm	22
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	3.5	15.0	cm	32

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub gravelly wet till swales (Typic Cryaquands, medial over loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9SA61	Subalpine Glaciated Benches on Lower Mountain Slopes (Andic Humicryods, medial over loamy-skeletal-Cryohemists, euic-Typic Cryaquands, medial over loamy Association, 0 to 20 percent slopes)
9SA62	Subalpine and Alpine Glaciated Benches on Lower Mountain Slopes (Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy Association, 2 to 40 percent slopes)
9TP	Alpine Till Plains and Hills (Andic Dystrocrypts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy-skeletal Association, 0 to 30 percent slopes)

Similar Landtypes**M135S_421—Gravelly Colluvial Slopes:**

This site has soils that are drier. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

Swales, Wet (M135S_424)**Ecoregion Classification**

Section: South Central Mountains (M135S)

Subsection(s): Alpine Mountains (M135S.M5)

Physiographic Features

Elevation (meters):	RV	Range
	964	499 to 1,614
Slope Gradient (percent):	16	12 to 30
Aspect (clockwise direction):	non-influencing	

Landform: drainageways on mountains

Landform Positions: footslopes; toeslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,568	509 to 3,285
Annual Air Temperature (°C):	-5.9	-11.4 to -1.7
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty volcanic ash and/or gravelly till over gravelly till

Rooting Depth (cm): *RV:* 36 *Range:* 12 to 59

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
4	slightly decomposed plant material	moderately rapid	.34	6.2		80
8	silt loam	moderate	.40	6.2		25
24	very cobbly loam	moderately rapid	.10	6.0		6

Restrictive Features: strongly contrasting textural stratification at 13 cm

Water Table (May to September): 0 to 10 cm

Drainage Class: somewhat poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Short stalked sedge-mixed forb wet meadow/scrub

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community with short stalked sedge-mixed forb wet meadow is identified on this site. The site is often drained by small streams or springs. Willow is almost always present, but its percentage is not high enough to classify the site as scrub. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		<i>Min.</i>	<i>Avg.</i>	<i>Max.</i>	
Short stalked sedge-mixed forb wet meadow/scrub	134	30	41	59	10

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type

Short stalked sedge-mixed forb wet meadow/scrub

Symbol

ARAMP

COCO9

HIMO2

Scientific Name

Arnica amplexicaulis ssp. prima

Conocephalum conicum

Hippuris montana

Characteristics of Short stalked sedge-mixed forb wet meadow/scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 10. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SM	SABA3	Salix barclayi	0.1	15	35	80	35
SL-SM	SAPU15	Salix pulchra	1.0	8	20	30	15
SD	LUPE	Luetkea pectinata	15.0	30	60	80	49
SD	SAPO	Salix polaris	20.0	29	40	40	34
SD	SARE2	Salix reticulata	0.1	12	35	40	22
SD	SAST2	Salix stolonifera	10.0	12	15	20	15
GM	CAPO	Carex podocarpa	0.1	19	45	100	44
GM	CANI2	Carex nigricans	0.1	12	30	70	29
GM	CAAN10	Carex anthoxanthea	0.1	6	10	50	17
GM	ERAN6	Eriophorum angustifolium	0.1	6	15	40	15
GM	CAREX	Carex	0.1	5	10	20	10
FM	SAST11	Sanguisorba stipulata	1.0	22	45	100	47
FD-FM	EQAR	Equisetum arvense	5.0	9	20	80	27
FD-FM	LEPY	Leptarrhena pyrolifolia	0.1	9	30	80	27
FM	ARAR9	Artemisia arctica	1.0	8	15	40	18
FD	ANPA	Anemone parviflora	5.0	12	20	30	19
FD	DOFR	Dodecatheon frigidum	3.0	5	7	20	10
L	LICHEN	total lichens	0.0	1	5	100	10
M	MOSS	total bryophytes-mosses and liverworts	40.0	72	90	100	85
M1	ZZMOSS	unknown-mosses	40.0	67	90	90	78
M1	SPHAG2	Sphagnum	0.1	6	15	40	15
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	34	60	100	58
B	WATER	water	0.1	3	10	100	17
B	ROCK	mineral-surface rock fragments	0.1	2	7	100	14
B	SOIL	mineral-bare soil	0.0	1	5	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.5	2.2	m	4
Low shrubs	SL	60.0	84.0	100.0	cm	5
Dwarf shrubs	SD	1.0	3.0	7.0	cm	7
Tall and medium grasses and grass-likes	GT, GM	5.0	26.8	60.0	cm	6
Tall and medium forbs	FT, FM	20.0	37.0	60.0	cm	5
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.5	8.0	cm	13

Map Unit Components**Common Name (Soils Name):**

Alpine-scrub mosaic gravelly till drains (Aquandic Cryaquepts, loamy-skeletal)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9TM3 Alpine Cirque Valleys
(Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Aquandic Cryaquepts, loamy-skeletal Complex, 8 to 60 percent slopes)

Geographically Associated Landtypes**M135S_364—Hummocks, Moderately Wet:**

This site has hummocky micro-relief and drier soils. The climax plant community is "Shrub birch-willow/crowberry scrub."

M135S_421—Gravelly Colluvial Slopes:

This site occurs on adjacent till plains and mountains and soils are drier. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

M135S_536—Organic Depressions:

This site occurs in depressions and soils are wetter and have a thick organic surface layer. The climax plant community is "Water sedge-tufted bulrush-forb wet meadow."

Organic Depressions (M135S_536)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Subalpine Mountains (M135S.M5L)

Alpine Mountains (M135S.M5)

Physiographic Features

	<i>RV</i>	<i>Range</i>
Elevation (meters):	525	191 to 1,117
Slope Gradient (percent):	2	0 to 4

Aspect (clockwise direction): non-influencing

Landform: fens on benches on mountains; fens on till plains

Landform Positions: footslopes

Frequency

Flooding: None

Ponding: None

Climatic Features

	<i>RV</i>	<i>Range</i>
Annual Precipitation (millimeters):	1,403	408 to 3,051
Annual Air Temperature (°C):	-3.4	-6.9 to 0.7
Frost Free Days:	70	60 to 90

Soil Features

Parent Materials: grassy organic material over gravelly till

Rooting Depth (cm): *RV:* 84 *Range:* 39 to 150

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
13 to 71	peat; mucky peat	moderately rapid	.34	5.4	30	

Restrictive Features: strongly contrasting textural stratification at 84 cm

Water Table (May to September): 0 cm

Drainage Class: very poorly drained

Vegetation Features

Common Vegetation Types:

Vegetation Type

Water sedge-tufted bulrush-forb wet meadow

Ecological Status

Climax plant community

Ecological Status-Transition Description:

A single plant community of water sedge-tufted bulrush-forb wet meadow is identified on this site. Small, shallow ponds of standing water are usually present. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Water sedge-tufted bulrush-forb wet meadow	130	16	35	71	11

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Water sedge-tufted bulrush-forb wet meadow	ARAMP	Arnica amplexicaulis ssp. prima
	CAPA18	Carex parryana
	CASI3	Carex sitchensis
	COTR2	Coptis trifolia
	GEDO	Gentiana douglasiana
	HIMO2	Hippuris montana
	RUSP	Rubus spectabilis
	TOGLB	Tofieldia glutinosa ssp. brevistyla

Characteristics of Water sedge-tufted bulrush-forb wet meadow

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 11. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD-SL	PEFL15	Pentaphylloides floribunda	0.1	5	10	36	13
SD	SAFU	Salix fuscescens	4.0	14	30	64	30
SD	SARE2	Salix reticulata	0.1	8	20	55	21
SD	EMNI	Empetrum nigrum	0.1	5	10	73	19
GM	TRCE3	Trichophorum cespitosum	5.0	32	70	82	51
GM	CAAQ	Carex aquatilis	1.0	28	80	55	39
GM	CAREX	Carex	30.0	47	60	27	36
GM	ERAN6	Eriophorum angustifolium	0.1	17	30	73	35
GM	CAPA19	Carex pauciflora	7.0	17	25	27	21
GM	CAAN10	Carex anthoxantha	0.1	6	30	64	20
GM	FEAL	Festuca altaica	7.0	14	20	18	16
GM	ERANS2	Eriophorum angustifolium ssp. subarcticum	5.0	7	10	27	14
GM	CARA5	Carex rariflora	5.0	8	10	18	12
GM	CAST10	Carex stylosa	0.1	5	10	27	12
GM	CAL17	Carex limosa	0.1	5	10	18	9
FD-FM	EQAR	Equisetum arvense	0.1	11	40	82	30
FM	SAST11	Sanguisorba stipulata	0.1	6	15	91	23
FD-FM	EQPA	Equisetum palustre	2.0	6	10	18	10
FD	VIEPR	Viola epipsila ssp. repens	0.1	6	15	73	21
FD	THAL	Thalictrum alpinum	0.1	5	10	45	15
FD	COSU4	Cornus suecica	1.0	6	10	27	13
L	LICHEN	total lichens	0.0	0	0	100	0
M	MOSS	total bryophytes-mosses and liverworts	10.0	56	90	100	75
M1	ZZMOSS	unknown-mosses	5.0	24	50	91	47
M1	SPHAG2	Sphagnum	0.1	21	70	91	44
M1	PLSC70	Pleurozium schreberi	5.0	10	20	27	16
M1	TONI70	Tomentypnum nitens	2.0	11	20	18	14
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	25.0	56	85	100	75
B	WATER	water	0.1	18	50	100	42

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
B	SOIL	mineral-bare soil	0.0	1	10	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	ROCK	mineral-surface rock fragments	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Medium shrubs	SM	1.2	1.2	1.2	m	1
Low shrubs	SL	20.0	50.0	70.0	cm	4
Dwarf shrubs	SD	2.0	5.9	20.0	cm	9
Tall and medium grasses and grass-like	GT, GM	14.0	50.8	130.0	cm	5
Tall and medium forbs	FT, FM	15.0	20.0	25.0	cm	4
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	4.1	15.0	cm	14

Map Unit Components**Common Name (Soils Name):**

Alpine-sedge wet meadow organic depressions (Cryohemists, euic)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9SA61 Subalpine Glaciated Benches on Lower Mountain Slopes
(Andic Humicryods, medial over loamy-skeletal-Cryohemists, euic-Typic Cryaquands, medial over loamy Association, 0 to 20 percent slopes)

Geographically Associated Landtypes**M135S_421—Gravelly Colluvial Slopes:**

This site occurs on adjacent till plains and mountains with drier soils. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

M135S_424—Swales, Wet:

This site occurs along depression perimeters and swales and soils are drier. The climax plant community is "Short stalked sedge-mixed forb wet meadow/scrub."

Loamy Depressions (M135S_551)**Ecoregion Classification**

Section: South Central Mountains (M135S)

Subsection(s): Alpine Mountains (M135S.M5)

Physiographic Features

Elevation (meters): RV 1,135 Range 406 to 2,018

Slope Gradient (percent): 34 20 to 70

Aspect (clockwise direction): non-influencing

Landform: swales on mountains

Frequency

Flooding: None

Ponding: None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,568	509 to 3,285
Annual Air Temperature (°C):	-5.9	-11.4 to -1.7
Frost Free Days:	60	50 to 70

Soil Features

Parent Materials: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from diorite
 silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock

Rooting Depth (cm): RV: 46 Range: 14 to 87

Soil Layers and Properties within Representative Rooting Depth:

Layers are described from the surface downward. If more than one texture is listed, the predominant texture is listed first. AWC = available water capacity. CEC = cation exchange capacity.

Thickness (cm)	Texture	Permeability	AWC (cm/cm)	pH	Effective CEC (me/100g)	CEC (me/100g)
2 to 3	moderately decomposed plant material; slightly decomposed plant material	moderately rapid	.34	3.4 to 4.4	30	
4 to 23	loam; gravelly loam	moderate	.12 to .34	4.6	12 to 25	
7 to 33	extremely channery loam; very cobbly sandy loam; extremely cobbly sandy loam	moderately rapid	.10	5.0 to 5.7	6	6

Restrictive Features: bedrock (paralithic) at 72 to 150 cm or more
 strongly contrasting textural stratification at 6 cm

Water Table (May to September): none

Drainage Class: well drained

Vegetation Features**Common Vegetation Types:**

Vegetation Type	Ecological Status
Partridge foot-dwarf willow/mixed forb dwarf alpine scrub	Climax plant community

Ecological Status-Transition Description:

The position of this site in depressions promotes snow drifting, which shortens the effective growing season and development of woody vegetation. A single plant community type of partridge foot-dwarf willow/mixed forb dwarf scrub is identified on this site. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Partridge foot-dwarf willow/mixed forb dwarf alpine scrub	138	15	33	52	14

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Partridge foot-dwarf willow/mixed forb dwarf alpine scrub	DRLO	Draba lonchocarpa
	FEBR2	Festuca brevissima
	PHAL4	Phyllodoce aleutica

Characteristics of Partridge foot-dwarf willow/mixed forb dwarf alpine scrub

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 14. Only those vascular, lichen, and bryophyte species with average cover $\geq 5\%$ and constancy $\geq 15\%$ are listed.

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
SD	LUPE	Luetkea pectinata	0.1	30	70	86	51
SD	EMNI	Empetrum nigrum	0.1	8	40	93	27
SD	SAPO	Salix polaris	5.0	13	35	57	27
SD	CAST33	Cassiope stelleriana	0.1	7	25	71	22
SD	SARE2	Salix reticulata	0.1	5	15	29	12
GM	CAMI4	Carex microchaeta	0.1	11	35	64	27
GM	FEAL	Festuca altaica	0.1	8	30	64	23
GM	CAPO	Carex podocarpa	0.1	5	15	43	15
FD-FM	ARAR9	Artemisia arctica	0.1	7	35	100	26
FD	DIAL5	Diphasiastrum alpinum	0.1	8	20	93	27
L	LICHEN	total lichens	0.1	17	55	100	41
L1	CLADO3	Cladonia	0.1	5	20	86	21
L1	CLADI3	Cladina	1.0	7	15	50	19
L1	CLMI61	Cladina mitis group	1.0	8	15	29	15
M	MOSS	total bryophytes-mosses and liverworts	10.0	42	85	100	65
M1	ZZMOSS	unknown-mosses	10.0	31	50	86	52
M1	POLYT5	Polytrichum	1.0	5	15	64	18
M1	DICRA8	Dicranum	4.0	6	10	43	16
M1	RACOM	Racomitrium	0.1	7	10	21	12
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	15.0	48	90	100	69
B	ROCK	mineral-surface rock fragments	0.1	2	10	100	14
B	SOIL	mineral-bare soil	0.1	1	3	100	10
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Low shrubs	SL	30.0	30.0	30.0	cm	2
Dwarf shrubs	SD	1.0	4.9	20.0	cm	14
Tall and medium grasses and grass-likes	GT, GM	10.0	26.8	60.0	cm	13
Tall and medium forbs	FT, FM	23.0	31.5	40.0	cm	2
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	1.0	2.3	10.0	cm	33

Map Unit Components**Common Name (Soils Name):**

Alpine-dwarf scrub-meadow mosaic gravelly colluvial slopes (Andic Dystrocryepts, loamy-skeletal)

Alpine-dwarf scrub-meadow mosaic gravelly diorite swales (Andic Dystrocryepts, loamy-skeletal)

Soil Map Units

This landtype is a minor component in the map units listed. It does not occur as a major component in any map units.

Symbol: Common Name (Soils Name):

9MSA	Alpine Diorite Mountains (Andic Dystrocryepts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes)
9MSH	Alpine Mountains (Rock Outcrop-Andic Dystrocryepts, loamy-skeletal Association, 20 to 150 percent slopes)
9TM3	Alpine Cirque Valleys (Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Aquandic Cryaquepts, loamy-skeletal Complex, 8 to 60 percent slopes)

Geographically Associated Landtypes

M135S_307—Gravelly Mountains, Moist:

This site occurs on moister micro-sites where snow persists later into the growing season. The climax plant community is "Steller cassiope-crowberry dwarf alpine scrub."

M135S_310—Gravelly Mountains:

This site occurs on convex or plain southerly facing mountain slopes. The climax plant community is "Lichen/mixed ericaceous shrub dwarf alpine scrub."

M135S_421—Gravelly Colluvial Slopes:

This site occurs on plain colluvial slopes. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

South Central Rock and Ice, Nonvegetated (M135S_ROC)

Ecoregion Classification

Section: South Central Mountains (M135S)

Subsection(s): Subalpine Mountains (M135S.M5L)

Alpine Mountains (M135S.M5)

Nonvegetated Alpine Mountains (M135S.B2)

Physiographic Features

	RV	Range
Elevation (meters):	958	183 to 6,188
Slope Gradient (percent):	70	20 to 150

Aspect (clockwise direction): non-influencing

Landform:

	Frequency
Flooding:	None
Ponding:	None

Climatic Features

	RV	Range
Annual Precipitation (millimeters):	1,654	408 to 3,450
Annual Air Temperature (°C):	-5.7	-23.9 to 0.7
Frost Free Days:	60	20 to 90

Soil Features

Parent Materials: rockfall deposits and/or scree and/or talus

Rooting Depth (cm): RV: 35 Range: 11 to 67

Water Table (May to September): not applicable

Drainage Class: not applicable

Vegetation Features

Common Vegetation Types:

Vegetation Type	Ecological Status
Sparsely vegetated mountain slopes, South Central	Climax plant community

Ecological Status-Transition Description:

This site consists of mostly nonvegetated slopes. Although cover is almost always less than one percent, scree slopes contain characteristic assemblages of plants, some of them rare and restricted to these habitats. No transitional pathways to other communities have been identified for this site.

Vascular Plant Species Richness:

Vascular plant species richness is based on 1999-2002 field season data only. Data from 1997 and 1998 were not used in the calculations.

Vegetation Type	Total	Per Stand			Number of Stands
		Min.	Avg.	Max.	
Sparsely vegetated mountain slopes, South Central	97	12	21	32	7

Notable Plants:

Notable plants include rare plants, range extensions, and plants little known from Denali National Park and Preserve.

Vegetation Type	Symbol	Scientific Name
Sparsely vegetated mountain slopes, South Central	MIBI9	Minuartia biflora
	STAL3	Stellaria alaskana
	THAR4	Thlaspi arcticum

Characteristics of Sparsely vegetated mountain slopes, South Central

Ecological Status: Climax plant community

Plant Species Cover, Constancy, and Importance:

Cover, constancy, and importance are based on 1997-2002 field season data. Number of stands sampled = 7. Only those vascular, lichen, and bryophyte species

Stratum	Symbol	Scientific Name	Percent Canopy Cover			Percent Constancy	Importance Value
			Min.	Avg.	Max.		
L	LICHEN	total lichens	0.1	21	80	100	46
L2	ZZCRUST	unknown-crustose and soil crust lichens	0.1	23	75	71	40
M	MOSS	total bryophytes-mosses and liverworts	0.1	7	20	100	26
M1	ZZMOSS	unknown-mosses	0.1	10	20	71	27
B	ROCK	mineral-surface rock fragments	60.0	78	100	100	88
B	SOIL	mineral-bare soil	0.0	16	40	100	40
B	LITTER	litter-herbaceous, mulch, and woody debris <2.5 cm	0.0	2	10	100	14
B	LITTER2	litter-woody debris >2.5 cm	0.0	0	0	100	0
B	WATER	water	0.0	0	0	100	0

Stratum Height:

Stratum height is based on 1997-2002 field season data. All plant species and ground layer records from all stands are included in the calculations.

Stratum Name	Included Strata	Height			Units	Number of Records
		Min.	Avg.	Max.		
Tall shrubs	ST	5.5	5.5	5.5	m	1
Dwarf shrubs	SD	1.0	2.0	3.0	cm	3
Tall and medium grasses and grass-likes	GT, GM	10.0	20.0	30.0	cm	2
Tall and medium forbs	FT, FM	10.0	10.0	10.0	cm	1
Dwarf herbs, lichens, and bryophytes	GD, FD, L, M	0.1	1.0	2.0	cm	8

Map Unit Components**Common Name (Soils Name):**

South Central nonvegetated rock outcrop, ice, talus, and/or drift (Nonvegetated rock outcrop, ice, talus, and/or drift)

Soil Map Units

Only those map units in which the landtype is a major component are listed. The landtype also may occur as a minor component in other map units.

Symbol: Common Name (Soils Name):

9CE	Alpine, Subalpine, and Boreal Recent Moraines (Typic Cryorthents-Nonvegetated Drift-Typic Eutrocryepts, loamy-skeletal Association, 0 to 65 percent slopes)
9MSA	Alpine Diorite Mountains (Andic Dystrocryepts, loamy-skeletal-Rock Outcrop Association, 20 to 150 percent slopes)
9MSH	Alpine Mountains (Rock Outcrop-Andic Dystrocryepts, loamy-skeletal Association, 20 to 150 percent slopes)
9SA4	Alpine Lower Mountain Colluvial Slopes (Humic Vitricryands, medial-skeletal-Rock Outcrop-Andic Dystrocryepts, loamy-skeletal Association, 35 to 75 percent slopes)

- 9SA5 Subalpine Mountain Colluvial Slopes
(Andic Humicryods, medial-skeletal-Andic Dystrocryepts, loamy-skeletal-Rock Outcrop-Association, 25 to 70 percent slopes)
- NV2 Alpine Nonvegetated Mountains-Alaska Range-South Central
(Nonvegetated High Mountains)

Geographically Associated Landtypes

M135S_307—Gravelly Mountains, Moist:

This site occurs on moister vegetated micro-sites where snow persists later into the growing season. The climax plant community is "Steller cassiope-crowberry dwarf alpine scrub."

M135S_310—Gravelly Mountains:

This site occurs on vegetated micro-sites. The climax plant community is "Lichen/mixed ericaceous shrub dwarf alpine

M135S_421—Gravelly Colluvial Slopes:

This site occurs on plain vegetated colluvial slopes. The climax plant community is "Barclay willow/mixed forb scrub mosaic."

Detailed Soil Descriptions

Soil Classification and Taxonomic Unit Descriptions

In this section, each soil taxonomic group recognized in the survey area is described; characteristics of the soil and the material in which it formed are identified; and a pedon, a small three-dimensional area of soil that is typical of the taxonomic group in the survey area, is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (Soil Survey Division Staff 1993). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* and *Keys to Soil Taxonomy* (Soil Survey Staff 1975; 1998). Unless otherwise stated, colors in the descriptions are for moist soil. The range of important characteristics of the soils in the series follows the pedon description.

The map units associated with each taxonomic group are described in the section [ECOMAP Landtype Associations \(detailed soil map units\)](#).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff 1975). Only five are used in this survey project. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field, or inferred from those observations, or from laboratory measurements. The categories are defined in the following paragraphs.

Order. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

Suborder. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth, or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Cryept (*Cry*, meaning cold, plus *ept*, from Inceptisol).

Great Group. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Eutrocryepts (*Eutr*, meaning fertile, plus *cryepts*, the suborder of the Inceptisols that has a cryic temperature regime).

Subgroup. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Eutrocryepts.

Family. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, cation exchange activity class, and temperature regime. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, superactive Typic Eutrocryepts. A majority of the soil components defined for this project are described at the family level in this soil classification system.

Series. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series. The soil series level was not used in this project.

The taxonomic unit descriptions provided in the following pages consist of descriptions and ranges of characteristics of soils based on a level of grouping that was determined appropriate for this project. Each taxonomic description is an aggregate of soils that share the same particle-size family within a Subgroup. Several other soil properties are used to differentiate soil families but were not used for the purpose of distinguishing taxonomic units. Other significant family criteria include mineralogy classes, cation-exchange activity classes, calcareous and reaction classes, and soil temperature classes. These additional criteria, though not used to distinguish taxonomic units, were used in designating interpretive phases in the map units. The classification of the soils is given in Table 8.

Andic Dystricrypts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive Andic Dystricrypts

Map unit component(s):

Alpine-dwarf scrub gravelly colluvial slopes, cool
 Alpine-dwarf scrub gravelly colluvial slopes, warm
 Alpine-dwarf scrub gravelly diorite colluvial slopes, cool
 Alpine-dwarf scrub gravelly diorite colluvial slopes, warm
 Alpine-dwarf scrub gravelly till hummocks
 Alpine-dwarf scrub-meadow mosaic gravelly colluvial slopes
 Alpine-dwarf scrub-meadow mosaic gravelly diorite swales
 Alpine-scrub gravelly colluvial slopes, warm
 Alpine-scrub gravelly till slopes, warm
 Alpine-scrub-meadow mosaic gravelly diorite colluvial slopes
 Alpine-scrub-meadow mosaic silty till slopes

Depth class: shallow to very deep

Drainage class: well drained

Landform: hills, mountains, till plains

Parent material: silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from diorite, silty volcanic ash and/or gravelly colluvium over gravelly colluvium derived from sedimentary rock, silty volcanic ash and/or gravelly till over gravelly till

Elevation: 103 to 2,018 m

Slope: 7 to 80 percent

Annual precipitation: 408 to 3,285 mm

Annual temperature: -11 to 1 °C

Frost-free period: 50 to 90 days

Representative Location

Map unit in which located: 9MSH1—Andic Humicryods, medial over loamy-skeletal-Andic Dystricrypts, loamy-skeletal-Humic Vitricryands, medial-skeletal Association, 10 to 80 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Along East Fork of Yentna River; UTM coordinates: Zone 5, Easting 562662, Northing 6933569

Representative Pedon

Oi—0 to 2 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine roots; 2 percent gravel; very strongly acid; abrupt smooth boundary.

A—2 to 6 cm; black (10YR 2/1) and dark brown (10YR 3/3) silt loam; weak medium granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent gravel; very strongly acid; clear smooth boundary.

Bw—6 to 23 cm; dark yellowish brown (10YR 3/4) gravelly loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 15 percent gravel, 5 percent cobbles; strongly acid; gradual wavy boundary.

2C1—23 to 38 cm; dark grayish brown (2.5Y 4/2) extremely channery loam; single grain; friable, nonsticky and nonplastic; few very fine and fine roots; 50 percent channers, 15 percent flagstones; moderately acid; diffuse wavy boundary.

2C2—38 to 63 cm; dark grayish brown (2.5Y 4/2) extremely flaggy loam; single grain; friable, nonsticky and nonplastic; 35 percent channers, 30 percent flagstones; moderately acid; gradual wavy boundary.

3Cr—63 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0.6 to 3.2 °C

Summer soil temperature: 5.8 to 8.6 °C

Depth to fractured bedrock: 54 to over 152 cm

Thickness of volcanic ash influenced layer: 12 to 71 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2, 2.5, or 3; chroma of 1 to 4

Texture—moderately decomposed plant material or slightly decomposed plant material

Reaction—ultra acid to strongly acid

A, A/E, and 2A horizons:

Color—hue of 2.5YR to 10YR; value of 2, 2.5, or 3; chroma of 1 to 4

Texture—very cobbly sandy loam, very gravelly sandy loam, silt loam, mucky silt loam, loam, very channery loam, very flaggy loam, very gravelly loam, gravelly loam, gravelly sandy loam

Clay content—0 to 15 percent

Silt content—10 to 70 percent

Sand content—20 to 80 percent

Organic matter content—2 to 12 percent

Rock fragments—0 to 45 percent gravel, cobbles, channers or flagstones

Reaction—ultra acid to strongly acid

2Bw, Bw, Bs, or Bhs/Bs horizons:

Color—hue of 5YR to 2.5Y; value of 3 or 4; chroma of 3 to 6

Texture—extremely flaggy loam, extremely gravelly loam, extremely channery loam, gravelly loam, very cobbly sandy loam, loam, silt loam, very gravelly sandy loam, very gravelly loam, very cobbly loam, very flaggy loam, extremely gravelly sandy loam

Clay content—5 to 15 percent

Silt content—10 to 70 percent

Sand content—20 to 80 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 60 percent angular sedimentary gravel, channers, flagstones, or cobbles

Reaction—extremely acid to moderately acid

2C or C horizons:

Color—hue of 7.5YR to 5Y; value of 2.5 to 5; chroma of 1 to 6

Texture—extremely flaggy loam, extremely gravelly loam, extremely channery loam, very gravelly sandy loam, gravelly loam, very cobbly sandy loam, extremely gravelly sandy loam, extremely cobbly sandy loam, very cobbly loam, extremely cobbly loam

Clay content—0 to 10 percent

Silt content—5 to 50 percent

Sand content—35 to 80 percent

Rock fragments—10 to 70 percent gravel, channers, flagstones, or cobbles

Reaction—extremely acid to slightly acid

Andic Humicryods, medial over loamy-skeletal

Taxonomic Classification

- Medial over loamy-skeletal, amorphic over mixed, superactive Andic Humicryods

Map unit component(s):

Alpine-dwarf scrub silty hummocks

Alpine-dwarf scrub silty till hummocks

Boreal-forested silty till slopes, ash influenced, warm

Subalpine-scrub-meadow mosaic silty till slopes

Depth class: moderately deep to very deep

Drainage class: well drained

Landform: hills, mountains, till plains

Parent material: silty volcanic ash and/or loess over gravelly colluvium derived from diorite, silty volcanic ash and/or loess over gravelly colluvium derived from sedimentary rock, silty volcanic ash and/or loess over gravelly till

Elevation: 63 to 1,614 m

Slope: 0 to 50 percent

Annual precipitation: 408 to 3,285 mm

Annual temperature: -11 to 1 °C

Frost-free period: 50 to 100 days

Representative Location

Map unit in which located: 9SA5—Andic Humicryods, medial-skeletal-Andic Dystrocryepts, loamy-skeletal-Rock Outcrop-Association, 20 to 75 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Wet Butt Creek near Kahiltna Glacier terminus; UTM coordinates: Zone 5, Easting 588482, Northing 6932241

Representative Pedon

Oi—0 to 4 cm; reddish black (2.5YR 2.5/1) slightly decomposed plant material; many very fine and fine, many medium and common coarse roots; extremely acid; abrupt smooth boundary.

A—4 to 10 cm; very dusky red (2.5YR 2.5/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; extremely acid; abrupt wavy boundary.

E—10 to 14 cm; dark reddish gray (5YR 4/2) and grayish brown (10YR 5/2) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; common very fine and fine roots; extremely acid; abrupt wavy boundary.

Bhs—14 to 39 cm; reddish black (10R 2.5/1) fine sandy loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 5 percent gravel, 5 percent cobbles; extremely acid; gradual boundary.

Bs—39 to 48 cm; dark reddish brown (5YR 3/4) loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; few very fine and fine roots; 5 percent gravel, 5 percent cobbles; extremely acid; clear wavy boundary.

2BC—48 to 63 cm; dark yellowish brown (10YR 4/4) gravelly loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; 15 percent gravel, 5 percent cobbles; very strongly acid; diffuse wavy boundary.

2C1—63 to 72 cm; olive brown (2.5Y 4/3) very cobbly loam; massive; friable, nonsticky and nonplastic; 20 percent gravel, 25 percent cobbles; very strongly acid; gradual smooth boundary.

2C2—72 to 150 cm; olive brown (2.5Y 4/3) very cobbly loam; massive; friable, nonsticky and nonplastic; 20 percent gravel, 25 percent cobbles; very strongly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 2.7 °C

Thickness of volcanic ash influenced surface layers: 17 to 88 cm

Oi horizon:

Color—hue of 10R to 10YR; value of 2, 2.5, or 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—ultra acid to very strongly acid

A or A/E horizon:

Color—hue of 2.5YR to 10YR; value of 2, 2.5, or 3; chroma of 1 or 2

Clay content—5 to 15 percent

Silt content—50 to 70 percent

Sand content—20 to 40 percent

Organic matter content—5 to 10 percent

Rock fragments—0 to 3 percent gravel; 0 to 3 percent cobbles

Reaction—ultra acid or very strongly acid

E horizon:

Color—hue of 5YR to 2.5Y; value of 4 or 5; chroma of 1 or 2

Clay content—5 to 15 percent

Silt content—50 to 70 percent

Sand content—20 to 40 percent

Organic matter content—5 to 10 percent

Rock fragments—0 to 3 percent gravel; 0 to 3 percent fine gravel; 0 to 3 percent cobbles

Reaction—extremely acid or very strongly acid

Bhs, BS, and Bhs/Bs horizons:

Color—hue of 10R to 5YR; value of 2.5 or 3; chroma of 1 to 4

Texture—fine sandy loam, loam, very fine sandy loam, silt loam

Clay content—0 to 15 percent

Silt content—25 to 70 percent

Sand content—20 to 60 percent

Organic matter content—5 to 10 percent

Rock fragments—0 to 5 percent cobbles; 0 to 5 percent gravel

Reaction—ultra acid or very strongly acid

2Bs horizon (when present):

Color—hue of 2.5YR to 7.5YR; value of 2.5 to 4; chroma of 4 to 8

Texture—very gravelly loam, very cobbly sandy loam, very gravelly sandy loam, very cobbly loam, extremely cobbly loam, extremely stony loam

Clay content—0 to 10 percent

Silt content—20 to 40 percent

Sand content—50 to 70 percent

Organic matter content—0 to 2 percent

Rock fragments—5 to 30 percent subangular mixed cobbles; 15 to 40 percent subangular mixed gravel; 0 to 40 percent subangular stones

Reaction—extremely acid to strongly acid

2BC horizon:

Color—hue of 10YR or 2.5Y; value of 3 or 4; chroma of 2 to 6

Texture—extremely flaggy loam, extremely gravelly loam, extremely channery loam, very cobbly sandy loam, very gravelly sandy loam, very gravelly loam

Clay content—0 to 10 percent

Silt content—20 to 40 percent

Sand content—35 to 70 percent

Organic matter content—0 to 2 percent

Rock fragments—5 to 60 percent angular cobbles, gravel, channers, or flagstones

Reaction—very strongly acid to moderately acid

2C horizon:

Color—hue of 10YR to 5Y; value of 2.5 to 4; chroma of 1 to 3

Texture—very gravelly sandy loam, very cobbly sandy loam, very gravelly loam, extremely flaggy loam, extremely gravelly loam, extremely channery loam, very cobbly loam, extremely cobbly loam

Clay content—0 to 10 percent

Silt content—20 to 50 percent

Sand content—35 to 70 percent

Rock fragments—20 to 60 percent gravel, cobbles, stones, channers, or flagstones

Reaction—very strongly acid to moderately acid

Andic Humicryods, medial-skeletal

Taxonomic Classification

- Medial-skeletal, amorphic, superactive Andic Humicryods

Map unit component(s):

Subalpine-scrub-meadow mosaic gravelly colluvial slopes, warm

Depth class: moderately deep to very deep

Drainage class: well drained

Landform: mountains

Parent material: silty volcanic ash and/or gravelly colluvium over gravelly till, silty volcanic ash over gravelly volcanic ash over gravelly colluvium and/or gravelly till

Elevation: 103 to 1,408 m

Slope: 15 to 70 percent

Annual precipitation: 408 to 3,051 mm

Annual temperature: -7 to 1 °C

Frost-free period: 60 to 90 days

Representative Location

Map unit in which located: 9SA5—Andic Humicryods, medial-skeletal-Andic Dystrocryepts, loamy-skeletal-Rock Outcrop-Association, 20 to 75 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Lower Buckskin Glacier; UTM coordinates: Zone 5, Easting 643731, Northing 6979744

Representative Pedon

Oi—0 to 4 cm; dark yellowish brown (10YR 3/4) slightly decomposed plant material; many very fine and fine and few medium roots; ultra acid; clear smooth boundary.

A—4 to 14 cm; dark reddish brown (5YR 2.5/2) silt loam; weak medium granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; ultra acid; clear smooth boundary.

2E—14 to 21 cm; reddish brown (5YR 4/3) cobbly loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; many very fine and fine roots; 15 percent gravel, 10 percent cobbles, 2 percent stones; ultra acid; clear smooth boundary.

2Bhs—21 to 36 cm; dark reddish brown (2.5YR 2.5/3) very cobbly loam; moderate fine granular structure; friable, nonsticky and nonplastic; many very fine and fine roots; 20 percent gravel, 25 percent cobbles; ultra acid; clear wavy boundary.

2Bs1—36 to 57 cm; dark reddish brown (5YR 3/4) very cobbly loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; common very fine and fine roots; 20 percent gravel, 25 percent cobbles; extremely acid; gradual wavy boundary.

2Bs2—57 to 92 cm; brown (7.5YR 4/4) very cobbly loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent gravel, 25 percent cobbles; extremely acid; diffuse irregular boundary.

2Cr—92 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 2.7 °C

Depth to bedrock: 56 to over 152 cm

Thickness of volcanic ash influenced surface layers: 17 to 88 cm

Oi horizon:

Color—hue of 10R to 7.5YR; value of 2 or 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—ultra acid to very strongly acid

A horizon:

Color—hue of 2.5YR to 10YR; value of 2, 2.5, or 3; chroma of 1 to 3

Clay content—5 to 15 percent

Silt content—50 to 70 percent

Sand content—20 to 40 percent

Organic matter content—5 to 10 percent

Rock fragments—0 to 3 percent gravel and cobbles

Reaction—ultra acid to very strongly acid

2E horizon:

Color—hue of 5YR to 10YR; value of 4 to 6; chroma of 1 or 3

Texture—very gravelly loam, very gravelly sandy loam, cobbly loam, extremely cobbly loam, extremely stony loam

Clay content—0 to 10 percent

Silt content—20 to 50 percent

Sand content—40 to 70 percent

Organic matter content—0 to 2 percent

Rock fragments—2 to 40 percent subangular mixed gravel, cobble, and stones
 Reaction—extremely acid or very strongly acid

2Bhs horizon:

Color—hue of 10R to 5YR; value of 2.5 or 3; chroma of 1 to 3
 Texture—very gravelly loam, very cobbly sandy loam, very gravelly sandy loam, extremely cobbly loam, extremely stony loam, very cobbly loam
 Clay content—0 to 5 percent
 Silt content—15 to 45 percent
 Sand content—40 to 70 percent
 Organic matter content—4 to 8 percent
 Rock fragments—20 to 45 percent subangular mixed gravel, cobbles, and stones
 Reaction—ultra acid or very strongly acid

2Bs horizon:

Color—hue of 5YR or 7.5YR; value of 3 or 4; chroma of 3 to 6
 Texture—very cobbly sandy loam, very gravelly sandy loam, extremely cobbly loam, extremely stony loam, very gravelly loam, very cobbly loam
 Clay content—0 to 15 percent
 Silt content—15 to 45 percent
 Sand content—40 to 70 percent
 Organic matter content—0 to 2 percent
 Rock fragments—20 to 45 percent subangular mixed rock gravel, cobble, and stones
 Reaction—extremely acid or strongly acid

Aquandic Cryaquepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, nonacid Aquandic Cryaquepts

Map unit component(s):

Alpine-scrub mosaic gravelly till drains

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: mountains

Parent material: silty volcanic ash and/or gravelly till over gravelly till

Elevation: 499 to 1,614 m

Slope: 12 to 30 percent

Annual precipitation: 509 to 3,285 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 9TM3—Andic Humicryods, medial over loamy-skeletal-Andic Dystrocryepts, loamy-skeletal-Aquandic Cryaquepts, loamy-skeletal Complex, 8 to 60 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Mountains east of the East Fork Yentna River; UTM coordinates: Zone 5, Easting 563433, Northing 6927945

Representative Pedon

Oi—0 to 4 cm; very dark brown (10YR 2/2) slightly decomposed plant material; many very fine and fine and few medium roots; very strongly acid; clear wavy boundary.

A1—4 to 12 cm; dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 2 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 15 percent of horizon); very strongly acid; clear wavy boundary.

2A2—12 to 39 cm; dark brown (10YR 3/3) and very dark brown (10YR 2/2) very cobbly loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; 2 percent gravel; strongly acid; abrupt smooth boundary.

2C1—39 to 56 cm; dark grayish brown (2.5Y 4/2) very cobbly sandy loam; massive; friable, nonsticky and nonplastic; 20 percent gravel, 20 percent cobbles; strongly acid; gradual smooth boundary.

2C2—56 to 150 cm; dark grayish brown (2.5Y 4/2) very cobbly sandy loam; massive; firm, nonsticky and nonplastic; 20 percent gravel, 20 percent cobbles; strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 0.6 to 3.2 °C

Thickness of volcanic ash influenced surface layers: 21 to 35 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 or 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—very strongly acid to neutral

A1 horizon:

Color—value of 2 or 3; chroma of 1 to 3

Texture—mucky silt loam, silt loam

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—5 to 20 percent

Organic matter content—8 to 20 percent

Rock fragments—0 to 2 percent subangular indurated gravel

Reaction—very strongly acid to neutral

2A2 horizon:

Color—chroma of 2 or 3

Texture—very cobbly sandy loam, very gravelly sandy loam, gravelly loam, very cobbly loam

Clay content—0 to 10 percent

Silt content—25 to 45 percent

Sand content—45 to 80 percent

Organic matter content—2 to 6 percent

Rock fragments—15 to 55 percent subangular indurated gravel; 0 to 35 percent subangular indurated cobbles

Reaction—strongly acid or slightly acid

2C horizon:

Color—hue of 10YR to 5Y; value of 2.5 to 4; chroma of 1 to 3

Texture—very gravelly sandy loam, gravelly loam, very cobbly sandy loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 80 percent

Organic matter content—0 to 0.2 percent

Rock fragments—15 to 55 percent subangular indurated gravel; 0 to 35 percent subangular indurated cobbles

Reaction—strongly acid to slightly acid

Aquandic Haplocryods, loamy-skeletal

Taxonomic classification

- Mixed, superactive, subgelic Aquandic Haplocryods

Map unit component(s):

Alpine-scrub gravelly till hummocks

Depth class: very deep

Drainage class: somewhat poorly drained

Landforms: earth hummocks on till plains

Parent material: silty cryoturbate over gravelly till

Elevation: 425 to 1,116 m

Slope: 2 to 10 percent

Annual precipitation: 1,568 to 3,285 mm

Annual temperature: -11.4 to -1.7 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 9TM—Andic Dystricrypts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystricrypts, loamy-skeletal Association, 10 to 55 percent slopes in the Denali National Park Area, Alaska

General location in survey area: East of Dunkle Mine; UTM coordinates: Zone 6, Easting 380495, Northing 7016375

Representative Pedon

Oi—0 to 13 cm; dark reddish brown (5YR 3/4) slightly decomposed plant material; many very fine and fine and many medium roots; ultra acid; clear wavy boundary.

A/E—13 to 34 cm; dark brown (10YR 3/3) and dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; 10 percent cobbles; very strongly acid; clear wavy boundary.

2Bs1—34 to 47 cm; brown (7.5YR 4/3) and dark brown (7.5YR 3/4) cobbly loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common very fine and fine roots; 10 percent gravel, 15 percent cobbles; strongly acid; diffuse broken boundary.

2Bs2—47 to 56 cm; dark reddish brown (2.5YR 3/4) and dark brown (7.5YR 3/4) gravelly loam; strong very fine granular structure; friable, nonsticky and nonplastic; few very fine and fine roots; 20 percent gravel, 5 percent cobbles; strongly acid; gradual wavy boundary.

2C—56 to 150 cm; yellowish brown (10YR 5/4) very cobbly sandy loam; single grain; firm, nonsticky and nonplastic; 30 percent gravel, 15 percent cobbles; strongly acid.

Range in Characteristics

Soil moisture class: udic

Annual soil temperature: 0.6 to 3.2 °C

Summer soil temperature: 5.8 to 8.6 °C

Depth to strongly contrasting textural stratification: 27 to 42 cm

O horizon:

Organic matter content: 60 to 90 percent

Reaction: ultra acid or extremely acid

A/E horizon:

Color—hue of 7.5YR or 10YR; value of 2 to 4; chroma of 2 or 3

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—10 to 30 percent

Organic matter content—5 to 10 percent

Rock fragments—0 to 10 percent gravel and cobbles

Reaction—extremely acid or very strongly acid

2Bs horizon:

Color—hue of 5YR or 7.5YR; value of 3 or 4; chroma of 3 or 4

Texture—very cobbly sandy loam, very gravelly sandy loam, extremely stony loam, extremely cobbly loam, cobbly loam

Clay content—5 to 15 percent

Silt content—25 to 45 percent

Sand content—40 to 70 percent

Rock fragments—5 to 40 percent gravel, cobbles and stones

Reaction—very strongly acid to moderately acid

2C horizon:

Color—hue of 10YR or 2.5Y; value of 3 to 5; chroma of 2 to 4

Texture—very cobbly sandy loam, very gravelly sandy loam, extremely stony loam, extremely cobbly loam

Clay content—0 to 10 percent

Silt content—20 to 40 percent

Sand content—50 to 70 percent

Rock fragments—5 to 40 percent gravel, cobbles, and stones

Reaction—very strongly acid to moderately acid

Aquic Cryofluvents, coarse-loamy over sandy-skeletal

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid Aquic Cryofluvents

Map unit component(s):

Boreal-riparian forested loamy wet flood plains

Boreal-riparian forested loamy wet flood plains, Cook Inlet

Boreal-riparian forested loamy very wet flood plains

Boreal-riparian scrub loamy low flood plains, moderately wet

Subalpine-riparian scrub loamy drains

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: flood plains

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Elevation: 61 to 624 m

Slope: 0 to 10 percent

Annual precipitation: 336 to 989 mm

Annual temperature: -3 to 1 °C

Frost-free period: 70 to 110 days

Representative Location

Map unit in which located: 1FP—Fluvaquentic Historthels, coarse-loamy-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryofluvents, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Lower Kantishna River east of Chilchukabena Lake; UTM coordinates: Zone 5, Easting 579734, Northing 7085228

Representative Pedon

Oi—0 to 2 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine, many medium and few coarse roots; neutral; abrupt smooth boundary.

AC—2 to 33 cm; black (5Y 2.5/1) stratified fine sand to silt; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine, common medium and few coarse roots; slightly effervescent; 2 mm dark yellowish brown (10YR 4/4) high chroma redox concentrations (approximately 10 percent of horizon); moderately alkaline; clear smooth boundary.

Cg1—33 to 54 cm; very dark gray (N 3/) stratified fine sand to silt; single grain; very friable, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; slightly alkaline; abrupt smooth boundary.

Cg2—54 to 69 cm; very dark gray (N 3/) very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; 30 percent gravel, 5 percent cobbles; slightly alkaline; gradual smooth boundary.

2C—69 to 150 cm; very dark gray (2.5Y 3/1) extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; 60 percent gravel, 5 percent cobbles; slightly alkaline.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.9 °C

Depth to contrasting sandy and gravelly material: 32 to 98 cm

O horizon:

Color—hue of 2.5YR, 5YR, 7.5YR, or 10YR; value of 2, 2.5, or 3; chroma of 1 to 4

Texture—slightly decomposed plant material, moderately decomposed plant material

Organic matter content—45 to 90 percent

Reaction—very strongly acid to neutral

AC, A/C or A horizons:

Color—hue of 10YR to 5Y; value of 2 to 4; chroma of 1 to 3

Texture—stratified sand to silt

Clay content—0 to 10 percent

Silt content—10 to 35 percent

Sand content—55 to 85 percent

Organic matter content—0 to 6 percent

Rock fragments—0 to 10 percent rounded mixed gravel

Calcium carbonate equivalent: 0 to 1 percent

Electrical Conductivity (mmhos/cm): 0 to 2

Reaction—strongly acid to moderately alkaline

Cg horizon:

Color—hue of 2.5Y to N 5/ ; value of 3 to 6; chroma of 1 or 2

Texture—stratified sand to silt, stratified fine sand to silt, stratified coarse sand to silt, stratified gravelly coarse sand to silt

Clay content—0 to 10 percent

Silt content—10 to 35 percent

Sand content—55 to 85 percent

Organic matter content—0 to 4 percent

Rock fragments—0 to 20 percent rounded mixed gravel and cobbles

Electrical Conductivity (mmhos/cm): 0 to 2

Reaction—strongly acid to slightly alkaline

2C and Cg2 horizons:

Color—hue of 10YR to N 3/ ; value of 2.5 to 7; chroma of 1 to 4

Texture—extremely gravelly coarse sand, very gravelly sand, very cobbly loamy coarse sand, gravelly coarse sand

Clay content—0 to 10 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—50 to 65 percent rounded mixed gravel and cobbles

Electrical Conductivity (mmhos/cm): 0 to 2

Reaction—strongly acid to slightly alkaline

Cryofibrists, euic

Taxonomic Classification

- Euic Cryofibrists

Map unit component(s):

Boreal-riparian wet meadow organic depressions

Boreal-sedge/sphagnum bog organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: flood plains, hills, till plains

Parent material: grassy organic material over sandy and silty alluvium, mossy organic material and/or grassy organic material over silty loess over gravelly till

Elevation: 160 to 236 m

Slope: 0 percent

Annual precipitation: 336 to 565 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1FP—Fluvaquentic Historthels, coarse-loamy-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryofluvents, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: About 8 kilometers south of Chilchukabena Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 570987, Northing 7079084

Representative Pedon

Oi1—0 to 23 cm; dark brown (7.5YR 3/4) peat; many very fine and fine and few medium roots; slightly alkaline; gradual smooth boundary.

Oi2—23 to 56 cm; dark reddish brown (2.5YR 3/4) and dark bluish gray (5B 4/1) peat; many very fine and fine roots; slightly alkaline; abrupt smooth boundary.

Cg1—56 to 83 cm; dark bluish gray (5B 4/1) silt loam; massive; friable, slightly sticky and slightly plastic; few very fine and fine roots; slightly alkaline; gradual smooth boundary.

Cg2—83 to 150 cm; dark bluish gray (5B 4/1) silt loam; massive; friable, slightly sticky and slightly plastic; slightly alkaline.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2.9 °C

Depth to mineral soil: 51 to over 150 cm

Oi horizon:

Color—hue of 2.5YR to 5Y; value of 2 to 4; chroma of 1 to 6

Organic matter content—70 to 95 percent

Reaction—extremely acid to slightly alkaline

Cg horizon:

Color—hue of 2.5Y to 10B; value of 2.5 to 4

Texture—very fine sandy loam, silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—35 to 80 percent

Sand content—5 to 55 percent

Organic matter content—0 to 12 percent

Rock fragments—0 to 2 percent subangular indurated gravel

Calcium carbonate equivalent: 0 to 1 percent

Reaction—very strongly acid to slightly alkaline

2Cg horizon (when present):

Color—hue of 2.5Y or 5Y

Texture—very gravelly sandy loam, very cobbly sandy loam, gravelly loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 80 percent

Organic matter content—0 to 1 percent

Rock fragments—10 to 40 percent subangular mixed indurated gravel; 0 to 30 percent subangular mixed indurated cobbles

Reaction—very strongly acid to moderately acid

Cryohemists, euic

Taxonomic Classification

- Euic Cryohemists

Map unit component(s):

Alpine-sedge wet meadow organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: till plains, mountains

Parent material: grassy organic material over gravelly till

Elevation: 191 to 1,117 m

Slope: 0 to 8 percent

Annual precipitation: 408 to 3,051 mm

Annual temperature: -7 to 1 °C
Frost-free period: 60 to 90 days

Representative Location

Map unit in which located: 9TP—Andic Dystricryepts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Typic Cryaquands, medial over loamy-skeletal Association, 0 to 30 percent slopes in the Denali National Park Area, Alaska

General location in survey area: East of Dunkle Mine; UTM coordinates: Zone 6, Easting 377733, Northing 7018973

Representative Pedon

Oi—0 to 4 cm; dark brown (7.5YR 3/4) peat; many very fine and fine roots; extremely acid; clear wavy boundary.

Oe1—4 to 43 cm; very dark brown (10YR 2/2) mucky peat; single grain; many very fine and fine roots; extremely acid; gradual wavy boundary.

Oe2—43 to 84 cm; very dark brown (10YR 2/2) and dark yellowish brown (10YR 3/4) mucky peat; single grain; many very fine and fine roots; strongly acid; abrupt wavy boundary.

Cg—84 to 150 cm; dark greenish gray (5GY 4/1) very gravelly loam; single grain; firm, nonsticky and nonplastic; 30 percent gravel, 10 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2 to 3.5 °C

Depth to contrasting textural stratification: 58 to over 150 cm

Thickness of histic epipedon: 58 to over 150 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 or 3; chroma of 2 to 4

Organic matter content—60 to 90 percent

Reaction—very strongly acid to slightly acid

Oe horizon:

Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma of 2 to 4

Organic matter content—60 to 90 percent

Reaction—very strongly acid to slightly acid

Cg horizon:

Color—hue of 5Y to N 4/ ; value of 3 or 4; chroma of 1 or 2

Texture—very gravelly loam, loam, silty clay loam, cobbly silt loam

Clay content—10 to 30 percent

Silt content—40 to 60 percent

Sand content—15 to 40 percent

Rock fragments—5 to 20 percent subangular indurated cobbles; 5 to 40 percent subangular mixed indurated gravel

Reaction—strongly acid to slightly acid

Fluvaquentic Aquorthels, coarse-silty

Taxonomic Classification

- Coarse-silty, mixed, superactive, subgelic Fluvaquentic Aquorthels

Map unit component(s):

Boreal-riparian tall scrub silty frozen drains
 Boreal-riparian tall scrub silty frozen drains, Yukon-Kuskokwim

Depth class: shallow to moderately deep

Drainage class: very poorly drained or poorly drained

Landform: drainages on hills, mountains, outwash plains, plains, till plains

Parent material: woody organic material and/or silty alluvium over silty alluvium

Elevation: 211 to 887 m

Slope: 0 to 10 percent

Annual precipitation: 358 to 776 mm

Annual temperature: -4.0 to -2.4 °C

Frost-free period: 60 to 110 days

Representative Location

Map unit in which located: 7P6—Typic Historthels, coarse-loamy-Typic Eutrocryepts, sandy-skeletal Association, 0 to 6 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Lower Herron Creek in Minchumina Basin; UTM coordinates: Zone 5, Easting 551936, Northing 7008428

Representative Pedon

Oi—0 to 9 cm; dark brown (7.5YR 3/4) slightly decomposed plant material; many very fine and fine, many medium and common coarse roots; extremely acid; abrupt wavy boundary.

Cg/Oa1—9 to 17 cm; dark brown (7.5YR 3/2) mixed silt loam and highly decomposed plant material; massive; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; very strongly acid; gradual wavy boundary.

Cg/Oa2—17 to 33 cm; dark gray (5Y 4/1) stratified mucky very fine sand to highly decomposed plant material; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; 5 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 20 percent of horizon); very strongly acid; gradual smooth boundary.

Cg/Oa3—33 to 48 cm; dark gray (5Y 4/1) and dark brown (10YR 3/3) stratified mucky very fine sand to highly decomposed plant material; massive; very friable, nonsticky and nonplastic; 5 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 15 percent of horizon); very strongly acid; abrupt smooth boundary.

Cgf—48 to 150 cm; dark grayish brown (2.5Y 4/2) and dark brown (10YR 3/3) permanently frozen stratified fine sand to silt; very strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1.0 °C

Depth to permafrost: 42 to 82 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 2 to 4

Texture—slightly decomposed plant material, moderately decomposed plant material

Organic matter content—60 to 90 percent

Reaction—ultra acid to strongly acid

Cg/Oa horizon:

Cg Color—hue of 7.5YR to 5Y; value of 3 or 4; chroma of 1 or 2

Oa Color—hue of 7.5YR to 5Y; value of 2 to 4; chroma of 1 or 2

Texture—stratified silt loam to muck, mixed silt loam and muck, stratified mucky very fine sand to highly decomposed plant material

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—10 to 20 percent

Reaction—very strongly acid or strongly acid

Cgf horizon:

Color—hue of 2.5Y to 5GY; value of 3 or 4; chroma of 1 or 2

Texture—silt loam, stratified fine sand to silt

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Reaction—very strongly acid or strongly acid

Fluvaquentic Cryohemists, dysic

Taxonomic Classification

- Dysic Fluvaquentic Cryohemists

Map unit component(s):

Boreal-woodland bog organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: till plains

Parent material: mossy organic material and/or grassy organic material

Elevation: 187 to 361 m

Slope: 0 to 2 percent

Annual precipitation: 536 to 2,174 mm

Annual temperature: -1 to 1 °C

Frost-free period: 70 to 100 days

Representative Location

Map unit in which located: 12B—Typic Cryofibrists, dysic-Fluvaquentic Cryohemists, dysic Complex, 0 to 2 percent slopes in the Denali National Park

General location in survey area: Ruth Glacier terminous; UTM coordinates: Zone 5, Easting 636889, Northing 6952864

Representative Pedon

Oi—0 to 28 cm; dark yellowish brown (10YR 3/6) peat; many very fine and fine, common medium and few coarse roots; ultra acid; gradual smooth boundary.

Oe1—28 to 67 cm; dark brown (10YR 3/3) mucky peat; many very fine and fine, common medium and few coarse roots; ultra acid; diffuse smooth boundary.

Oe2—67 to 110 cm; dark brown (10YR 3/3) mucky peat; many very fine and fine and few medium roots; extremely acid; gradual smooth boundary.

Oe3—110 to 132 cm; very dark brown (10YR 2/2) mucky peat; extremely acid; abrupt irregular boundary.

Oa/C—132 to 150 cm; dark brown (10YR 3/3) and brownish yellow (10YR 6/6) muck and fine sandy loam; very strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2 to 4 °C

Depth to contrasting textural stratification: 110 to 132 cm

Thickness of histic epipedon: 110 to 132 cm

Oi horizon:

Color—hue of 5YR, 7.5YR, or 10YR; value of 2 to 4; chroma of 3 to 6

Organic matter content—60 to 90 percent

Reaction—ultra acid or extremely acid

Oe horizon:

Color—hue of 5YR, 7.5YR, or 10YR; value of 2 to 3; chroma of 2 or 3

Reaction—ultra acid to extremely acid

Oa/C horizon:

Oa Color—value of 2 or 3; chroma of 1 or 2

C Color—value of 4 to 6; chroma of 4 to 8

Clay content—0 to 5 percent

Silt content—30 to 45 percent

Sand content—50 to 70 percent

Organic matter content—35 to 70 percent

Reaction—ultra acid to very strongly acid

Fluvaquentic Historthels, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic Fluvaquentic Historthels

Map unit component(s):

Boreal-riparian forested loamy wet flood plains, frozen

Depth class: very shallow to moderately deep

Drainage class: poorly drained

Landform: flood plains

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium

Elevation: 160 to 307 m

Slope: 0 to 1 percent

Annual precipitation: 336 to 565 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1FP—Fluvaquentic Historthels, coarse-loamy-Aquic Cryofluvents, coarse-loamy over sandy-skeletal-Typic Cryofluvents, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Littlelong Lake near lower Heron River in Minchumina Basin; UTM coordinates: Zone 5, Easting 532233, Northing 7037520

Representative Pedon

Oi—0 to 10 cm; very dusky red (2.5YR 2.5/2) peat; many very fine and fine, many medium and common coarse roots; ultra acid; clear smooth boundary.

Oe—10 to 20 cm; very dark brown (10YR 2/2) mucky peat; common very fine and fine and few medium roots; very strongly acid; clear smooth boundary.

Cg/Oab—20 to 41 cm; dark gray (N 4/) and black (10YR 2/1) mixed very fine sandy loam and muck; massive; very friable, nonsticky and nonplastic; common very fine and fine roots; slightly acid; abrupt smooth boundary.

Cg/Oabf—41 to 150 cm; dark gray (5Y 4/1) and black (10YR 2/1) permanently frozen stratified fine sand to muck; neutral.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1 °C

Depth to permafrost: 23 to 83 cm

Thickness of histic epipedon: 17 to 40 cm

O horizons:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Texture—peat, mucky peat

Organic matter content—50 to 70 percent

Reaction—ultra acid to slightly acid

Cg/Oab horizon:

Cg Color—hue of 10B, N 3/, N 4/, 5GY, 5Y, and 2.5Y; value of 3 or 4; chroma of 1 or 2

Texture—stratified silt to fine sand to muck, mixed very fine sandy loam and muck

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Organic matter content—12 to 20 percent

Rock fragments—0 to 5 percent rounded mixed indurated gravel; 0 to 5 percent rounded mixed indurated cobbles

Electrical Conductivity (mmhos/cm)—0.2 to 1.5

Reaction—moderately acid to neutral

Cg/Oabf horizon:

Cg Color—hue of 10B, N 3/, N 4/, 5GY, 5Y and 2.5Y; value of 3 or 4; chroma of 1 or 2

Texture—stratified silt to fine sand to muck, stratified fine sand to muck

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Organic matter content—12 to 20 percent

Rock fragments—0 to 5 percent rounded mixed indurated gravel; 0 to 5 percent rounded mixed indurated cobbles

Electrical Conductivity (mmhos/cm)—0.2 to 1.5

Reaction—moderately acid to neutral

Fluvaquentic Historthels, coarse-silty

Taxonomic Classification

- Coarse-silty, mixed, superactive, subgelic Fluvaquentic Historthels

Map unit component(s):

Boreal-riparian scrub mica rich silty drains, frozen
Boreal-riparian scrub silty drains, frozen

Depth class: moderately deep to deep

Drainage class: very poorly drained

Landform: drainageways on hills, mountain slopes, outwash plains, plains

Parent material: mossy organic material and/or woody organic material over silty alluvium, woody organic material and/or silty alluvium over silty alluvium

Elevation: 162 to 649 m

Slope: 0 to 6 percent

Annual precipitation: 345 to 651 mm

Annual temperature: -2.9 to -1.2 °C

Frost-free period: 60 to 110 days

Representative Location

Map unit in which located: 3FG—Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Middle Birch Creek in Minchumina Basin; UTM coordinates: Zone 5, Easting 561536, Northing 7033956

Representative Pedon

Oi—0 to 10 cm; dark reddish brown (5YR 3/4) peat; many very fine and fine, many medium and common coarse roots; ultra acid; clear wavy boundary.

Oe—10 to 24 cm; dark reddish brown (5YR 3/3) mucky peat; many very fine and fine, many medium and common coarse roots; very strongly acid; abrupt wavy boundary.

Cg/Oe—24 to 33 cm; very dark grayish brown (2.5Y 3/2) and very dark brown (10YR 2/2) mixed silt loam and mucky peat; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 2 mm dark brown (7.5YR 3/4) high chroma redox concentrations (approximately 10 percent of horizon); very strongly acid; abrupt wavy boundary.

Cg—33 to 99 cm; dark greenish gray (10Y 3/1) silt loam; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; moderately acid; abrupt smooth boundary.

Cgf—99 to 150 cm; very dark gray (10YR 3/1) permanently frozen silt loam; moderately acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -2 °C

Depth to permafrost: 51 to 82 cm

Thickness of histic epipedon: 18 to 52 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—moderately decomposed plant material, peat, mucky peat

Organic matter content—50 to 70 percent

Reaction—ultra acid to strongly acid

Cg/Oe and Cg horizons:

Cg Color—hue of 10Y to 5Y; value of 3 or 4; chroma of 1 or 2

Oe Color—value of 2 or 3; chroma of 1 to 3

Texture—stratified silt loam to moderately decomposed plant material, silt loam, mixed silt loam and mucky peat

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—10 to 20 percent

Reaction—very strongly acid or strongly acid

Cgf horizon:

Color—hue of 10Y to 5Y; value of 3 or 4; chroma of 1 or 2

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Reaction—very strongly acid to moderately acid

Fluventic Haplorthels, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic Fluventic Haplorthels
- Coarse-loamy, paramicaceous, superactive, subgelic Fluventic Haplorthels

Map unit component(s):

Boreal-riparian forested loamy flood plains, frozen

Boreal-riparian forested mica rich loamy flood plains, frozen

Depth class: shallow to moderately deep

Drainage class: moderately well drained

Landform: flood plains

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium

Elevation: 168 to 236 m

Slope: 0 to 1 percent

Annual precipitation: 336 to 565 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1FP4—Fluvaquentic Historthels, coarse-loamy-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euic Complex in the Denali National Park Area, Alaska

General location in survey area: Beaver Log Lake near Chilchukabena Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 560518, Northing 7096326

Representative Pedon

Oi—0 to 8 cm; dark yellowish brown (10YR 3/4) slightly decomposed plant material; many very fine and fine, many medium and common coarse roots; very strongly acid; abrupt smooth boundary.

A—8 to 21 cm; very dark brown (10YR 2/2) and dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine, many medium and common coarse roots; extremely acid; clear irregular boundary.

C/Oab—21 to 78 cm; very dark grayish brown (2.5Y 3/2) and black (10YR 2/1) stratified fine sand to highly decomposed plant material; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; extremely acid; abrupt broken boundary.

Cf—78 to 150 cm; very dark grayish brown (2.5Y 3/2) permanently frozen stratified fine sand to silt; extremely acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -1.0 °C

Depth to permafrost: 31 to 89 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—moderately decomposed plant material, slightly decomposed plant material

Organic matter content—60 to 90 percent

Reaction—ultra acid to very strongly acid

A horizon when present:

Color—hue of 7.5YR or 10YR value of 2 to 3; chroma of 1 to 3

Texture—silt loam, very fine sandy loam

Clay content—0 to 10 percent

Silt content—35 to 75 percent

Sand content—15 to 60 percent

Organic matter content—2 to 4 percent

Reaction—extremely acid to strongly acid

C/O horizon:

Color—hue of 7.5YR to N 5/ ; value of 2.5 to 4; chroma of 1 or 2

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Organic matter content—8 to 12 percent

Rock fragments—0 to 5 percent rounded indurated cobbles; 0 to 5 percent rounded indurated gravel

Reaction—very strongly acid to neutral

Cf horizon:

Color—hue of 7.5YR to N 5/ ; value of 2.5 to 4; chroma of 1 or 2

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 5 percent rounded indurated cobbles; 0 to 5 percent rounded mixed indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 1.5

Reaction—strongly acid to moderately alkaline

Glacic Folistels, dysic

Taxonomic Classification

- Dysic, subgelic Glacic Folistels

Map unit component(s):

Alpine-scrub organic mounds, frozen
Boreal-taiga peat plateaus, frozen

Depth class: shallow to moderately deep

Drainage class: well drained

Landform: basin floors, plains

Parent material: mossy organic material and/or woody organic material over silty alluvium, mossy organic material and/or woody organic material over silty eolian deposits

Elevation: 149 to 788 m

Slope: 0 to 3 percent

Annual precipitation: 359 to 651 mm

Annual temperature: -3 to -2 °C

Frost-free period: 60 to 110 days

Representative Location

Map unit in which located: 3FU2—Glacic Folistels, dysic-Typic Histoturbels, coarse-silty-Typic Historthels, coarse-silty Association, 0 to 10 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Diamond monument west on Bearpaw River; UTM coordinates: Zone 5, Easting 599415, Northing 7086946

Representative Pedon

Oi1—0 to 21 cm; very dark brown (7.5YR 2.5/3) peat; many very fine and fine and common medium roots; extremely acid; clear wavy boundary.

Oi2—21 to 33 cm; yellowish brown (10YR 5/6) peat; many very fine and fine and few medium roots; extremely acid; clear wavy boundary.

Oe—33 to 45 cm; very dark brown (10YR 2/2) mucky peat; common very fine and fine roots; extremely acid; abrupt wavy boundary.

Oef—45 to 85 cm; dark yellowish brown (10YR 3/4) permanently frozen mucky peat; common very fine and fine roots; extremely acid; abrupt wavy boundary.

Oe/Cf—85 to 150 cm; very dark brown (10YR 2/2) and brown (10YR 4/3) mixed mucky peat and silt loam; common very fine and fine roots; very strongly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -1 °C

Depth to permafrost: 38 to 61 cm

Thickness of histic epipedon: over 150 cm

Oi and Oe horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 2 to 4

Texture—mucky peat, peat

Organic matter content—60 to 90 percent

Reaction—ultra acid to very strongly acid

Def horizon:

Color—hue of 2.5YR, 5YR, 7.5YR, or 10YR; value of 2 to 3; chroma of 2 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to strongly acid

Histic Cryaquepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, nonacid Histic Cryaquepts

Map unit component(s):

Alpine-wet meadow gravelly pond margins

Boreal-taiga gravelly alluvial plains, wet

Depth class: very deep

Drainage class: very poorly drained or poorly drained

Landform: kettles, plains

Parent material: grassy organic material over gravelly drift, mossy organic material and/or woody organic material over gravelly alluvium, mossy organic material and/or woody organic material over sandy and silty alluvium

Elevation: 168 to 289 m

Slope: 0 to 1 percent

Annual precipitation: 336 to 565 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1STW2—Histic Cryaquepts, coarse-loamy-Terric Cryohemists, loamy Association in the Denali National Park Area, Alaska

General location in survey area: Large terrace along lower Kantishna River near north border of Park; UTM coordinates: Zone 5, Easting 589067, Northing 7079729

Representative Pedon

Oi—0 to 11 cm; black (10YR 2/1) peat; many very fine and fine, many medium and many coarse roots; neutral; clear wavy boundary.

Oe—11 to 43 cm; black (10YR 2/1) mucky peat; many very fine and fine, common medium and few coarse roots; slightly acid; clear wavy boundary.

Cg1—43 to 64 cm; very dark gray (5Y 3/1) stratified very gravelly sand to silt; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent gravel, 5 percent cobbles; neutral; gradual smooth boundary.

Cg2—64 to 150 cm; dark gray (5Y 4/1) stratified very gravelly sand to silt; massive; friable, nonsticky and nonplastic; 30 percent gravel, 5 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 0 to 1 °C

Thickness of histic epipedon: 38 to 43 cm

O horizon:

Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma of 1 to 4

Texture—peat, mucky peat

Organic matter content—60 to 90 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—very strongly acid to slightly alkaline

Cg horizon:

Color—hue of 2.5Y to 5GY; value of 3 to 5; chroma of 1 or 2

Texture—very cobbly sandy loam, gravelly loam, very gravelly sandy loam, stratified very gravelly sand to silt

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 85 percent

Organic matter content—0 to 1 percent

Rock fragments—15 to 60 percent gravel; 0 to 30 percent subangular mixed cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—very strongly acid to slightly alkaline

Humic Cryaquepts, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive, acid Humic Cryaquepts

Map unit component(s):

Boreal-loamy wet meadows

Depth class: very deep

Drainage class: very poorly drained

Landform: depressions on plains

Parent material: silty eolian deposits over loamy eolian deposits

Elevation: 232 to 266 m

Slope: 0 percent

Annual precipitation: 359 to 651 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 2FG—Typic Histoturbels, coarse-silty-Glacial Folistels, dysic Association in the Denali National Park Area, Alaska

General location in survey area: Lower Birch Creek in Minchumina Basin; UTM coordinates: Zone 5, Easting 562865, Northing 7038730

Representative Pedon

Oi—0 to 8 cm; dark yellowish brown (10YR 3/4) slightly decomposed plant material; many very fine and fine and few medium roots; extremely acid; clear wavy boundary.

A—8 to 28 cm; dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine roots; extremely acid; clear wavy boundary.

2Cg1—28 to 59 cm; dark grayish brown (2.5Y 4/2) fine sandy loam; massive; very friable, nonsticky and nonplastic; common very fine and fine roots; 5 mm dark brown (7.5YR 3/4) high chroma redox

concentrations (approximately 15 percent of horizon); 5 mm dark gray (5Y 4/1) low chroma redox depletions (approximately 15 percent of horizon); very strongly acid; diffuse wavy boundary.

2Cg2—59 to 87 cm; dark gray (5Y 4/1) fine sandy loam; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; 20 mm dark yellowish brown (10YR 4/4) high chroma redox concentrations (approximately 30 percent of horizon); strongly acid; diffuse wavy boundary.

2Cg3—87 to 150 cm; dark gray (5Y 4/1) stratified fine sandy loam to silt; massive; very friable, nonsticky and nonplastic; 20 mm dark yellowish brown (10YR 4/4) high chroma redox concentrations (approximately 40 percent of horizon); strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 1 to 3 °C

Depth to contrasting textural stratification: 28 to 68 cm

Thickness of umbric epipedon: 20 to 61 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 4; chroma of 2 to 6

Texture—moderately decomposed plant material, slightly decomposed plant material

Organic matter content—60 to 90 percent

Reaction—ultra acid or extremely acid

A horizon:

Color—value of 2 or 3; chroma of 2 or 3

Texture—mucky silt loam, silt loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—6 to 14 percent

Reaction—extremely acid or very strongly acid

2Cg horizon:

Color—hue of 2.5Y or 5Y; value of 3 or 4; chroma of 1 or 2

Texture—fine sandy loam, stratified fine sandy loam to silt

Clay content—0 to 10 percent

Silt content—10 to 35 percent

Sand content—60 to 85 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Reaction—extremely acid to strongly acid

Humic Cryaquepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, paramicaceous, superactive, nonacid Humic Cryaquepts

Map unit component(s):

Boreal-forested silty schist slopes, wet

Depth class: moderately deep to very deep

Drainage class: poorly drained

Landform: mountains

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Elevation: 273 to 1,152 m

Slope: 12 to 36 percent

Annual precipitation: 358 to 776 mm

Annual temperature: -4 to -2 °C

Frost-free period: 60 to 80 days

Representative Location

Map unit in which located: 8MVF—Humic Cryaquepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal-Typic Dystrocryepts, loamy-skeletal Association, 12 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Between Camp Denali and Kantishna; UTM coordinates: Zone 5, Easting 603418, Northing 7045186

Representative Pedon

Oi—0 to 9 cm; very dark brown (10YR 2/2); slightly decomposed plant material; many very fine and fine, many medium and few coarse roots; moderately acid; abrupt smooth boundary.

A1—9 to 18 cm; black (10YR 2/1) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; slightly acid; clear smooth boundary.

2A2—18 to 27 cm; dark brown (10YR 3/3) gravelly silt loam; massive; friable, slightly sticky and slightly plastic; common very fine and fine roots; 15 percent gravel; slightly acid; gradual wavy boundary.

2Cg—27 to 54 cm; dark grayish brown (2.5Y 4/2) gravelly silt loam; massive; friable, slightly sticky and slightly plastic; few very fine and fine roots; 20 percent gravel, 5 percent cobbles; slightly acid; abrupt wavy boundary.

2C—54 to 103 cm; light olive brown (2.5Y 5/3) very channery silt loam; massive; friable, slightly sticky and slightly plastic; 30 percent channers, 10 percent flagstones; moderately acid; abrupt smooth boundary.

2Cr—103 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 0 to 0.5 °C

Depth to contrasting textural stratification: 16 to 43 cm

Depth to bedrock (paralithic): 84 to 150 cm

Thickness of umbric epipedon: 18 to 40 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to moderately acid

A1 horizon:

Color—chroma of 1 or 2
 Texture—silt loam, mucky silt loam
 Clay content—5 to 10 percent
 Silt content—40 to 70 percent
 Sand content—15 to 35 percent
 Organic matter content—6 to 14 percent
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—strongly acid to slightly alkaline

2A2 horizon:

Color—hue of 10YR or 2.5Y; value of 2 or 3; chroma of 1 or 2
 Texture—channery loam, channery silt loam, gravelly silt loam
 Clay content—10 to 20 percent
 Silt content—45 to 65 percent
 Sand content—25 to 45 percent
 Organic matter content—4 to 8 percent
 Rock fragments—0 to 15 percent angular schist channer fragments strongly cemented; 10 to 30 percent angular schist fragments strongly cemented gravel
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—strongly acid to slightly alkaline

2C horizon:

Color—hue of 10YR, 2.5Y, or 5Y; value of 3 to 5; chroma of 1 to 4
 Texture—extremely channery silt loam, very channery sandy loam, very gravelly loam
 Clay content—10 to 20 percent
 Silt content—45 to 65 percent
 Sand content—25 to 45 percent
 Rock fragments—10 to 60 percent angular schist fragments strongly cemented flagstones; 15 to 60 percent angular schist fragments strongly cemented channers
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—moderately acid to slightly alkaline

Humic Eutrogelepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, subgelic Humic Eutrogelepts

Map unit component(s):

Alpine-dwarf scrub gravelly diorite fans, cool
 Alpine-dwarf scrub-meadow mosaic gravelly depressions

Depth class: very deep

Drainage class: well drained

Landform: moraines

Parent material: gravelly till, gravelly till derived from diorite, silty eolian deposits over gravelly till derived from diorite

Elevation: 758 to 2,043 m

Slope: 2 to 40 percent

Annual precipitation: 552 to 2,466 mm

Annual temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7TMS—Typic Eutrogelepts, loamy-skeletal Association, 0 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Bull River near Cantwell; UTM coordinates: Zone 6, Easting 378101, Northing 7031843

Representative Pedon

Oe—0 to 2 cm; black (10YR 2/1) moderately decomposed plant material; many very fine and fine roots; neutral; abrupt smooth boundary.

A—2 to 17 cm; very dark brown (10YR 2/2) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; 2 percent gravel; slightly acid; clear wavy boundary.

2Bw—17 to 53 cm; yellowish brown (10YR 5/8) gravelly loam; moderate medium angular blocky structure; friable, slightly sticky and slightly plastic; common very fine and fine roots; 20 percent gravel, 5 percent cobbles; moderately acid; gradual smooth boundary.

2C1—53 to 86 cm; light olive brown (2.5Y 5/4) very gravelly loam; single grain; friable, slightly sticky and slightly plastic; few very fine and fine roots; 30 percent gravel, 5 percent cobbles; neutral; gradual smooth boundary.

2C2—86 to 150 cm; olive brown (2.5Y 4/3) very gravelly loam; single grain; friable, slightly sticky and slightly plastic; 30 percent gravel, 5 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -2 °C

Depth to contrasting textural stratification: 12 to 33 cm

Thickness of umbric epipedon: 10 to 24 cm

Thickness of cambic horizon: 25 to 46 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 or 2.5; chroma of 1 or 2

Organic matter content—60 to 90 percent

Reaction—extremely acid to slightly acid

A horizon:

Color—value of 2 or 3; chroma of 2 or 3

Texture—silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—10 to 14 percent

Rock fragments—0 to 2 percent subrounded indurated gravel

Reaction—strongly acid to slightly acid

2Bw horizon:

Color—hue of 10YR or 2.5Y; value of 4 or 5; chroma of 4 to 8

Texture—extremely cobbly sandy loam, extremely gravelly loamy coarse sand, very gravelly sandy loam, gravelly loam; very gravelly loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—50 to 80 percent

Rock fragments—20 to 50 percent subrounded diorite very strongly cemented gravel; 5 to 50 percent subrounded diorite very strongly cemented cobbles

Reaction—very strongly acid to slightly acid

2C horizon:

Color—hue of 10YR or 2.5Y; value of 4 or 5; chroma of 2 to 4

Texture—extremely gravelly loamy coarse sand, extremely cobbly sandy loam, very gravelly sandy loam, very gravelly loam, very cobbly sandy loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—50 to 80 percent

Rock fragments—5 to 50 percent subrounded diorite very strongly cemented cobbles; 20 to 50 percent subrounded diorite very strongly cemented gravel

Reaction—very strongly acid to neutral

Humic Vitricryands, medial-skeletal

Taxonomic Classification

- Medial-skeletal, mixed, superactive Humic Vitricryands

Map unit component(s):

Alpine-scrub-meadow mosaic gravelly colluvial slopes

Depth class: moderately deep to very deep

Drainage class: well drained

Landform: mountains

Parent material: silty volcanic ash and/or gravelly colluvium derived from sedimentary rock

Elevation: 336 to 1,660 m

Slope: 20 to 80 percent

Annual precipitation: 509 to 3,285 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 9MSH—Rock Outcrop-Andic Dystrocryepts, loamy-skeletal Association, 20 to 150 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Upper Ruth Glacier; UTM coordinates: Zone 5, Easting 616361, Northing 6963773

Representative Pedon

Oe—0 to 1 cm; black (10YR 2/1) moderately decomposed plant material; many very fine and fine, common medium and few coarse roots; 2 percent gravel; moderately acid; abrupt wavy boundary.

A1—1 to 4 cm; black (10YR 2/1) silt loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine, common medium and few coarse roots; 5 percent gravel; strongly acid; clear wavy boundary.

A2—4 to 9 cm; very dark brown (10YR 2/2) gravelly loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; 15 percent gravel; very strongly acid; clear wavy boundary.

A3—9 to 26 cm; dark brown (7.5YR 3/3) loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 10 percent gravel; strongly acid; gradual wavy boundary.

Bw1—26 to 41 cm; dark yellowish brown (10YR 3/4) gravelly loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 15 percent gravel, 3 percent cobbles; strongly acid; diffuse smooth boundary.

Bw2—41 to 79 cm; dark yellowish brown (10YR 3/4) very gravelly loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; 35 percent gravel, 5 percent cobbles; moderately acid; clear wavy boundary.

2C—79 to 107 cm; dark yellowish brown (10YR 3/4) extremely gravelly loam; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; 75 percent gravel, 5 percent cobbles; strongly acid; clear smooth boundary.

2Cr—107 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.5 to 2.5 °C

Depth to bedrock (paralithic): 53 to 150 cm

Thickness of umbric epipedon: 14 to 45 cm

Thickness of cambic horizon: 26 to 72 cm

Thickness of volcanic ash influenced zone: 53 to 150 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Organic matter content—60 to 90 percent

Rock fragments—0 to 2 percent angular mixed strongly cemented gravel; 0 to 2 percent angular mixed strongly cemented cobbles

Reaction—extremely acid to moderately acid

A horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Texture—very channery loam, silt loam, gravelly loam, loam

Clay content—5 to 15 percent

Silt content—40 to 70 percent

Sand content—25 to 50 percent

Organic matter content—6 to 12 percent

Rock fragments—0 to 10 percent angular mixed strongly cemented cobbles; 2 to 25 percent angular mixed strongly cemented gravel

Reaction—extremely acid or very strongly acid

Bw horizon:

Color—hue of 7.5YR to 2.5Y; value of 3 or 4; chroma of 3 or 4

Texture—very gravelly loam, gravelly loam

Clay content—5 to 10 percent

Silt content—40 to 60 percent

Sand content—25 to 50 percent

Organic matter content—1 to 3 percent

Rock fragments—0 to 15 percent angular mixed strongly cemented cobbles; 0 to 5 percent angular mixed strongly cemented stones; 10 to 35 percent angular mixed strongly cemented gravel

Reaction—extremely acid to slightly acid

2C horizon:

Color—hue of 10YR or 2.5Y; value of 3 to 5; chroma of 2 to 4

Texture—very gravelly loam, extremely channery loam, very cobbly loam, extremely gravelly loam

Clay content—5 to 10 percent

Silt content—35 to 50 percent

Sand content—35 to 50 percent

Rock fragments—15 to 80 percent angular mixed strongly cemented gravel; 0 to 20 percent angular mixed strongly cemented cobbles; 0 to 5 percent angular mixed strongly cemented stones; 5 to 45 percent angular strongly cemented channers

Reaction—very strongly acid to slightly acid

Hydric Cryofibrists, dysic

Taxonomic Classification

- Dysic Hydric Cryofibrists

Map unit component(s):

Boreal-bog organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: hills, outwash plains, peat plateaus, plains

Parent material: mossy organic material and/or grassy organic material

Elevation: 232 to 266 m

Slope: 0 percent

Annual precipitation: 359 to 651 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1ST1—Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-silty-Cryofibrists, euic Association in the Denali National Park Area, Alaska

General location in survey area: Beaver Log Lake near Chilchukabena Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 561051, Northing 7095437

Representative Pedon

Oi1—0 to 9 cm; dark yellowish brown (10YR 3/6) peat; many very fine and fine roots; ultra acid; clear smooth boundary.

Oi2—9 to 38 cm; dark yellowish brown (10YR 4/6) peat; many very fine and fine roots; extremely acid; diffuse smooth boundary.

Oi3—38 to 63 cm; dark yellowish brown (10YR 4/6) peat; many very fine and fine roots; extremely acid; diffuse smooth boundary.

WATER—63 to 143 cm; fractured bedrock; very strongly acid; abrupt smooth boundary.

C—143 to 150 cm; very dark grayish brown (2.5Y 3/2) silt loam; massive; very friable, nonsticky and nonplastic; very strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2.5 to 3.5 °C

Depth to first contrasting textural stratification: 45 to 110 cm

Depth to second contrasting textural stratification: 82 to over 150 cm

Depth to water layer: 40 to 105 cm

Thickness of histic epipedon: 45 to 110 cm

Oi horizon:

Color—hue of 7.5YR or 10YR; value of 3 to 5; chroma of 2 to 6

Organic matter content—70 to 95 percent

Reaction—extremely acid or very strongly acid

C horizon:

Color—hue of 10YR or 2.5Y; value of 3 or 4; chroma of 1 or 2

Clay content—0 to 10 percent

Sand content—30 to 40 percent

Silt content—50 to 70 percent

Organic matter content—0 to 1 percent

Reaction—extremely acid or very strongly acid

Oxyaquic Cryorthents, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, mixed Oxyaquic Cryorthents
- Sandy-skeletal, mixed Oxyaquic Cryorthents
- Sandy-skeletal, paramicaceous Oxyaquic Cryorthents

Map unit component(s):

Boreal-riparian scrub gravelly diorite flood plains, moderately wet

Boreal-riparian scrub gravelly flood plains, moderately wet

Boreal-riparian scrub gravelly flood plains, moderately wet and warm

Boreal-riparian scrub gravelly schist flood plains, moderately wet

Subalpine-riparian scrub gravelly diorite flood plains, moderately wet

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: flood plains

Parent material: sandy and silty alluvium over sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium derived from diorite, sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Elevation: 91 to 989 m

Slope: 0 to 3 percent

Annual precipitation: 344 to 989 mm

Annual temperature: -6 to 1 °C

Frost-free period: 60 to 100 days

Representative Location

Map unit in which located: 8FP2—Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal-Typic Haplogelods, sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Lower Canyon Creek in Kantishna Hills; UTM coordinates: Zone 5, Easting 627291, Northing 7065882

Representative Pedon

Oi—0 to 1 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine and few medium roots; neutral; abrupt smooth boundary.

AC—1 to 11 cm; very dark brown (10YR 2/2) and dark yellowish brown (10YR 4/4) stratified very fine sand to silt; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine roots; 2 percent gravel; neutral; clear wavy boundary.

2C1—11 to 42 cm; dark yellowish brown (10YR 4/6) extremely cobbly loamy sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; 40 percent gravel, 20 percent cobbles; neutral; gradual wavy boundary.

2C2—42 to 150 cm; dark yellowish brown (10YR 4/4) extremely cobbly sand; single grain; loose, nonsticky and nonplastic; slightly effervescent; 40 percent gravel, 25 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Oxyaquic

Annual soil temperature: 0 to 1 °C

Depth to contrasting textural stratification: 8 to 12 cm

Thickness of ochric epipedon: 5 to 22 cm

O horizon (when present):

Color—value of 2 or 3; chroma of 1 to 4

Texture—moderately decomposed plant material, slightly decomposed plant material

Organic matter content—60 to 90 percent

Reaction—strongly acid to neutral

AC horizon:

Color—hue of 10YR to 5Y; value of 2 to 7; chroma of 1 to 6

Texture—stratified sand to silt, extremely cobbly coarse sand, extremely gravelly loamy coarse sand, stratified very fine sand to silt, stratified highly decomposed plant material to sand to silt

Clay content—0 to 10 percent

Silt content—0 to 30 percent

Sand content—60 to 95 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 60 percent rounded indurated cobbles; 0 to 35 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 5 percent

Electrical Conductivity (mmhos/cm)—0 to 1.5

Reaction—very strongly acid to moderately alkaline

2C or C horizon:

Color—hue of 10YR to 5Y; value of 2.5 to 7; chroma of 1 to 4

Texture—extremely cobbly coarse sand, extremely gravelly loamy coarse sand, extremely cobbly sand, extremely cobbly loamy coarse sand, extremely cobbly loamy sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—0 to 35 percent rounded indurated cobbles; 20 to 65 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 5 percent

Electrical Conductivity (mmhos/cm)—0 to 1.5

Reaction—strongly acid to moderately alkaline

Oxyaquic Eutrocryepts, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive Oxyaquic Eutrocryepts

Map unit component(s):

Boreal-forested gravelly till slopes, moderately wet
 Boreal-forested loamy fan terraces
 Subalpine-scrub-meadow mosaic gravelly swales, Nenana Gravels
 Subalpine-scrub-meadow mosaic gravelly till swales

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: mountains, escarpments, hills, outwash plains, till plains

Parent material: silty eolian deposits over gravelly residuum, silty eolian deposits over gravelly till, silty eolian deposits over loamy drift

Elevation: 445 to 1,554 m

Slope: 0 to 55 percent

Annual precipitation: 506 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 80 days

Representative Location

Map unit in which located: 7TM2—Typic Historthels, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, coarse-loamy Association, 10 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Coal Creek near Muldrow Glacier; UTM coordinates: Zone 5, Easting 613233, Northing 7024416

Representative Pedon

Oi—0 to 8 cm; dark yellowish brown (10YR 3/4) slightly decomposed plant material; many very fine and fine, common medium and common coarse roots; very strongly acid; abrupt smooth boundary.

A—8 to 38 cm; very dark brown (10YR 2/2) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 5 percent gravel, 5 percent cobbles; very strongly acid; clear smooth boundary.

2Bw—38 to 69 cm; dark brown (7.5YR 3/4) cobbly sandy loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; few very fine and fine roots; 15 percent gravel, 15 percent cobbles; strongly acid; gradual wavy boundary.

2C1—69 to 91 cm; dark grayish brown (10YR 4/2) and brown (7.5YR 4/4) gravelly sandy loam; massive; friable, nonsticky and nonplastic; 25 percent gravel, 7 percent cobbles; strongly acid; gradual wavy boundary.

2C2—91 to 150 cm; yellowish brown (10YR 5/6) gravelly sandy loam; massive; friable, nonsticky and nonplastic; 25 percent gravel, 7 percent cobbles; strongly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.4 °C

Depth to gravelly drift: 21 to 53 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—slightly decomposed plant material, moderately decomposed plant material

Organic matter content—60 to 90 percent

Reaction—very strongly acid to slightly acid

A horizon:

Color—hue of 7.5YR or 10YR; value of 2 to 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—55 to 80 percent

Sand content—5 to 35 percent

Organic matter content—8 to 20 percent

Rock fragments—0 to 10 percent subangular indurated gravel or cobbles

Reaction—very strongly acid to slightly acid

2Bw horizon (when present):

Color—hue of 5YR to 10YR; value of 3 or 4; chroma of 3 to 6

Texture—very cobbly sandy loam, gravelly loam, very gravelly sandy loam, cobbly sandy loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 80 percent

Organic matter content—0 to 1 percent

Rock fragments—0 to 15 percent subrounded indurated cobbles; 15 to 50 percent subrounded indurated gravel

Reaction—very strongly acid to slightly acid

2C horizon:

Color—hue of 10YR to 5Y; value of 3 to 5; chroma of 2 to 6

Texture—very gravelly sandy loam, gravelly loam, very cobbly loam, very cobbly sandy loam, stratified fine sand to mucky silt, gravelly sandy loam

Clay content—0 to 10 percent

Silt content—5 to 50 percent

Sand content—45 to 80 percent

Rock fragments—15 to 60 percent subangular indurated gravel; 0 to 35 percent subangular indurated cobbles

Reaction—very strongly acid to slightly acid

3C horizon (when present):

Color—hue of variegated, 2.5Y, or 5Y; value of 3 or 4; chroma of 2 to 4

Texture—extremely cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—30 to 50 percent rounded indurated gravel; 10 to 30 percent rounded indurated cobbles

Reaction—moderately acid to slightly alkaline

Oxyaquic Eutrocrypts, coarse-silty over sandy-skeletal

Taxonomic Classification

- Coarse-silty over sandy or sandy-skeletal, mixed, superactive Oxyaquic Eutrocrypts

Map unit component(s):

Boreal-meadow loamy outwash slope depressions

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: hills, outwash plains

Parent material: silty eolian deposits over sandy and gravelly outwash

Elevation: 475 to 878 m

Slope: 0 to 30 percent

Annual precipitation: 506 to 732 mm

Annual temperature: -3 to -2 °C

Frost-free period: 60 to 80 days

Representative Location

Map unit in which located: 7P2—Typic Eutrocryepts, sandy-skeletal-Typic Eutrocryepts, coarse-silty over sandy-skeletal Association, 0 to 30 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Near McKinley Village; UTM coordinates: Zone 6, Easting 410153, Northing 7062373

Representative Pedon

Oi—0 to 7 cm; light brownish gray (10YR 6/2) slightly decomposed plant material; many very fine and fine and few medium roots; strongly acid; clear smooth boundary.

A1—7 to 10 cm; black (10YR 2/1) and very dark brown (10YR 2/2) silt loam; weak coarse granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; strongly acid; gradual smooth boundary.

A2—10 to 33 cm; dark brown (10YR 3/3) silt loam; weak coarse subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; moderately acid; clear smooth boundary.

2Bw—33 to 58 cm; dark brown (7.5YR 3/3) extremely gravelly loamy coarse sand; weak coarse subangular blocky structure; loose, nonsticky and nonplastic; common very fine and fine roots; 50 percent gravel, 15 percent cobbles; 5 mm dark reddish brown (5YR 3/3) high chroma redox concentrations (approximately 50 percent of horizon); moderately acid; gradual wavy boundary.

2C—58 to 150 cm; dark brown (10YR 3/3) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; 50 percent gravel, 15 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.7 °C

Depth to sandy and gravelly outwash: 58 to 123 cm

O horizon:

Color—value of 2 or 3; chroma of 1 to 3

Organic matter content—60 to 90 percent

Reaction—very strongly acid to moderately acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—10 to 20 percent

Rock fragments—0 to 2 percent subrounded indurated gravel

Reaction—strongly acid to slightly acid

2C and 2Bw horizons:

Color—hue of 10YR or 2.5Y; value of 3 or 4; chroma of 2 to 4

Texture—extremely gravelly coarse sand, extremely gravelly loamy coarse sand, extremely cobbly loamy sand, extremely cobbly sand

Clay content—0 to 5 percent
 Silt content—0 to 15 percent
 Sand content—75 to 95 percent
 Rock fragments—25 to 70 percent rounded mixed rock fragments indurated gravel; 0 to 30 percent rounded mixed rock fragments indurated cobbles
 Reaction—moderately acid or slightly acid

Oxyaquic Eutrocryepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, paramicaceous, superactive Oxyaquic Eutrocryepts

Map unit component(s):

Subalpine-scrub-meadow mosaic gravelly schist swales

Depth class: moderately deep to very deep

Drainage class: somewhat poorly drained

Landform: mountains

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Elevation: 273 to 1,479 m

Slope: 5 to 50 percent

Annual precipitation: 358 to 870 mm

Annual temperature: -5 to -2 °C

Frost-free period: 50 to 80 days

Representative Location

Map unit in which located: 5SA11—Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 12 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Northeast corner of Park; UTM coordinates: Zone 6, Easting 371791, Northing 7096857

Representative Pedon

Oi—0 to 3 cm; dark brown (10YR 3/3) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; moderately acid; clear wavy boundary.

A—3 to 9 cm; black (10YR 2/1) and very dark brown (10YR 2/2) channery loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; 10 percent channers, 10 percent flagstones; moderately acid; abrupt wavy boundary.

2Bw—9 to 22 cm; dark gray (5Y 4/1) very channery silt loam; massive; friable, slightly sticky and slightly plastic; few very fine and fine roots; 30 percent channers, 10 percent flagstones; 2 mm dark yellowish brown (10YR 3/4) high chroma redox concentrations (approximately 15 percent of horizon); slightly acid; gradual wavy boundary.

2C—22 to 124 cm; dark gray (5Y 4/1) very channery silt loam; massive; friable, slightly sticky and slightly plastic; few coarse roots; 30 percent channers, 10 percent flagstones; neutral; gradual smooth boundary.

2Cr—124 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.5 °C

Depth to bedrock: 78 to over 152 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 or 3; chroma of 1 to 4

Texture—moderately decomposed plant material

Organic matter content—60 to 90 percent
 Reaction—extremely acid to moderately acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3
 Texture—mucky silt loam, silt loam, channery loam
 Clay content—5 to 10 percent
 Silt content—40 to 70 percent
 Sand content—15 to 35 percent
 Organic matter content—6 to 14 percent
 Rock fragments—0 to 20 percent angular schist strongly cemented flagstones; 0 to 20 percent angular schist strongly cemented channers
 Reaction—very strongly acid to slightly acid

2Bw horizon:

Color—hue of 10YR, 2.5Y, or 5Y; value of 4 or 5; chroma of 1 to 4
 Texture—very channery loam, extremely flaggy loam, very channery silt loam
 Clay content—10 to 20 percent
 Silt content—40 to 65 percent
 Sand content—15 to 45 percent
 Rock fragments—15 to 60 percent angular schist strongly cemented flagstones; 15 to 60 percent angular schist moderately strongly channers
 Reaction—strongly acid to neutral

2C horizon:

Color—hue of 10YR, 2.5Y, or 5Y; value of 4 or 5; chroma of 1 to 4
 Texture—very channery loam, extremely flaggy loam, very channery silt loam
 Clay content—10 to 20 percent
 Silt content—40 to 65 percent
 Sand content—15 to 45 percent
 Rock fragments—15 to 60 percent angular schist strongly cemented flagstones; 15 to 60 percent angular schist moderately strongly channers
 Reaction—strongly acid to neutral

(Oxyaquic)* Humic Eutroglepts, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic (Oxyaquic) Humic Eutroglepts

Map unit component(s):

Alpine-scrub-meadow mosaic gravelly till swales

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: hills, till plains

Parent material: silty eolian deposits over gravelly till

Elevation: 502 to 1,920 m

Slope: 2 to 45 percent

Annual precipitation: 528 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7TM1—Typic Entrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Entrogelepts, coarse-loamy Association, 2 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Refuge Valley; UTM coordinates: Zone 6, Easting 382584, Northing 7043927

Representative Pedon

Oe—0 to 2 cm; black (10YR 2/1) moderately decomposed plant material; common medium and common coarse roots; strongly acid; clear smooth boundary.

A—2 to 21 cm; black (10YR 2/1) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common medium and common coarse roots; moderately acid; clear wavy boundary.

2ABw—21 to 32 cm; dark brown (10YR 3/3) and black (10YR 2/1) cobbly loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common medium and common coarse roots; 20 percent gravel, 10 percent cobbles; moderately acid; gradual wavy boundary.

2C—32 to 150 cm; dark grayish brown (10YR 4/2) cobbly loam; massive; friable, nonsticky and nonplastic; 20 percent gravel, 10 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to 0.1 °C

Depth to cobbly glacial till: 12 to 32 cm

O horizon:

Color—value of 2 or 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—very strongly acid to slightly acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—5 to 20 percent

Organic matter content—8 to 20 percent

Rock fragments—0 to 2 percent subangular indurated gravel

Reaction—very strongly acid to slightly acid

2ABw horizon:

Color—hue of 10YR to 5Y; value of 1 or 2; chroma of 1 to 3

Texture—very gravelly sandy loam, very cobbly sandy loam, gravelly loam, cobbly loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 80 percent

Organic matter content—1 to 4 percent

Rock fragments—15 to 35 percent subangular mixed rock fragments indurated gravel; 0 to 25 percent subangular mixed rock fragments indurated cobbles

Reaction—very strongly acid to slightly acid

2C horizon:

Color—hue of 10YR to 5Y; chroma of 2 to 6

Texture—gravelly loam, very gravelly sandy loam, very cobbly sandy loam, cobbly loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 80 percent

Rock fragments—0 to 25 percent subangular mixed indurated cobbles; 15 to 35 percent subangular mixed indurated gravel

Reaction—very strongly acid to slightly acid

* An Oxyaquic subgroup is not currently recognized for this taxonomic great group. These soils, however, lack the redox features common to the Typic or Humic subgroups. They have seasonally saturated conditions, usually from snowmelt, that persist for a limited time early in spring. An Oxyaquic subgroup for these soils has been proposed for official recognition in TAXONOMY.

(Oxyaquic)* Humic Eutrogelepts, coarse-silty over sandy-skeletal

Taxonomic Classification

- Coarse-silty over sandy or sandy-skeletal, mixed, superactive, subgelic (Oxyaquic) Humic Eutrogelepts

Map unit component(s):

Alpine-scrub silty fan terraces

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: mountains

Parent material: silty eolian deposits over sandy and gravelly alluvium

Elevation: 620 to 1,077 m

Slope: 2 to 8 percent

Annual precipitation: 497 to 1,229 mm

Annual temperature: -8 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7AF—(Oxyaquic) Humic Eutrogelepts, coarse-silty over sandy-skeletal-Typic Haplogelods, sandy-skeletal Association, 2 to 8 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Straightaway Glacier; UTM coordinates: Zone 5, Easting 558832, Northing 6993390

Representative Pedon

Oi—0 to 7 cm; very dark brown (7.5YR 2.5/2) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; moderately acid; clear smooth boundary.

A1—7 to 17 cm; black (10YR 2/1) silt loam; weak medium granular structure; very friable, nonsticky and nonplastic; many very fine and fine, common medium and few coarse roots; 2 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 25 percent of horizon); moderately acid; clear wavy boundary.

A2—17 to 41 cm; very dark grayish brown (10YR 3/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 2 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 20 percent of horizon); slightly acid; abrupt smooth boundary.

2C1—41 to 62 cm; black (5Y 2.5/1) extremely gravelly loamy coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; 45 percent gravel, 15 percent cobbles; neutral; gradual smooth boundary.

2C2—62 to 150 cm; black (5Y 2.5/1) extremely cobbly loamy coarse sand; single grain; loose, nonsticky and nonplastic; slightly effervescent; 40 percent gravel, 20 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.1 to -0.5 °C

Depth to sandy and gravelly material: 28 to 52 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to moderately acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—5 to 20 percent

Organic matter content—8 to 20 percent

Rock fragments—0 to 2 percent subangular indurated gravel

Reaction—extremely acid to slightly acid

2C and 2Cg horizons:

Color—hue of 10YR to 5GY; value of 3 to 5; chroma of 1 to 4

Texture—extremely gravelly coarse sand, extremely gravelly loamy coarse sand, extremely cobbly loamy sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—0 to 30 percent rounded mixed indurated cobbles; 25 to 70 percent rounded mixed indurated gravel

Reaction—strongly acid to neutral

* An Oxyaquic subgroup is not currently recognized for this taxonomic great group. These soils, however, lack the redox features common to the Typic or Humic subgroups. They have seasonally saturated conditions, usually from snowmelt, that persist for a limited time early in spring. An Oxyaquic subgroup for these soils has been proposed for official recognition in TAXONOMY.

(Oxyaquic)* Humic Eutrogelepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, subgelic (Oxyaquic) Humic Eutrogelepts
- Loamy-skeletal, paramicaceous, superactive, subgelic (Oxyaquic) Humic Eutrogelepts

Map unit component(s):

Alpine-scrub-meadow mosaic gravelly diorite swales

Alpine-scrub-meadow mosaic gravelly schist swales

Depth class: moderately deep to very deep

Drainage class: somewhat poorly drained

Landform: hills, mountains, till plains

Parent material: silty eolian deposits over gravelly colluvium derived from diorite, silty eolian deposits over gravelly colluvium derived from schist

Elevation: 670 to 1,423 m

Slope: 5 to 40 percent

Annual precipitation: 528 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 8MBS—Typic Dystroglepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 8 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Spruce Peak in Kantishna Hills; UTM coordinates: Zone 5, Easting 617103, Northing 7053843

Representative Pedon

Oi—0 to 6 cm; very dark brown (7.5YR 2.5/2) slightly decomposed plant material; many very fine and fine and many medium roots; moderately acid; clear smooth boundary.

A1—6 to 20 cm; black (10YR 2/1) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and many medium roots; moderately acid; clear smooth boundary.

A2—20 to 29 cm; dark brown (10YR 3/3) and brown (10YR 4/3) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 2 percent gravel, 2 percent cobbles; slightly acid; clear wavy boundary.

2C1—29 to 42 cm; dark yellowish brown (10YR 3/4) very cobbly loam; massive; friable, slightly sticky and slightly plastic; 30 percent gravel, 25 percent cobbles; neutral; clear wavy boundary.

2C2—42 to 87 cm; dark yellowish brown (10YR 3/4) very channery loam; massive; friable, slightly sticky and slightly plastic; 40 percent channers, 15 percent flagstones; slightly acid; gradual broken boundary.

2Cr—87 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.4 °C

Depth to gravelly material: 20 to 52 cm

Depth to bedrock: 80 to over 152 cm

O horizons:

Color—hue of 10R to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to moderately acid

A horizon:

Color—hue of 10YR or 2.5Y; value of 2 or 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—55 to 80 percent

Sand content—15 to 35 percent

Organic matter content—4 to 14 percent

Rock fragments—0 to 2 percent gravel

Reaction—very strongly acid to slightly acid

2Bw horizon (when present):

Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 3 or 4

Texture—very gravelly loamy sand, very cobbly sandy loam, very gravelly sandy loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—50 to 80 percent

Organic matter content—0 to 1 percent

Rock fragments—10 to 50 percent cobbles or gravel; 0 to 10 percent stones

Reaction—strongly acid or moderately acid

2C horizon:

Texture—very cobbly silt loam, very cobbly loam, extremely channery silt loam, very channery loam, very gravelly loamy sandy, very cobbly sandy loam, very gravelly sandy loam

Clay content—0 to 20 percent

Silt content—10 to 65 percent

Sand content—35 to 80 percent

Rock fragments—25 to 60 percent channers, cobbles or gravel; 0 to 20 percent flagstones or stones

Reaction—strongly acid to neutral

* An Oxyaquic subgroup is not currently recognized for this taxonomic great group. These soils, however, lack the redox features common to the Typic or Humic subgroups. They have seasonally saturated conditions, usually from snowmelt, that persist for a limited time early in spring. An Oxyaquic subgroup for these soils has been proposed for official recognition in TAXONOMY.

Oxyaquic Gelorthents, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, paramicaceous, subgelic Oxyaquic Gelorthents
- Sandy-skeletal, mixed, subgelic Oxyaquic Gelorthents

Map unit component(s):

Alpine-riparian scrub gravelly diorite flood plains, moderately wet

Alpine-riparian scrub gravelly flood plains, moderately wet

Alpine-riparian scrub gravelly schist flood plains, moderately wet

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: flood plains

Parent material: sandy and silty alluvium over sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium derived from diorite, sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Elevation: 609 to 1,298 m

Slope: 0 to 5 percent

Annual precipitation: 497 to 1,229 mm

Annual temperature: -8 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7FP2—Oxyaquic Gelorthents, sandy-skeletal-Typic Gelorthents, sandy-skeletal-Riverwash Complex in the Denali National Park Area, Alaska

General location in survey area: Near Teklanika Campground; UTM coordinates: Zone 6, Easting 379190, Northing 7063645

Representative Pedon

AC—0 to 12 cm; very dark gray (10YR 3/1) stratified sand to silt; weak coarse subangular blocky structure; loose, nonsticky and nonplastic; common very fine and fine roots; strongly effervescent; 2 mm strong brown (7.5YR 5/8) high chroma redox concentrations (approximately 3 percent of horizon); neutral; clear wavy boundary.

2C1—12 to 39 cm; black (2.5Y 2.5/1) extremely cobbly loamy sand; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; slightly effervescent; 40 percent gravel, 30 percent cobbles; slightly alkaline; gradual smooth boundary.

2C2—39 to 150 cm; black (2.5Y 2.5/1) extremely cobbly loamy sand; single grain; loose, nonsticky and nonplastic; slightly effervescent; 40 percent gravel, 30 percent cobbles; slightly alkaline.

Range in Characteristics

Soil moisture class: Oxyaquic

Depth to contrasting textural stratification: 8 to 12 cm

O horizon:

Organic matter content—60 to 90 percent

Calcium carbonate equivalent—0 to 1 percent

Reaction—strongly acid to slightly alkaline

AC horizon:

Texture—stratified highly decomposed plant material to sand to silt, stratified sand to silt

Clay content—0 to 10 percent

Silt content—10 to 35 percent

Sand content—60 to 85 percent

Organic matter content—6 to 12 percent

Rock fragments—0 to 5 percent rounded schist fragments indurated gravel and cobbles

Calcium carbonate equivalent—0 to 5 percent

Reaction—moderately acid to slightly alkaline

2C horizon:

Texture—extremely gravelly coarse sand, extremely cobbly loamy coarse sand, extremely cobbly loamy sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—20 to 65 percent rounded indurated gravel; 0 to 35 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 5 percent

Electrical Conductivity (mmhos/cm)—0 to 2

Reaction—moderately acid to moderately alkaline

Oxyaquic Haplocryolls, coarse-loamy**Taxonomic Classification**

- Coarse-loamy, mixed, superactive Oxyaquic Haplocryolls

Map unit component(s):

Subalpine-scrub-meadow mosaic dark gravelly swales

Depth class: very deep

Drainage class: somewhat poorly drained

Landform: mountains

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Elevation: 656 to 1,707 m

Slope: 25 to 70 percent

Annual precipitation: 552 to 2,466 mm

Annual temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7SA1—Rock Outcrop-Typic Haplogelolls, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 25 to 85 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Igloo Mountain; UTM coordinates: Zone 6, Easting 369819, Northing 7059363

Representative Pedon

Oi—0 to 4 cm; dark yellowish brown (10YR 3/4) slightly decomposed plant material; common very fine and fine, common medium and common coarse roots; neutral; gradual smooth boundary.
 A1—4 to 22 cm; black (10YR 2/1) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine, common medium and common coarse roots; 5 percent gravel; neutral; gradual smooth boundary.
 A2—22 to 41 cm; black (10YR 2/1) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; 5 percent gravel; neutral; gradual smooth boundary.
 2CA—41 to 150 cm; black (5Y 2.5/2) gravelly loam; massive; friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent gravel; neutral.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1 to 2 °C

Depth to contrasting textural stratification: 12 to 42 cm

Thickness of mollic epipedon: 8 to 39 cm

Oi horizon:

Color—value of 2 or 3; chroma of 1 to 3

Organic matter content—60 to 90 percent

Rock fragments—0 to 2 percent subangular mixed very strongly cemented gravel; 0 to 2 percent subangular mixed very strongly cemented cobbles

Reaction—very strongly acid to slightly acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3

Texture—mucky silt loam, silt loam

Clay content—5 to 10 percent

Silt content—50 to 70 percent

Sand content—20 to 40 percent

Organic matter content—6 to 12 percent

Rock fragments—0 to 2 percent subangular shale strongly cemented flagstones, 2 to 10 percent subangular shale strongly cemented channers

Reaction—strongly acid to neutral

2CA horizon:

Color—hue of 2.5Y or 5Y; value of 2.5 or 3; chroma of 1 or 2

Texture—channery loam, gravelly loam, extremely channery loam

Clay content—5 to 10 percent

Silt content—35 to 50 percent

Sand content—40 to 60 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 10 percent angular strongly cemented flagstones; 10 to 20 percent angular strongly cemented channers; 0 to 10 percent angular strongly cemented stones; 5 to 35 percent angular strongly cemented gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—strongly acid to slightly alkaline

(Oxyaquic)* Typic Haplogelolls, loamy-skeletal***Taxonomic Classification***

- Loamy-skeletal, mixed, superactive, subgelic (Oxyaquic) Typic Haplogelolls

Map unit component(s):

Alpine-scrub-meadow mosaic gravelly swales

Depth class: shallow to very deep

Drainage class: somewhat poorly drained

Landform: mountains

Parent material: silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock

Elevation: 755 to 2,053 m

Slope: 25 to 60 percent

Annual precipitation: 552 to 2,466 mm

Annual temperature: -10.7 to -2.5 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7MS1D—Typic Haplogelolls, loamy-skeletal-Rock Outcrop-Typic Eutrogelepts, loamy skeletal Association, 25 to 70 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Head of Savage River; UTM coordinates: Zone 6, Easting 392849, Northing 7057336

Representative Pedon

Oi—0 to 4 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine, few medium and few coarse roots; neutral; clear smooth boundary.

A—4 to 29 cm; black (10YR 2/1) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 5 percent gravel, 5 percent cobbles; neutral; clear wavy boundary.

2CA—29 to 55 cm; very dark grayish brown (2.5Y 3/2) very flaggy loam; single grain; very friable, nonsticky and nonplastic; few very fine and fine roots; 20 percent channers, 15 percent flagstones; neutral; clear irregular boundary.

2Cr—55 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0 to -1 °C

Depth to contrasting textural stratification: 29 to 42 cm

Depth to bedrock (paralithic): 52 to over 150 cm

Thickness of mollic epipedon: 21 to 39 cm

Oi horizon:

Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Rock fragments—0 to 2 percent subangular mixed very strongly cemented gravel; 0 to 2 percent subangular mixed very strongly cemented cobbles

Reaction—very strongly acid to slightly acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3

Texture—mucky silt loam, silt loam

Clay content—5 to 10 percent

Silt content—50 to 70 percent
 Sand content—20 to 40 percent
 Organic matter content—6 to 12 percent
 Rock fragments—5 to 15 percent subangular shale fragments strongly cemented gravel; 0 to 10 percent subangular shale fragments strongly cemented cobbles
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—strongly acid to neutral

2CA horizon:

Color—hue of 10YR to 5Y; value of 3 or 4; chroma of 1 or 2
 Texture—channery loam, gravelly loam, extremely channery loam
 Clay content—5 to 10 percent
 Silt content—35 to 50 percent
 Sand content—40 to 60 percent
 Organic matter content—0 to 2 percent
 Rock fragments—0 to 25 percent angular shale strongly cemented flagstones; 10 to 35 percent angular shale strongly cemented channers; 0 to 20 percent angular strongly cemented gravel; 0 to 10 percent angular strongly cemented stones
 Calcium carbonate equivalent—0 to 1 percent
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—strongly acid to slightly alkaline

*An Oxyaquic subgroup is not currently recognized for this taxonomic great group. These soils, however, lack the redox features common to the Typic or Humic subgroups. They have seasonally saturated conditions, usually from snowmelt, that persist for a limited time early in spring. An Oxyaquic subgroup for these soils has been proposed for official recognition in TAXONOMY.

Ruptic-Histic Aquiturbels, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic Ruptic-Histic Aquiturbels
- Coarse-loamy, mixed, superactive, subgelic Ruptic-Histic Aquiturbels

Map unit component(s):

Alpine-scrub gravelly till circles, frozen
 Alpine-scrub gravelly circles, frozen

Depth class: moderately deep to very deep

Drainage class: moderately well drained

Landform: nonsorted circles on hills, mountains, plains, plateaus, till plains

Parent material: silty eolian deposits over gravelly cryoturbate

Elevation: 481 to 1,492 m

Slope: 0 to 22 percent

Annual precipitation: 426 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7NG—Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 25 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Wyoming Hills; UTM coordinates: Zone 6, Easting 351755, Northing 7066368

Representative Pedon

- Oe—0 to 1 cm; black (10YR 2/1) moderately decomposed plant material; many very fine and fine and common medium roots; 5 percent gravel; very strongly acid; abrupt wavy boundary.
- A—1 to 5 cm; dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; 5 percent gravel; extremely acid; clear wavy boundary.
- 2Bw/Cjj—5 to 23 cm; brown (7.5YR 4/4) and grayish brown (2.5Y 5/2) cobbly sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; many very fine and fine roots; 10 percent gravel, 20 percent cobbles; very strongly acid; gradual wavy boundary.
- 2C/Bwjj—23 to 52 cm; light olive brown (2.5Y 5/6) and brown (7.5YR 4/4) cobbly sandy loam; weak coarse subangular blocky structure; friable, sticky and plastic; common very fine and fine roots; 10 percent gravel, 20 percent cobbles; 2 mm yellowish red (5YR 4/6) high chroma redox concentrations (approximately 10 percent of horizon); 7 mm dark gray (5Y 4/1) low chroma redox depletions (approximately 15 percent of horizon); very strongly acid; clear wavy boundary.
- 2C—52 to 120 cm; light olive brown (2.5Y 5/6) gravelly sandy loam; massive; friable, sticky and plastic; 25 percent gravel, 5 percent cobbles; very strongly acid; abrupt wavy boundary.
- 2Cf—120 to 150 cm; light olive brown (2.5Y 5/6) permanently frozen gravelly sandy loam; 25 percent gravel, 5 percent cobbles; very strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 0 to -1 °C

Depth to contrasting textural stratification: 2 to 6 cm

Depth to permafrost: 90 to 150 cm

Thickness of histic epipedon: 0 to 26 cm

Thickness of ochric epipedon: 2 to 6 cm

Thickness of cambic horizon: 13 to 26 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid or very strongly acid

A horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Texture—mucky silt loam, silt loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—6 to 14 percent

Rock fragments—0 to 2 percent subangular indurated gravel

Reaction—extremely acid to strongly acid

2Bw/Cjj horizon:

Color—hue of 7.5YR, 10YR, or 2.5Y; value of 3 or 4; chroma of 4 to 6

Texture—very gravelly sandy loam, very cobbly sandy loam, gravelly loam, cobbly sandy loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—45 to 80 percent

Organic matter content—0 to 1 percent

Rock fragments—0 to 30 percent subangular mixed indurated cobbles; 10 to 30 percent subangular mixed indurated gravel

Reaction—very strongly acid to moderately acid

2C/Bwjj and 2C horizons:

Color—hue of 7.5YR to 5Y; value of 3 to 5; chroma of 2 to 4

Texture—gravelly loam, very gravelly sandy loam, very cobbly sandy loam, gravelly sandy loam, cobbly sandy loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—45 to 80 percent

Rock fragments—10 to 35 percent subangular mixed indurated gravel; 0 to 30 percent subangular mixed indurated cobbles

Reaction—very strongly acid to slightly acid

2Cf horizon:

Color—hue of 10YR to 5Y; value of 4 or 5; chroma of 2 to 6

Texture—gravelly loam, very gravelly sandy loam, very cobbly sandy loam, gravelly sandy loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—45 to 80 percent

Rock fragments—10 to 35 percent subangular mixed rock fragments indurated gravel; 0 to 30 percent subangular mixed rock fragments indurated cobbles

Reaction—very strongly acid to slightly acid

Ruptic-Histic Aquiturbels, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, paramicaceous, superactive, subgelic Ruptic-Histic Aquiturbels
- Loamy-skeletal, paramicaceous, superactive, subgelic Ruptic-Histic Aquiturbels

Map unit component(s):

Alpine-scrub gravelly schist circles, frozen

Alpine-scrub gravelly schist circles, Kuskokwim Mountains

Depth class: moderately deep to very deep

Drainage class: moderately well drained

Landform: nonsorted circles on mountains

Parent material: silty eolian deposits over gravelly cryoturbate derived from schist

Elevation: 197 to 1,546 m

Slope: 0 to 25 percent

Annual precipitation: 356 to 870 mm

Annual temperature: -5 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 5P1—Ruptic Histic Aquiturbels, loamy-skeletal-Typic Dystrogelepts, loamy-skeletal-Tpic Aquiturbels, loamy-skeletal Association, 0 to 25 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Gauge station on Lower Teklanika River; UTM coordinates: Zone 6, Easting 379847, Northing 7094959

Representative Pedon

- Oi—0 to 1 cm; dark yellowish brown (10YR 3/4) slightly decomposed plant material; common very fine and fine and common medium roots; very strongly acid; abrupt wavy boundary.
- A—1 to 3 cm; dark brown (10YR 3/3) silt loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 5 percent gravel; moderately acid; abrupt wavy boundary.
- 2Bw/Cjj—3 to 11 cm; dark grayish brown (2.5Y 4/2) and strong brown (7.5YR 5/6) very channery silt loam; massive; firm, sticky and plastic; few very fine and fine and few medium roots; 30 percent channers, 10 percent flagstones; 3 mm dark gray (5Y 4/1) low chroma redox depletions (approximately 10 percent of horizon); moderately acid; diffuse broken boundary.
- 2C/Bwj—11 to 88 cm; dark grayish brown (2.5Y 4/2) and strong brown (7.5YR 4/6) very channery silt loam; massive; firm, sticky and plastic; 25 percent channers, 10 percent flagstones; 3 mm dark gray (5Y 4/1) low chroma redox depletions (approximately 5 percent of horizon); slightly acid; diffuse broken boundary.
- 2Crf—88 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 0 to -1 °C

Depth to contrasting textural stratification: 1 to 12 cm

Depth to permafrost: 88 to 150 cm

Depth to bedrock (paralithic): 88 to 150 cm

Thickness of histic epipedon: 0 to 33 cm

Thickness of ochric epipedon: 1 to 12 cm

Oi horizon:

Color—hue of 10R to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to strongly acid

A horizon:

Color—value of 2 to 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—5 to 10 percent

Silt content—55 to 70 percent

Sand content—20 to 40 percent

Organic matter content—6 to 14 percent

Rock fragments—0 to 10 percent angular schist strongly cemented channers; 0 to 10 percent angular schist strongly cemented flagstones; 0 to 10 percent angular schist strongly cemented gravel

Reaction—extremely acid to moderately acid

2Bw/Cjj horizon:

Color—hue of 5YR to 2.5Y; value of 4 or 5; chroma of 2 to 6

Texture—cobble loam, very cobble loam, very channery silt loam

Clay content—10 to 20 percent

Silt content—45 to 65 percent

Sand content—25 to 45 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 15 percent angular schist strongly cemented flagstones; 10 to 50 percent angular schist strongly cemented channers; 0 to 40 percent angular schist fragments strongly cemented cobbles

Reaction—extremely acid to moderately acid

2C/Bwjj horizon:

Color—hue of 7.5YR to 5Y; value of 3 to 5; chroma of 2 to 6

Texture—cobbly loam, very cobbly loam, very channery silt loam, extremely cobbly loam

Clay content—10 to 20 percent

Silt content—45 to 65 percent

Sand content—25 to 45 percent

Rock fragments—0 to 15 percent angular schist strongly cemented flagstones; 15 to 50 percent angular schist fragments strongly cemented channers; 0 to 65 percent angular schist fragments strongly cemented cobbles

Reaction—very strongly acid to slightly acid

Spodic Dystrocryepts, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, mixed Spodic Dystrocryepts

Map unit component(s):

Boreal-forested gravelly fan terraces

Subalpine-scrub gravelly fan terraces

Depth class: very deep

Drainage class: somewhat excessively drained

Landform: fan terraces on mountains

Parent material: loamy volcanic ash and/or loamy eolian deposits over sandy and gravelly alluvium

Elevation: 90 to 992 m

Slope: 2 to 18 percent

Annual precipitation: 408 to 3,051 mm

Annual temperature: -7 to 1 °C

Frost-free period: 60 to 90 days

Representative Location

Map unit in which located: 9AF—Spodic Dystrocryepts, sandy-skeletal, 4 to 18 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Along Hidden Creek tributary of Kahiltna Glacier; UTM coordinates: Zone 5, Easting 646297, Northing 6978489

Representative Pedon

Oi—0 to 10 cm; very dusky red (2.5YR 2.5/2) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; 2 percent cobbles, 2 percent stones; extremely acid; clear smooth boundary.

A—10 to 18 cm; black (10YR 2/1) silt loam; weak coarse granular structure; very friable, nonsticky and nonplastic; common very fine and fine, few medium and few coarse roots; 2 percent cobbles, 2 percent stones; extremely acid; gradual smooth boundary.

2Bs—18 to 32 cm; dark reddish brown (5YR 3/4) very cobbly sandy loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; few very fine and fine and few medium roots; 15 percent gravel, 35 percent cobbles, 5 percent stones; extremely acid; diffuse smooth boundary.

2BC—32 to 66 cm; dark yellowish brown (10YR 4/4) extremely cobbly loamy sand; weak coarse subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine and few medium roots; 20 percent gravel, 35 percent cobbles, 5 percent stones; extremely acid; diffuse smooth boundary.

2C1—66 to 98 cm; dark yellowish brown (10YR 3/4) extremely cobbly loamy sand; single grain; very friable, nonsticky and nonplastic; 20 percent gravel, 35 percent cobbles, 5 percent stones; very strongly acid; diffuse smooth boundary.

2C2—96 to 150 cm; dark yellowish brown (10YR 3/4) extremely cobbly loamy sand; single grain; very friable, nonsticky and nonplastic; 15 percent gravel, 35 percent cobbles, 10 percent stones; very strongly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.5 to 3.5 °C

Depth to strongly contrasting textural stratification: 4 to 18 cm

Thickness of ochric epipedon: 2 to 16 cm

Thickness of spodic horizon: 10 to 32 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 2 to 4

Organic matter content—60 to 90 percent

Rock fragments: 0 to 5 percent rounded indurated gravel

Reaction—ultra acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3

Texture—gravelly sandy loam, sandy loam, silt loam

Clay content—0 to 10 percent

Silt content—40 to 60 percent

Sand content—40 to 60 percent

Organic matter content—2 to 4 percent

Rock fragments—0 to 10 percent rounded indurated gravel, cobbles, and stones

Reaction—ultra acid or extremely acid

2Bs or 2Bhs horizon:

Color—hue of 2.5YR to 7.5YR; value of 2.5 or 3; chroma of 1 to 4

Texture—very gravelly sandy loam, very cobbly sandy loam

Clay content—0 to 5 percent

Silt content—10 to 30 percent

Sand content—65 to 85 percent

Organic matter content—0 to 1 percent

Rock fragments—15 to 50 percent subrounded mixed indurated gravel; 2 to 40 percent subrounded mixed indurated cobbles; 0 to 10 percent subrounded indurated stones

Reaction—ultra acid to very strongly acid

2BC horizon:

Color—value of 3 to 5; chroma of 4 to 6

Texture—extremely gravelly coarse sand, very cobbly loamy sand, extremely cobbly loamy sand

Clay content—0 to 5 percent

Silt content—10 to 20 percent

Sand content—75 to 85 percent

Rock fragments—20 to 60 percent subrounded mixed indurated gravel; 0 to 30 percent subrounded mixed indurated cobbles; 0 to 10 percent subrounded indurated stones

Reaction—extremely acid or very strongly acid

2C horizon:

Color—hue of 10YR to 5Y; value of 2 to 5; chroma of 1 to 4

Texture—extremely gravelly coarse sand, very cobbly loamy sand, extremely cobbly loamy sand

Clay content—0 to 5 percent

Silt content—5 to 20 percent

Sand content—75 to 90 percent

Rock fragments—20 to 60 percent subrounded mixed indurated gravel; 0 to 30 percent subrounded mixed indurated cobbles; 0 to 10 percent subrounded indurated stones

Reaction—extremely acid to strongly acid

Terric Cryofibrists, euic

Taxonomic Classification

- Loamy, mixed, euic Terric Cryofibrists

Map unit component(s):

Boreal-riparian wet meadow organic flood plains, Cook Inlet

Boreal-riparian scrub organic flood plains, wet

Subalpine-riparian wet meadow organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: flood plains

Parent material: grassy organic material over sandy and silty alluvium, grassy organic material over sandy and silty alluvium over sandy and gravelly alluvium

Elevation: 61 to 849 m

Slope: 0 percent

Annual precipitation: 678 to 989 mm

Annual temperature: -2 to 1 °C

Frost-free period: 70 to 100 days

Representative Location

Map unit in which located: 13FWW—Terric Cryofibrists, euic-Aquic Cryofluvents, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Near Home Lake on the Tokositna River; UTM coordinates: Zone 5, Easting 616261, Northing 6947782

Representative Pedon

OiCg1—0 to 9 cm; very dark gray (5Y 3/1) and very dark gray (N 3/) mixed peat and very fine sandy loam; many very fine and fine, common medium and few coarse roots; moderately acid; clear smooth boundary.

CgOi—9 to 19 cm; very dark gray (5Y 3/1) and very dark gray (N 3/) mixed silt and peat; single grain; friable, slightly sticky and slightly plastic; many very fine and fine, common medium and few coarse roots; slightly acid; clear wavy boundary.

OiCg2—19 to 63 cm; very dark gray (N 3/) mixed peat and silt loam; many very fine and fine and few medium roots; strongly acid; gradual wavy boundary.

CgOi—63 to 82 cm; very dark gray (N 3/) mixed silt loam and peat; single grain; friable, nonsticky and nonplastic; many very fine and fine roots; slightly acid; clear smooth boundary.

Cg—82 to 150 cm; very dark gray (N 3/) stratified fine sand to silt; single grain; friable, nonsticky and nonplastic; few very fine and fine roots; slightly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2.5 to 4 °C

Depth to contrasting textural stratification: 24 to 86 cm

Depth to contrasting textural stratification: 42 to 150 cm

Thickness of histic epipedon: 51 to 96 cm

Oi, OiCg, and CgOi horizons:

Color—hue of 7.5YR to N /3; value of 2 to 4; chroma of 1 to 4

Texture—peat, peat with small amounts of very fine sandy loam or silt loam

Organic matter content—70 to 95 percent

Reaction—extremely acid to neutral

Cg horizon:

Color—hue of 2.5Y to N /4; value of 2 to 4; chroma of 1 or 2

Texture—silt loam, very fine sandy loam, stratified fine sand to silt

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—0 to 2 percent

Reaction—very strongly acid to slightly acid

2C horizon (when present):

Color—hue of 10YR to N/4; value of 2 to 4; chroma of 1 or 2

Texture—extremely gravelly loamy sand, extremely cobbly sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—35 to 60 percent rounded indurated gravel; 0 to 35 percent rounded indurated cobbles

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—strongly acid to neutral

Terric Cryohemists, loamy**Taxonomic Classification**

- Loamy, mixed, euic Terric Cryohemists

Map unit component(s):

Boreal-riparian fen organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: depressions on plains

Parent material: grassy organic material over sandy and silty alluvium over sandy and gravelly alluvium

Elevation: 168 to 289 m

Slope: 0 percent

Annual precipitation: 336 to 565 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1STW2—Histic Cryaquepts, coarse-loamy-Terric Cryohemists, loamy Association in the Denali National Park Area, Alaska

General location in survey area: Lower Kantishna River near north Park border; UTM coordinates: Zone 5, Easting 588066, Northing 7079395

Representative Pedon

Oi—0 to 19 cm; black (10YR 2/1) peat; many very fine and fine and common medium roots; neutral; clear smooth boundary.

Oe—19 to 54 cm; black (10YR 2/1) mucky peat; many very fine and fine and common medium roots; slightly acid; abrupt smooth boundary.

Cg1—54 to 71 cm; greenish black (10Y 2.5/1) stratified fine sand to silt; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; slightly acid; gradual smooth boundary.

Cg2—71 to 96 cm; black (N 2.5/) stratified fine sand to silt; single grain; loose, nonsticky and nonplastic; slightly acid; gradual smooth boundary.

Cg3—96 to 130 cm; black (N 2.5/) stratified gravelly fine sand to silt; single grain; loose, nonsticky and nonplastic; 15 percent gravel; neutral; clear smooth boundary.

2Cg4—130 to 150 cm; black (N 2.5/) very gravelly loamy coarse sand; single grain; loose, nonsticky and nonplastic; 40 percent gravel, 5 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2 to 3.5 °C

Depth to contrasting textural stratification: 63 to over 150 cm

Thickness of histic epipedon: 24 to 96 cm

Oi and Oe horizons:

Color—value of 2 or 3; chroma of 1 to 4

Texture—mucky peat, peat

Organic matter content—60 to 90 percent

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0.2 to 1.0

Reaction—slightly acid to moderately alkaline

Cg horizon:

Color—hue of 5Y to N 4/ ; value of 2 to 4

Texture—stratified sand to silt, stratified fine sand to silt, stratified gravelly fine sand to silt

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 5 percent rounded indurated cobbles; 0 to 20 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0.2 to 1.0

Reaction—moderately acid to slightly alkaline

2C horizon:

Color—hue of 5Y to N 4/ ; value of 2 to 4

Texture—very cobbly loamy coarse sand, extremely gravelly coarse sand, gravelly loamy coarse sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—81 to 95 percent

Rock fragments—20 to 65 percent rounded indurated gravel; 0 to 25 percent rounded indurated cobbles
 Calcium carbonate equivalent—0 to 1 percent
 Electrical Conductivity (mmhos/cm)—0.2 to 1.0
 Reaction—neutral or slightly alkaline

Terric Fibristels, loamy

Taxonomic Classification

- Loamy, mixed, euic, subgelic Terric Fibristels

Map unit component(s):

Alpine-sedge bog organic depressions, frozen
 Alpine-sedge wet meadow organic depressions, frozen

Depth class: moderately deep

Drainage class: very poorly drained

Landform: basins, till plains

Parent material: grassy organic material over silty eolian deposits

Elevation: 448 to 788 m

Slope: 0 to 2 percent

Annual precipitation: 452 to 577 mm

Annual temperature: -3 to -2 °C

Frost-free period: 60 to 80 days

Representative Location

Map unit in which located: 7TP—Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 16 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Teklanika Campground; UTM coordinates: Zone 6, Easting 380350, Northing 7064479

Representative Pedon

Oi1—0 to 9 cm; dark yellowish brown (10YR 3/6) peat; many very fine and fine, many medium and many coarse roots; neutral; clear smooth boundary.

Oi2—9 to 31 cm; brown (7.5YR 4/4) peat; many very fine and fine, common medium and few coarse roots; slightly acid; clear wavy boundary.

Oi3—31 to 59 cm; dark brown (7.5YR 3/4) peat; many very fine and fine and few medium roots; slightly acid; clear wavy boundary.

A/Cgf—59 to 150 cm; dark brown (10YR 3/3) and dark gray (5Y 4/1) permanently frozen mixed mucky silt loam and silt loam; few very fine and fine roots; slightly acid; clear smooth boundary.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -2.0 °C

Depth to contrasting textural stratification: 54 to 63 cm

Depth to permafrost: 54 to 63 cm

Thickness of histic epipedon: 54 to 63 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 6
 Organic matter content—70 to 95 percent
 Reaction—very strongly acid to neutral

A/Cgf horizon:

A part: Color—value of 2 or 3; chroma of 1 to 3
 Cgf part: Color—hue 2.5Y or 5Y; chroma of 1 or 2
 Texture—mucky silt loam, silt loam
 Clay content—0 to 10 percent
 Silt content—55 to 75 percent
 Sand content—15 to 35 percent
 Organic matter content—8 to 14 percent
 Reaction—strongly acid to slightly acid

Terric Hemistels, loamy

Taxonomic Classification

- Loamy, mixed, dysic, subgelic Terric Hemistels

Map unit component(s):

Boreal-taiga peat slopes, frozen

Depth class: shallow to moderately deep

Drainage class: poorly drained

Landform: plains

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Elevation: 153 to 381 m

Slope: 0 to 10 percent

Annual precipitation: 359 to 651 mm

Annual temperature: -2.9 to -2.4 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 3FG3—Typic Historthels, coarse-silty-Typic Histoturbels, coarse-silty-Glacic Folistels, dysic Association, 0 to 14 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Lonestar Creek along west edge of Park; UTM coordinates: Zone 5, Easting 510619, Northing 7039183

Representative Pedon

Oi—0 to 26 cm; yellowish red (5YR 4/6) peat; many very fine and fine roots; extremely acid; clear smooth boundary.

Oe—26 to 53 cm; dark reddish brown (5YR 3/2) mucky peat; many very fine and fine roots; extremely acid; abrupt smooth boundary.

Oef—53 to 66 cm; dark reddish brown (5YR 3/2) permanently frozen mucky peat; few very fine and fine roots; very strongly acid; abrupt smooth boundary.

Af—66 to 150 cm; very dark grayish brown (10YR 3/2) permanently frozen silt loam; very strongly acid; abrupt broken boundary.

Range in Characteristics

Soil moisture class: Aquic
Annual soil temperature: -0.2 to -2.0 °C
Depth to contrasting textural stratification: 66 to 100 cm
Depth to permafrost: 43 to 79 cm
Thickness of histic epipedon: 66 to 100 cm

Oi, Oe, and Oef horizons:
 Color—hue of 5YR to 10YR; value of 2 to 4; chroma of 2 to 6
 Texture—mucky peat, peat
 Organic matter content—60 to 90 percent
 Reaction—extremely acid or very strongly acid

Af horizon:
 Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma of 1 or 2
 Clay content—0 to 10 percent
 Silt content—55 to 75 percent
 Sand content—15 to 35 percent
 Organic matter content—4 to 9 percent

Thaptic Cryaquands, medial over loamy**Taxonomic Classification**

- Medial over loamy, amorphic over mixed Thaptic Cryaquands

Map unit component(s):
 Boreal-forested silty wet till slopes, ash influenced

Depth class: very deep
Drainage class: very poorly drained or poorly drained
Landform: swales on hills, mountains, till plains
Parent material: volcanic ash and/or silty loess over loamy drift and/or gravelly till
Elevation: 63 to 966 m
Slope: 0 to 20 percent
Annual precipitation: 408 to 3,051 mm
Annual temperature: -7 to 1 °C
Frost-free period: 60 to 100 days

Representative Location

Map unit in which located: 9TMF—Andic Humicryods, medial over loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Thaptic Cryaquands, medial over loamy-skeletal Complex, 2 to 30 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Large alluvial fan near East and West Fork Yentna Confluence; UTM coordinates: Zone 5, Easting 560260, Northing 6915793

Representative Pedon

Oi—0 to 8 cm; dark yellowish brown (10YR 3/4) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; strongly acid; clear smooth boundary.

A—8 to 40 cm; very dark brown (10YR 2/2) and dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine, few medium and few coarse roots; moderately acid; abrupt smooth boundary.

A/Cg—40 to 78 cm; dark brown (10YR 3/3) and dark greenish gray (5G 4/1) mixed silt loam and sandy loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; moderately acid; abrupt broken boundary.

2Cg—78 to 150 cm; dark greenish gray (5G 4/1) cobbly loam; massive; friable, nonsticky and nonplastic; 5 percent gravel, 10 percent cobbles; slightly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2.5 to 4.0 °C

Depth to contrasting textural stratification: 78 to 120 cm

Thickness of umbric epipedon: 40 to 106 cm

Oi horizon:

Color—value of 2 or 3; chroma of 2 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid or very strongly acid

A horizon:

Color—value of 2 to 3; chroma of 1 to 3

Texture—mucky silt loam, silt loam

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—15 to 35 percent

Organic matter content—8 to 12 percent

Rock fragments—0 to 3 percent subangular mixed indurated gravel; 0 to 3 percent subangular mixed indurated cobbles; 0 to 3 percent subangular mixed indurated stones

Reaction—very strongly acid to moderately acid

A/Cg horizon:

A part: Color—value of 2 or 3; chroma of 1 to 3

C part: Color—hue of 5Y to N; value of 3 or 4

Texture—fine sandy loam, silt loam, sandy loam, mixed silt loam and sandy loam

Clay content—0 to 10 percent

Silt content—35 to 70 percent

Sand content—35 to 60 percent

Organic matter content—1 to 5 percent

Rock fragments—0 to 5 percent subangular mixed rock fragments indurated cobbles; 0 to 5 percent subangular mixed rock fragments indurated gravel; 0 to 5 percent subangular mixed rock fragments indurated stones

Reaction—very strongly acid to moderately acid

2C horizon:

Color—hue of 10YR or 2.5Y; value of 3 or 4; chroma of 2 to 4

Texture—gravelly loam, cobbly loam, very cobbly loam

Clay content—0 to 10 percent

Silt content—35 to 55 percent

Sand content—35 to 60 percent

Organic matter content—0 to 1 percent

Rock fragments—0 to 15 percent subangular mixed rock fragments indurated cobbles; 10 to 30 percent subangular mixed rock fragments indurated gravel; 0 to 5 percent subangular mixed rock fragments indurated stones
 Reaction—very strongly acid to slightly acid

Typic Aquiturbels, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, paramicaceous, superactive, subgelic Typic Aquiturbels

Map unit component(s):

Alpine-sedge-dwarf scrub gravelly schist lobes and stripes, frozen

Depth class: moderately deep to very deep

Drainage class: very poorly drained

Landform: mountains

Parent material: gravelly cryoturbate derived from schist

Elevation: 489 to 1,546 m

Slope: 8 to 25 percent

Annual precipitation: 446 to 870 mm

Annual temperature: -5 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 8MS—Typic Dystrogelepts, loamy-skeletal-Rock Outcrop-Typic Aquiturbels, loamy-skeletal Association, 8 to 45 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Caribou Creek in Kantishna Hills; UTM coordinates: Zone 5, Easting 611474, Northing 7056577

Representative Pedon

Oi—0 to 4 cm; dark reddish brown (5YR 2.5/2) slightly decomposed plant material; many very fine and fine and few medium roots; neutral; abrupt wavy boundary.

Oe—4 to 17 cm; black (10YR 2/1) moderately decomposed plant material; many very fine and fine roots; neutral; abrupt broken boundary.

A/Cgjj—17 to 21 cm; dark brown (10YR 3/3) very gravelly silt loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; many very fine and fine roots; 30 percent gravel, 5 percent cobbles; neutral; abrupt wavy boundary.

Cg—21 to 58 cm; dark greenish gray (5GY 4/1) very gravelly loam; massive; friable, nonsticky and nonplastic; common very fine and fine roots; 35 percent gravel, 10 percent cobbles; neutral; gradual wavy boundary.

C1—58 to 81 cm; yellowish brown (10YR 5/6) and dark gray (5Y 4/1) very gravelly silt loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; 35 percent gravel, 10 percent cobbles; neutral; gradual wavy boundary.

C2—81 to 130 cm; brownish yellow (10YR 6/8) very gravelly silt loam; massive; friable, slightly sticky and slightly plastic; 35 percent gravel, 10 percent cobbles; neutral; abrupt wavy boundary.

Crf—130 to 150 cm; fractured bedrock; 30 percent gravel, 10 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1.0 °C

Depth to permafrost: 68 to 150 cm

Depth to bedrock (paralithic): 68 to 150 cm
Thickness of ochric epipedon: 2 to 18 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 or 2.5; chroma of 1 or 2
 Texture—moderately decomposed plant material, slightly decomposed plant material
 Organic matter content—60 to 90 percent
 Reaction—moderately acid to neutral

A/Cgjj and Cg/Ajj horizons:

A Color—value of 2 or 3; chroma of 2 or 3
 Cg Color—hue of 2.5Y to 5B; value of 4 to 6; chroma of 1 or 2
 Texture—very gravelly silt loam, mucky gravelly loam, very channery silt loam
 Clay content—10 to 20 percent
 Silt content—45 to 65 percent
 Sand content—25 to 45 percent
 Organic matter content—6 to 12 percent
 Rock fragments—0 to 25 percent angular schist strongly cemented channers; 15 to 40 percent angular schist strongly cemented gravel; 0 to 10 percent strongly cemented cobbles
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—very strongly acid to neutral

Cg and C horizons:

Color—hue of 10YR to 5G; value of 4 to 6; chroma of 1 to 8
 Texture—very gravelly silt loam, very channery loam, very gravelly loam
 Clay content—10 to 20 percent
 Silt content—45 to 65 percent
 Sand content—25 to 45 percent
 Organic matter content—0 to 1 percent
 Rock fragments—10 to 50 percent angular schist strongly cemented cobbles; 15 to 50 percent angular schist strongly cemented channers; 0 to 10 percent strongly cemented cobbles
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—strongly acid to neutral

Typic Cryaquands, medial over loamy-skeletal

Taxonomic Classification

- Medial over loamy-skeletal, amorphic over mixed, superactive Typic Cryaquands

Map unit component(s):

Alpine-scrub gravelly wet till swales

Depth class: very deep

Drainage class: poorly drained

Landform: hills, mountains, till plains

Parent material: silty volcanic ash and/or silty eolian deposits over gravelly till

Elevation: 164 to 1,117 m

Slope: 2 to 30 percent

Annual precipitation: 408 to 3,285 mm

Annual temperature: -11 to 1 °C

Frost-free period: 50 to 90 days

Representative Location

Map unit in which located: 9TM—Andic Dystricrypts, loamy-skeletal-Andic Humicryods, medial over loamy-skeletal-Andic Dystricrypts, loamy-skeletal Association, 10 to 55 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Mountains east of the East Fork Yentna River; UTM coordinates: Zone 5, Easting 562535, Northing 6927771

Representative Pedon

- Oi—0 to 9 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine, many medium and few coarse roots; slightly acid; clear wavy boundary.
- A1—9 to 28 cm; very dark brown (10YR 2/2) and black (10YR 2/1) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; 2 percent gravel; 5 mm dark reddish brown (2.5YR 3/4) high chroma redox concentrations (approximately 20 percent of horizon); slightly acid; gradual smooth boundary.
- A2—28 to 42 cm; very dark grayish brown (10YR 3/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 2 percent gravel; 5 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 10 percent of horizon); slightly acid; clear smooth boundary.
- 2Cg—42 to 59 cm; greenish gray (5GY 5/1) very cobbly loam; massive; friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent gravel, 15 percent cobbles; 5 mm dark yellowish brown (10YR 4/4) high chroma redox concentrations (approximately 20 percent of horizon); slightly acid; gradual smooth boundary.
- 2C—59 to 150 cm; dark grayish brown (2.5Y 4/2) very cobbly loam; massive; friable, nonsticky and nonplastic; 30 percent gravel, 15 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 1.0 to 3.5 °C

Depth to contrasting textural stratification: 24 to 58 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—very strongly acid or strongly acid

A horizon:

Color—value of 2 or 3; chroma of 1 or 2

Texture—mucky silt loam, silt loam

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—5 to 20 percent

Organic matter content—8 to 20 percent

Rock fragments—0 to 2 percent subangular indurated gravel

Reaction—very strongly acid to moderately acid

2Cg horizon:

Color—hue of 10YR, 2.5Y, 5Y, 5GY, or N 2.5/ ; value of 3 to 5; chroma of 1 or 2

Texture—very gravelly sandy loam, cobbly loam, very cobbly sandy loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 80 percent

Rock fragments—0 to 35 percent subangular indurated cobbles; 15 to 55 percent subangular indurated gravel

2C horizon:

Color—hue of 10YR, 2.5Y, or 5Y; value of 3 or 4; chroma of 2 to 4

Texture—very gravelly sandy loam, cobbly loam, very cobbly sandy loam, very cobbly loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 80 percent

Rock fragments—0 to 35 percent subangular indurated cobbles; 15 to 55 percent subangular indurated gravel

Reaction—very strongly acid or strongly acid

Typic Cryaquents, coarse-loamy over sandy-skeletal

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid Typic Cryaquents
- Coarse-loamy over sandy or sandy-skeletal, paramicaceous, superactive, nonacid Typic Cryaquents

Map unit component(s):

Alpine-riparian scrub loamy wet diorite low flood plains

Alpine-riparian scrub loamy wet flood plains, warm

Boreal-riparian forested loamy flood plains, moderately wet

Boreal-riparian scrub loamy wet flood plains

Boreal-riparian scrub loamy wet flood plains, Cook Inlet

Boreal-riparian scrub loamy schist flood plains, wet

Boreal-riparian woodland loamy flood plains, wet

Depth class: very deep

Drainage class: very poorly drained

Landform: flood plains, alluvial fans

Parent material: sandy and silty alluvium over sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium derived from diorite, sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Elevation: 61 to 865 m

Slope: 0 to 4 percent

Annual precipitation: 344 to 989 mm

Annual temperature: -6 to 1 °C

Frost-free period: 60 to 100 days

Representative Location

Map unit in which located: 7AFF—Typic Eutrocryepts, sandy-skeletal-Typic Cryaquents, coarse-loamy over sandy-skeletal-Typic Historthels, coarse-loamy Association, 0 to 5 percent slopes in the Denali National Park Area, Alaska

General location in survey area: McLeod Creek near McKinley River; UTM coordinates: Zone 5, Easting 595508, Northing 7022147

Representative Pedon

Oe—0 to 4 cm; black (10YR 2/1) moderately decomposed plant material; many very fine and fine and common medium roots; slightly acid; abrupt wavy boundary.

A/C—4 to 16 cm; very dark brown (10YR 2/2) and black (2.5Y 2.5/1) stratified fine sand to silt; single grain; loose, nonsticky and nonplastic; many very fine and fine and few medium roots; neutral; gradual wavy boundary.

Cg/Ab—16 to 33 cm; greenish black (5GY 2.5/1) and very dark brown (10YR 2/2) stratified sand to silt; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; 5 percent cobbles; neutral; abrupt smooth boundary.

2Cg—33 to 56 cm; dark gray (5Y 4/1) extremely cobbly sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 45 percent gravel, 25 percent cobbles; slightly acid; diffuse smooth boundary.

2C—56 to 150 cm; dark grayish brown (10YR 4/2) extremely cobbly sand; single grain; loose, nonsticky and nonplastic; 45 percent gravel, 25 percent cobbles; slightly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2.0 to 3.5 °C

Depth to contrasting textural stratification: 38 to 83 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—very strongly acid to neutral

A, ACg, AC, and A/C horizons:

Color—hue of 10YR to 10Y; value of 2 to 5; chroma of 1 or 2

Texture—stratified fine sand to silt, stratified sand to silt, silt, very fine sandy loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—15 to 85 percent

Organic matter content—3 to 6 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 2

Reaction—slightly acid to slightly alkaline

Cg, C, Cg/Ab, and Cg/Oa horizons:

Cg part: Color—hue of 2.5Y to 5GY; value of 2.5 to 5; chroma of 1 or 2

Texture—stratified sand to silt, stratified highly decomposed plant material to silt

Clay content—0 to 10 percent

Silt content—10 to 35 percent

Sand content—60 to 85 percent

Organic matter content—0 to 12 percent

Rock fragments—0 to 5 percent rounded fragments indurated gravel; 0 to 5 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—strongly acid to moderately alkaline

2Cg horizon (when present):

Color—hue of 5Y to N; value of 2.5 to 4; chroma of 1 or 2

Texture—very cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—20 to 65 percent rounded indurated gravel; 0 to 30 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—slightly acid to slightly alkaline

2C horizon:

Color—hue of 10YR to 5Y; value of 2.5 to 7; chroma of 1 or 2

Texture—very cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly loamy coarse sand, extremely cobbly sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—20 to 65 percent rounded indurated gravel; 0 to 30 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—moderately acid to moderately alkaline

Typic Cryaquents, coarse-silty

Taxonomic Classification

- Coarse-silty, mixed, superactive, nonacid Typic Cryaquents

Map unit component(s):

Boreal-riparian scrub silty flood plains, wet

Depth class: very deep

Drainage class: very poorly drained

Landform: flood plains

Parent material: silty alluvium

Elevation: 190 to 236 m

Slope: 0 to 1 percent

Annual precipitation: 336 to 565 mm

Annual temperature: -3.0 to -2.5 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1FP4—Fluvaquentic Historthels, coarse-loamy-Fluventic Haplorthels, coarse-loamy-Cryofibrists, euic Complex in the Denali National Park Area, Alaska

General location in survey area: Beaver Log Lake near Chilchukabena Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 560282, Northing 7097751

Representative Pedon

Oi—0 to 4 cm; very dark brown (10YR 2/2) slightly decomposed plant material; many very fine and fine, many medium and common coarse roots; neutral; abrupt irregular boundary.

Cg/Oi—4 to 25 cm; dark gray (5Y 4/1) and black (10YR 2/1) mixed silt loam and slightly decomposed plant material; massive; very friable, nonsticky and nonplastic; many very fine and fine, common medium and few coarse roots; neutral; abrupt broken boundary.

Cg1—25 to 47 cm; very dark gray (N 3/) stratified very fine sand to silt; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; 5 mm dark brown (7.5YR 3/4) high chroma redox concentrations (approximately 15 percent of horizon); neutral; gradual smooth boundary.

Cg2—47 to 150 cm; very dark gray (N 3/) stratified very fine sand to silt; massive; very friable, nonsticky and nonplastic; neutral.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2 to 3.5 °C

Oi horizon:

Color—value of 2 or 3; chroma of 1 or 2

Organic matter content—60 to 90 percent

Electrical Conductivity (mmhos/cm)—0 to 0.2

Reaction—slightly acid to slightly alkaline

Cg and Cg/Oi horizons:

Cg part: Color—hue of 5Y to N; value of 2.5 to 4

Texture—silt loam, stratified very fine sand to silt

Clay content—0 to 10 percent

Silt content—30 to 75 percent

Sand content—15 to 60 percent

Organic matter content—3 to 6 percent

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0.2 to 1.5

Reaction—slightly acid to slightly alkaline

Typic Cryaquents, sandy-skeletal**Taxonomic Classification**

- Sandy-skeletal, mixed Typic Cryaquents

Map unit component(s):

Boreal-riparian scrub gravelly flood plains, wet

Depth class: very deep

Drainage class: very poorly drained

Landform: flood plains

Parent material: sandy and silty alluvium over sandy and gravelly alluvium

Elevation: 333 to 960 m

Slope: 0 to 2 percent

Annual precipitation: 344 to 923 mm

Annual temperature: -6.0 to -2.1 °C

Frost-free period: 60 to 80 days

Representative Location

Map unit in which located: 7FP1—Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex in the Denali National Park

General location in survey area: West Fork of lower Toklat River; UTM coordinates: Zone 5, Easting 639915, Northing 7063654

Representative Pedon

Oi—0 to 2 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine and few medium roots; 5 percent gravel, 5 percent cobbles; neutral; abrupt smooth boundary.

ACg—2 to 9 cm; dark gray (5Y 4/1) stratified sand to silt; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; slightly effervescent; 2 percent gravel, 2 percent cobbles; 2 mm dark

brown (7.5YR 3/4) high chroma redox concentrations (approximately 20 percent of horizon); slightly alkaline; gradual smooth boundary.

2C1—9 to 26 cm; very dark gray (2.5Y 3/1) extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; 45 percent gravel, 20 percent cobbles; slightly alkaline; diffuse smooth boundary.

2C2—26 to 150 cm; very dark gray (2.5Y 3/1) extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; slightly effervescent; 45 percent gravel, 20 percent cobbles; slightly alkaline.

Range in Characteristics

Soil moisture class: Oxyaquic

Annual soil temperature: 2 to 3.5 °C

Depth to contrasting textural stratification: 2 to 10 cm

Oe horizon:

Color—hue of 7.5YR or 10YR; value of 2 or 2.5; chroma of 1 to 3

Organic matter content—60 to 90 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—slightly acid or neutral

ACg horizon:

Color—hue of 10YR, 2.5Y, 5Y, or N; value of 2 to 4; chroma of 1 to 3

Clay content—0 to 10 percent

Silt content—10 to 35 percent

Sand content—60 to 85 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 5 percent rounded indurated gravel; 0 to 5 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—neutral to moderately alkaline

2C horizon:

Color—hue of 2.5Y or 5Y; value of 2 to 4; chroma of 1 or 2

Texture—extremely cobbly loamy coarse sand, extremely gravelly coarse sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—35 to 60 percent rounded indurated gravel; 0 to 35 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 0.5 percent

Electrical Conductivity (mmhos/cm)—0 to 1

Reaction—neutral to moderately alkaline

Typic Cryofibrists, dysic

Taxonomic Classification

- Dysic Typic Cryofibrists

Map unit component(s):

Boreal-sedge bog organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: hills, mountains, till plains

Parent material: mossy organic material and/or grassy organic material

Elevation: 76 to 757 m

Slope: 0 to 15 percent

Annual precipitation: 536 to 2,174 mm

Annual temperature: -1 to 1 °C

Frost-free period: 70 to 100 days

Representative Location

Map unit in which located: 12B—Typic Cryofibrists, dysic-Fluvaquentic Cryohemists, dysic Complex, 0 to 2 percent slopes in the Denali National Park

General location in survey area: Ruth Glacier terminous; UTM coordinates: Zone 5, Easting 636848, Northing 6952868

Representative Pedon

Oi1—0 to 42 cm; dark yellowish brown (10YR 3/4) peat; many very fine and fine and few medium roots; very strongly acid; gradual smooth boundary.

Oi2—42 to 120 cm; dark yellowish brown (10YR 3/4) peat; many very fine and fine roots; very strongly acid; diffuse smooth boundary.

Oi3—120 to 150 cm; dark yellowish brown (10YR 3/4) peat; many very fine and fine roots; very strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2.5 to 4.0 °C

Thickness of histic epipedon: over 150 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 to 5; chroma of 2 to 8

Organic matter content—60 to 90 percent

Reaction—ultra acid to very strongly acid

Typic Cryofluvents, coarse-loamy over sandy-skeletal

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid Typic Cryofluvents
- Coarse-loamy over sandy or sandy-skeletal, paramicaceous, superactive, nonacid Typic Cryofluvents

Map unit component(s):

Alpine-riparian scrub loamy flood plains, warm

Boreal-riparian forested loamy flood plains

Boreal-riparian forested loamy flood plains, Yukon-Kuskokwim

Boreal-riparian forested loamy high flood plains

Boreal-riparian forested loamy schist flood plains

Boreal-riparian scrub loamy flood plains

Boreal-riparian scrub loamy schist flood plains

Subalpine-riparian scrub loamy diorite flood plains

Depth class: very deep

Drainage class: well drained

Landform: flood plains

Parent material: sandy and silty alluvium, sandy and silty alluvium over sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium derived from diorite, sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Elevation: 149 to 960 m

Slope: 0 to 3 percent

Annual precipitation: 336 to 923 mm

Annual temperature: -6 to -2 °C

Frost-free period: 60 to 110 days

Representative Location

Map unit in which located: 7FP1—Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal Complex in the Denali National Park

General location in survey area: Zippy Benchmark along west Park boundary; UTM coordinates: Zone 5, Easting 532741, Northing 6995172

Representative Pedon

Oi—0 to 5 cm; black (10YR 2/1) and dark grayish brown (2.5Y 4/2) mixed slightly decomposed plant material and silt; many very fine and fine, many medium and common coarse roots; strongly acid; clear smooth boundary.

AC—5 to 25 cm; dark grayish brown (2.5Y 4/2) stratified fine sand to silt; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine, few medium and few coarse roots; 1 mm dark reddish brown (5YR 3/4) high chroma relict high chroma mottles (approximately 5 percent of horizon); 2 mm dark gray (5Y 4/1) low chroma relict low chroma mottles (approximately 10 percent of horizon); slightly acid; gradual smooth boundary.

C1—25 to 53 cm; dark gray (5Y 4/1) stratified fine sand to silt; single grain; very friable, nonsticky and nonplastic; few very fine and fine roots; 5 mm dark yellowish brown (10YR 3/4) high chroma relict high chroma mottles (approximately 0 percent of horizon); slightly acid; diffuse smooth boundary.

C2—53 to 92 cm; dark grayish brown (2.5Y 4/2) stratified fine sand to silt; single grain; very friable, nonsticky and nonplastic; neutral; abrupt smooth boundary.

2C—92 to 150 cm; dark grayish brown (2.5Y 4/2) very cobbly sand; single grain; loose, nonsticky and nonplastic; 30 percent gravel, 20 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to 1.0 °C

Depth to contrasting textural stratification: 32 to 88 cm

Thickness of ochric epipedon: 2 to 31 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to slightly acid

AC and A horizons:

Color—hue of 7.5YR to 2.5Y; value of 2 to 5; chroma of 1 to 4

Texture—stratified sand to silt, silt loam, stratified fine sand to silt

Clay content—0 to 10 percent

Silt content—10 to 75 percent

Sand content—15 to 85 percent

Organic matter content—2 to 6 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—extremely acid to slightly alkaline

C horizon:

Color—hue of 10YR to 5Y; value of 2.5 to 7; chroma of 1 to 3

Texture—stratified sand to silt, stratified fine sand to silt

Clay content—0 to 10 percent

Silt content—10 to 35 percent

Sand content—60 to 85 percent

Organic matter content—1 to 4 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—very strongly acid to slightly alkaline

2C horizon:

Color—hue of 10YR to 5Y; value of 2 to 7; chroma of 2 to 4

Texture—very cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly sand, extremely gravelly loamy coarse sand, extremely cobbly sand, very cobbly sand, very cobbly loamy coarse sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—75 to 95 percent

Rock fragments—20 to 65 percent rounded indurated gravel, 0 to 45 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—very strongly acid to moderately alkaline

Typic Cryohemists, euic

Taxonomic Classification

- Euic Typic Cryohemists

Map unit component(s):

Boreal-taiga scrub bog organic depressions

Depth class: very deep

Drainage class: very poorly drained

Landform: alluvial flats

Parent material: mossy organic material and/or herbaceous organic material

Elevation: 165 to 236 m

Slope: 0 percent

Annual precipitation: 336 to 565 mm

Annual temperature: -3.0 to -2.5 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 1STW—Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association in the Denali National Park Area, Alaska

General location in survey area: Billberg Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 563847, Northing 7085634

Representative Pedon

Oi—0 to 34 cm; very dark brown (10YR 2/2) and dark brown (10YR 3/3) peat; many medium and many coarse roots; slightly acid; gradual smooth boundary.

Oe1—34 to 82 cm; very dark brown (10YR 2/2) mucky peat; many very fine and fine, common medium and common coarse roots; slightly acid; diffuse smooth boundary.

Oe2—82 to 150 cm; very dark brown (10YR 2/2) mucky peat; common very fine and fine, common medium and common coarse roots; slightly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 2 to 3.5 °C

Thickness of histic epipedon: over 150 cm

Oi horizon:

Color—value of 2 or 3; chroma of 2 or 3

Organic matter content—60 to 90 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—strongly acid to slightly acid

Oe horizon:

Color—value of 2 or 3; chroma of 2 or 3

Organic matter content—60 to 90 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—moderately acid or slightly acid

Typic Cryorthents, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, nonacid Typic Cryorthents

Map unit component(s):

Boreal-riparian forested gravelly fans

Subalpine-scrub gravelly moraines

Depth class: very deep

Drainage class: well drained

Landform: moraines, mountains

Parent material: gravelly ablation till, gravelly alluvium

Elevation: 183 to 1,320 m

Slope: 10 to 45 percent

Annual precipitation: 408 to 3,051 mm

Annual temperature: -7 to 1 °C

Frost-free period: 60 to 90 days

Representative Location

Map unit in which located: 9CE—Typic Cryorthents-Nonvegetated Drift-Typic Eutrocryepts, loamy-skeletal Association, 0 to 65 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Lower Buckskin Glacier; UTM coordinates: Zone 5, Easting 639916, Northing 6985725

Representative Pedon

- Oi—0 to 2 cm; very dark brown (10YR 2/2) slightly decomposed plant material; very strongly acid; abrupt wavy boundary.
- A—2 to 12 cm; very dark gray (2.5Y 3/1) very cobbly sandy loam; weak medium granular structure; friable, nonsticky and nonplastic; many very fine and fine and common medium roots; 30 percent gravel, 25 percent cobbles; very strongly acid; gradual wavy boundary.
- CA—12 to 38 cm; dark gray (5Y 4/1) very cobbly sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common very fine and fine roots; 20 percent gravel, 20 percent cobbles; strongly acid; diffuse wavy boundary.
- C1—38 to 67 cm; dark gray (5Y 4/1) very cobbly sandy loam; single grain; friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent gravel, 25 percent cobbles; moderately acid; diffuse irregular boundary.
- C2—67 to 150 cm; dark gray (5Y 4/1) very cobbly sandy loam; single grain; friable, nonsticky and nonplastic; 30 percent gravel, 25 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.4 °C

O horizon:

Color—hue of 7.5YR or 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Rock fragments—0 to 20 percent angular strongly cemented boulders

Calcium carbonate equivalent: 0 to 1 percent

Reaction—very strongly acid to slightly alkaline

A or AC horizons:

Color—hue of 2.5Y or 10YR; value of 2 to 4; chroma of 1 or 2

Texture—very gravelly sandy loam, gravelly loam, very cobbly sandy loam, extremely cobbly sandy loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 85 percent

Organic matter content—0 to 8 percent

Rock fragments—10 to 55 percent strongly cemented gravel; 10 to 40 percent strongly cemented cobbles; 0 to 20 percent strongly cemented stones

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—strongly acid to moderately alkaline

C or CA horizons:

Texture—very gravelly sandy loam, gravelly loam, very cobbly sandy loam, extremely cobbly sand, extremely gravelly coarse sand, extremely stony loamy coarse sand, extremely cobbly loamy sand, extremely cobbly sandy loam

Clay content—0 to 10 percent

Silt content—5 to 45 percent

Sand content—45 to 95 percent

Rock fragments—10 to 40 percent subangular indurated cobbles; 25 to 60 percent subangular indurated gravel; 0 to 40 percent subangular indurated stones

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—strongly acid to moderately alkaline

Typic Cryorthents, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, mixed Typic Cryorthents
- Sandy-skeletal, mixed Typic Cryorthents
- Sandy-skeletal, paramicaceous Typic Cryorthents
- Sandy-skeletal, mixed Typic Cryorthents

Map unit component(s):

Alpine-riparian scrub gravelly diorite flood plains
 Alpine-riparian scrub gravelly flood plains, warm
 Boreal-riparian forested gravelly flood plains
 Boreal-riparian forested gravelly high flood plains
 Boreal-riparian forested gravelly high flood plains, Cook Inlet
 Boreal-riparian forested gravelly high flood plains, Yukon-Kuskokwim
 Boreal-riparian forested gravelly schist flood plains
 Boreal-riparian forested hardwood gravelly flood plains
 Boreal-riparian scrub gravelly flood plains
 Subalpine-riparian scrub gravelly diorite flood plains
 Subalpine-riparian scrub gravelly fan terraces

Depth class: very deep

Drainage class: somewhat excessively drained or excessively drained

Landform: flood plains, alluvial fans, mountains

Parent material: sandy and gravelly alluvium, sandy and gravelly alluvium derived from diorite, sandy and gravelly alluvium derived from schist, sandy and silty alluvium over sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium derived from diorite

Elevation: 90 to 1,145 m

Slope: 0 to 30 percent

Annual precipitation: 344 to 3,051 mm

Annual temperature: -11 to 1 °C

Frost-free period: 50 to 110 days

Representative Location

Map unit in which located: 11FP—Typic Cryofluvents, coarse-loamy over sandy-skeletal-Oxyaquic Cryorthents, sandy-skeletal-Typic Cryorthents, sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Main Fork of Toklat in Basin; UTM coordinates: Zone 5, Easting 634192, Northing 7080764

Representative Pedon

Oi—0 to 2 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine, common medium and few coarse roots; neutral; abrupt smooth boundary.

AC—2 to 10 cm; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) stratified fine sand to silt; single grain; loose, nonsticky and nonplastic; common very fine and fine, few medium and few coarse roots; strongly effervescent; 2 percent gravel; slightly alkaline; clear smooth boundary.

2C1—10 to 46 cm; dark grayish brown (10YR 4/2) very cobbly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; strongly effervescent; 25 percent gravel, 20 percent cobbles; moderately alkaline; gradual wavy boundary.

2C2—46 to 150 cm; very dark grayish brown (2.5Y 3/2) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; strongly effervescent; 40 percent gravel, 30 percent cobbles; moderately alkaline.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.5 to 3.0 °C

Depth to contrasting textural stratification: 0 to 18 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—moderately decomposed plant material, slightly decomposed plant material

Organic matter content—60 to 90 percent

Rock fragments—0 to 30 percent rounded indurated gravel, 0 to 30 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—extremely acid to slightly alkaline

A, AC, Ab, and 2AC horizons:

Color—hue of 10YR to N; value of 2.5 to 4; chroma of 1 to 3

Texture—extremely gravelly loamy coarse sand, extremely cobbly coarse sand, stratified sand to silt, stratified fine sand to silt, loam, sandy loam, extremely cobbly loamy sandy, extremely cobbly sand loam, silt, extremely cobbly loamy coarse sand, extremely gravelly coarse sand

Clay content—0 to 10 percent

Silt content—0 to 80 percent

Sand content—20 to 95 percent

Rock fragments—0 to 40 percent rounded indurated cobbles, 0 to 60 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—very strongly acid to moderately alkaline

C and 2C horizons:

Color—hue of 10YR to N; value of 2.5 to 7; chroma of 1 to 6

Texture—extremely cobbly coarse sand, extremely gravelly loamy coarse sand, extremely cobbly coarse sand, very cobbly coarse sand, very gravelly coarse sand, extremely gravelly coarse sand, extremely gravelly loamy sand extremely cobbly loamy sand, very gravelly loamy coarse sand, extremely cobbly sandy loam, cobbly sandy loam, gravelly loam

Clay content—0 to 10 percent

Silt content—0 to 40 percent

Sand content—50 to 95 percent

Rock fragments—0 to 40 percent rounded indurated cobbles; 10 to 70 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—extremely acid to moderately alkaline

Typic Dystricrypts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive Typic Dystricrypts
- Loamy-skeletal, paramicaceous, superactive Typic Dystricrypts

Map unit component(s):

Boreal-forested gravelly schist colluvial slopes
 Boreal-taiga mica rich silt loess slopes
 Subalpine-scrub gravelly colluvial slopes
 Subalpine-scrub gravelly schist colluvial slopes

Depth class: shallow to very deep

Drainage class: well drained

Landform: mountains

Parent material: silty eolian deposits over gravelly colluvium derived from schist, silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock

Elevation: 194 to 1,554 m

Slope: 15 to 70 percent

Annual precipitation: 345 to 2,466 mm

Annual temperature: -11 to -1 °C

Frost-free period: 50 to 100 days

Representative Location

Map unit in which located: 8MVF—Humic Cryaquepts, loamy-skeletal-Oxyaquic Eutricrypts, loamy-skeletal-Typic Dystricrypts, loamy-skeletal Association, 12 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Lower Canyon Creek in Kantishna Hills; UTM coordinates: Zone 5, Easting 625355, Northing 7066064

Representative Pedon

Oi—0 to 5 cm; dark reddish brown (5YR 2.5/2) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; extremely acid; abrupt smooth boundary.

A—5 to 11 cm; black (10YR 2/1) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine, common medium and few coarse roots; 5 percent gravel; extremely acid; clear smooth boundary.

2Bw1—11 to 41 cm; dark yellowish brown (10YR 4/4) gravelly silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine and fine roots; 20 percent gravel, 5 percent cobbles; very strongly acid; clear wavy boundary.

2Bw2—41 to 63 cm; dark yellowish brown (10YR 4/6) very channery silt loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine and fine roots; 40 percent channers, 10 percent flagstones; moderately acid; gradual wavy boundary.

2C1—63 to 105 cm; dark yellowish brown (10YR 4/4) extremely channery loam; massive; friable, nonsticky and nonplastic; 50 percent channers, 20 percent flagstones; neutral; gradual smooth boundary.

2Cr—105 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1 to 2 °C

Depth to contrasting textural stratification: 4 to 22 cm

Depth to bedrock (paralithic): 53 to 150 cm

Thickness of ochric epipedon: 2 to 18 cm

Thickness of cambic horizon: 8 to 54 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 5; chroma of 1 to 4

Organic matter content—60 to 90 percent

Rock fragments—0 to 2 percent angular strongly cemented channers

Reaction—ultra acid to strongly acid

A horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—5 to 10 percent

Silt content—50 to 70 percent

Sand content—15 to 40 percent

Organic matter content—6 to 14 percent

Rock fragments—2 to 10 percent angular strongly cemented channers

Reaction—ultra acid to moderately acid

2Bw horizon:

Color—hue of 5YR to 10YR; value of 3 to 6; chroma of 4 to 8

Texture—extremely cobbly loam, extremely gravelly loam, extremely flaggy loam, very channery loam, very gravelly loam, very channery silt loam, gravelly loam, very gravelly silt loam, very channery sandy loam

Clay content—5 to 20 percent

Silt content—40 to 65 percent

Sand content—15 to 50 percent

Organic matter content—0 to 8 percent

Rock fragments—0 to 40 percent angular strongly cemented flagstones; 15 to 60 percent angular strongly cemented channers; 0 to 55 percent angular strongly cemented gravel; 0 to 50 percent angular strongly cemented cobbles; 0 to 60 percent angular strongly cemented stones

Reaction—extremely acid to moderately acid

2C horizon:

Color—hue of 2.5Y or 10YR; value of 3 to 6; chroma of 2 to 8

Texture—extremely cobbly loam, extremely gravelly loam, extremely flaggy loam, very channery loam, very gravelly loam, extremely channer silt loam, extremely channery loam, very channery sandy loam, very channery silt loam

Clay content—5 to 20 percent

Silt content—40 to 65 percent

Sand content—15 to 50 percent

Rock fragments—10 to 60 percent angular strongly cemented channers; 5 to 40 percent angular strongly cemented flagstones; 0 to 55 percent angular strongly cemented gravel; 0 to 50 percent angular strongly cemented cobbles; 0 to 60 percent angular strongly cemented stones

Reaction—very strongly acid to neutral

Typic Dystrogelepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, paramicaceous, superactive, subgelic Typic Dystrogelepts
- Loamy-skeletal, mixed, superactive, subgelic Typic Dystrogelepts

Map unit component(s):

Alpine-dwarf scrub gravelly diorite colluvial slopes
 Alpine-dwarf scrub gravelly diorite colluvial slopes, moist
 Alpine-dwarf scrub gravelly diorite fans
 Alpine-dwarf scrub gravelly schist colluvial slopes
 Alpine-dwarf scrub gravelly schist colluvial slopes, moist
 Alpine-dwarf scrub gravelly schist steps and lobes
 Alpine-scrub gravelly schist colluvial slopes
 Alpine-scrub gravelly schist colluvial slopes, thick surface
 Alpine-scrub mosaic gravelly colluvial schist slopes

Depth class: very shallow to very deep

Drainage class: well drained

Landform: mountains

Parent material: gravelly colluvium derived from diorite, gravelly colluvium derived from schist, gravelly cryoturbate derived from schist, silty eolian deposits over gravelly colluvium derived from diorite, silty eolian deposits over gravelly colluvium derived from schist

Elevation: 261 to 2,043 m

Slope: 0 to 65 percent

Annual precipitation: 446 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 5SA11—Typic Dystrogelepts, loamy-skeletal-Oxyaquic Eutrocryepts, loamy-skeletal Association, 12 to 50 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Healy Peak; UTM coordinates: Zone 6, Easting 403822, Northing 7070861

Representative Pedon

A—0 to 2 cm; very dark brown (10YR 2/2) very gravelly silt loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 30 percent gravel, 10 percent cobbles; very strongly acid; gradual smooth boundary.

Bw—2 to 28 cm; reddish yellow (7.5YR 6/8) very gravelly silt loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine and fine roots; 40 percent gravel, 15 percent cobbles; extremely acid; gradual wavy boundary.

C1—28 to 61 cm; brownish yellow (10YR 6/8) extremely cobbly silt loam; massive; friable, slightly sticky and slightly plastic; 40 percent gravel, 30 percent cobbles; extremely acid; gradual wavy boundary.

C2—61 to 86 cm; brownish yellow (10YR 6/8) extremely cobbly silt loam; massive; friable, slightly sticky and slightly plastic; 40 percent gravel, 30 percent cobbles; extremely acid; gradual wavy boundary.

2Cr—86 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -2 °C

Depth to contrasting textural stratification: 5 to 25 cm

Depth to bedrock (paralithic): 110 to 150 cm

Thickness of ochric epipedon: 2 to 18 cm

Thickness of cambic horizon: 12 to 62 cm

Oi and Oe horizons (when present):

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—moderately decomposed plant material, slightly decomposed plant material

Organic matter content—60 to 90 percent

Reaction—ultra acid to very strongly acid

A horizon:

Color—hue of 5YR to 10YR; value of 2 to 4; chroma of 2 or 3

Texture—gravelly silt loam, silt loam, channery silt loam, mucky gravelly loam, gravelly loam, very gravelly silt loam, loam

Clay content—0 to 20 percent

Silt content—25 to 80 percent

Sand content—15 to 75 percent

Organic matter content—2 to 12 percent

Rock fragments—0 to 30 percent strongly cemented channers or strongly cemented gravel; 0 to 20 percent strongly cemented flagstones or strongly cemented cobbles; 0 to 5 percent very strongly cemented stones

Reaction—extremely acid to moderately acid

Bw, AC/Bw, and 2Bw horizons:

Color—hue of 5YR to 2.5Y; value of 3 to 6; chroma of 3 to 8

Texture—very channery silt loam, very gravelly loam, very channery loam, extremely channery silt loam, very gravelly sandy loam, very cobbly sandy loam, very gravelly silt loam, very cobbly loam, very flaggy loam, extremely gravelly loam, extremely channery loam, extremely cobbly sandy loam

Clay content—8 to 20 percent

Silt content—30 to 65 percent

Sand content—25 to 60 percent

Organic matter content—0 to 2 percent

Rock fragments—15 to 60 percent strongly cemented channers; 5 to 60 percent strongly cemented gravel; 10 to 60 percent angular schist fragments strongly cemented flagstones; 0 to 10 percent very strongly cemented stones

Reaction—extremely acid to slightly acid

C and 2C horizons:

Color—hue of 7.5YR to 2.5Y; value of 3 to 8; chroma of 2 to 8

Texture—very gravelly loam, very channery silt loam, extremely channery silt loam, extremely channery loam, very channery loam, extremely gravelly loamy coarse sand, extremely cobbly sandy loam, very gravelly sandy loam, very cobbly sandy loam, extremely cobbly silt loam, very flaggy loam

Clay content—0 to 20 percent

Silt content—10 to 65 percent

Sand content—10 to 80 percent

Rock fragments—15 to 60 percent angular strongly cemented channers; 5 to 60 percent very strongly cemented gravel; 0 to 60 percent very strongly cemented cobbles; 10 to 60 percent angular strongly cemented flagstones; 5 to 45 percent very strongly cemented stones

Reaction—very strongly acid to slightly acid

Typic Dystrogelepts, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, mixed, subgelic Typic Dystrogelepts

Map unit component(s):

Alpine-dwarf scrub gravelly diorite till slopes

Depth class: very deep

Drainage class: well drained

Landform: hills, mountains

Parent material: gravelly drift derived from diorite

Elevation: 670 to 1,792 m

Slope: 2 to 37 percent

Annual precipitation: 528 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7TM21—Typic Dystrogelepts, sandy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Haplogelods, loamy-skeletal Association, 8 to 40 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Jeffery Creek; UTM coordinates: Zone 5, Easting 594537, Northing 7012608

Representative Pedon

Oi—0 to 1 cm; very dark brown (10YR 2/2) slightly decomposed plant material; many very fine and fine roots; extremely acid; clear smooth boundary.

A—1 to 7 cm; very dark brown (10YR 2/2) gravelly loam; weak coarse granular structure; friable, nonsticky and nonplastic; many very fine and fine roots; 15 percent gravel, 2 percent cobbles; extremely acid; clear smooth boundary.

Bw1—7 to 22 cm; dark brown (7.5YR 3/4) extremely cobbly loamy coarse sand; weak coarse subangular blocky structure; loose, nonsticky and nonplastic; common very fine and fine roots; 40 percent gravel, 20 percent cobbles; very strongly acid; gradual wavy boundary.

Bw2—22 to 47 cm; dark yellowish brown (10YR 4/4) extremely cobbly loamy coarse sand; weak coarse subangular blocky structure; loose, nonsticky and nonplastic; common very fine and fine roots; 40 percent gravel, 20 percent cobbles; very strongly acid; gradual wavy boundary.

C1—47 to 77 cm; yellowish brown (10YR 5/4) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 40 percent gravel, 25 percent cobbles; strongly acid; diffuse wavy boundary.

C2—77 to 150 cm; grayish brown (10YR 5/2) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; 40 percent gravel, 25 percent cobbles; strongly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -2 °C

Thickness of ochric epipedon: 3 to 16 cm

Thickness of cambic horizon: 13 to 47 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 2 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to strongly acid

A horizon:

Color—hue of 7.5YR or 10YR; value of 2 to 3; chroma of 2 or 3

Texture—gravelly sandy loam, gravelly loam, loam

Clay content—0 to 10 percent

Silt content—20 to 49 percent

Sand content—41 to 75 percent

Organic matter content—0 to 1 percent

Rock fragments—20 to 30 percent subrounded indurated gravel; 0 to 10 percent subrounded indurated cobbles

Reaction—extremely acid to strongly acid

Bw horizon:

Color—hue of 7.5YR or 10YR; value of 3 to 5; chroma of 4 to 8

Texture—cobbly sandy loam, extremely gravelly loamy coarse sand, very gravelly sandy loam, extremely cobbly loamy coarse sand

Clay content—0 to 10 percent

Silt content—20 to 35 percent

Sand content—55 to 85 percent

Organic matter content—0 to 1 percent

Rock fragments—0 to 25 percent subrounded indurated cobbles; 20 to 50 percent subrounded indurated gravel

Reaction—extremely acid to strongly acid

C horizon:

Color—hue of 10YR or 2.5Y; value of 3 to 5; chroma of 2 to 4

Texture—extremely cobbly coarse sand, extremely gravelly loamy coarse sand, extremely gravelly loamy sand

Clay content—0 to 5 percent

Silt content—5 to 20 percent

Sand content—45 to 90 percent

Rock fragments—25 to 65 percent subrounded indurated gravel; 0 to 40 percent subrounded indurated cobbles

Reaction—very strongly acid to slightly acid

Typic Eutrocrypts, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive Typic Eutrocrypts

Map unit component(s):

Boreal-forested gravelly colluvial slopes, dissected

Depth class: very deep

Drainage class: well drained or somewhat excessively drained

Landform: escarpments on plateaus and terraces

Parent material: silty eolian deposits over gravelly colluvium

Elevation: 333 to 1,005 m

Slope: 30 to 70 percent

Annual precipitation: 405 to 856 mm

Annual temperature: -5 to -2 °C

Frost-free period: 50 to 80 days

Representative Location

Map unit in which located: 10ES1—Typic Eutrocryepts, coarse-loamy-Typic Historthels, coarse-silty-Typic Historthels, loamy-skeletal Complex, 5 to 70 percent slopes in the Denali National Park Area, Alaska
General location in survey area: Sushana River; UTM coordinates: Zone 6, Easting 357532, Northing 7098491

Representative Pedon

- Oi—0 to 5 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; moderately acid; clear wavy boundary.
- A—5 to 11 cm; dark brown (10YR 3/3) loam; weak medium granular structure; friable, nonsticky and nonplastic; many very fine and fine, many medium and many coarse roots; 5 percent gravel; moderately acid; clear smooth boundary.
- Bw—11 to 32 cm; reddish brown (5YR 4/4) and brown (7.5YR 4/4) silt loam; weak coarse subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; moderately acid; gradual wavy boundary.
- BC—32 to 74 cm; dark yellowish brown (10YR 4/4) silt loam; weak coarse subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 5 percent gravel; neutral; clear smooth boundary.
- 2C—74 to 150 cm; dark grayish brown (10YR 4/2) very gravelly loamy sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 40 percent gravel; neutral.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0 to 1.5 °C

Depth to contrasting textural stratification: 9 to 18 cm

Thickness of ochric epipedon: 2 to 10 cm

Thickness of cambic horizon: 4 to 23 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—strongly acid or moderately acid

A horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Texture—gravelly loam, loam, silt loam

Clay content—5 to 10 percent

Silt content—40 to 65 percent

Sand content—30 to 50 percent

Organic matter content—1 to 4 percent

Rock fragments—0 to 10 percent subrounded indurated gravel

Reaction—very strongly acid or strongly acid

Bw or BC horizon:

Color—hue of 5YR to 10YR; value of 3 or 4; chroma of 3 to 6

Texture—gravelly sandy loam, silt loam

Clay content—5 to 10 percent

Silt content—20 to 60 percent

Sand content—35 to 70 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 20 percent gravel

Reaction—strongly acid or moderately acid

2C horizon:

Color—hue of 10YR to 5Y; value of 3 to 5; chroma of 2 to 4

Texture—very gravelly loamy coarse sand, very gravelly sandy loam, extremely gravelly coarse sand, very gravelly loamy sand

Clay content—0 to 5 percent

Silt content—5 to 25 percent

Sand content—70 to 90 percent

Rock fragments—25 to 55 percent indurated gravel; 0 to 10 percent indurated cobbles

Reaction—strongly acid to slightly acid

Typic Eutrocryepts, coarse-silty

Taxonomic Classification

- Coarse-silty, mixed, superactive Typic Eutrocryepts

Map unit component(s):

Boreal-forested mica rich silty loess slopes

Depth class: moderately deep to very deep

Drainage class: well drained

Landform: mountains

Parent material: silty eolian deposits over gravelly colluvium derived from schist

Elevation: 193 to 579 m

Slope: 10 to 30 percent

Annual precipitation: 345 to 549 mm

Annual temperature: -3 to -1 °C

Frost-free period: 60 to 100 days

Representative Location

Map unit in which located: 4BSS—Typic Eutrocryepts, coarse-silty, 8 to 30 percent slopes in the Denali National Park Area, Alaska

General location in survey area: North of Chilchukabena Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 578467, Northing 7096895

Representative Pedon

Oi—0 to 6 cm; very dark brown (10YR 2/2) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; extremely acid; abrupt smooth boundary.

A—6 to 9 cm; very dark brown (10YR 2/2) silt loam; weak medium granular structure; very friable, nonsticky and nonplastic; many very fine and fine, many medium and many coarse roots; extremely acid; clear wavy boundary.

Bw1—9 to 33 cm; yellowish brown (10YR 5/4) and very dark brown (10YR 2/2) very fine sandy loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine, few medium and few coarse roots; very strongly acid; gradual smooth boundary.

Bw2—33 to 56 cm; dark yellowish brown (10YR 4/6) and very dark brown (10YR 2/2) very fine sandy loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; strongly acid; gradual smooth boundary.

C1—56 to 97 cm; brown (10YR 4/3) and dark grayish brown (10YR 4/2) very fine sandy loam; single grain; very friable, nonsticky and nonplastic; 5 mm dark brown (7.5YR 3/4) high chroma redox concentrations (approximately 10 percent of horizon); moderately acid; diffuse smooth boundary.

C2—97 to 141 cm; brown (10YR 4/3) and dark grayish brown (10YR 4/2) very fine sandy loam; single grain; very friable, nonsticky and nonplastic; 5 mm dark brown (7.5YR 3/4) high chroma redox concentrations (approximately 10 percent of horizon); moderately acid; gradual irregular boundary.
 2Cr—141 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0.5 to 1.5 °C

Depth to contrasting textural stratification: 51 to 150 cm

Depth to bedrock (paralithic): 89 to 150 cm

Thickness of ochric epipedon: 3 to 19 cm

Thickness of cambic horizon: 15 to 40 cm

Oi horizon:

Organic matter content—60 to 90 percent

Reaction—ultra acid or extremely acid

A horizon:

Color—hue of 7.5YR or 10YR; value of 2 to 3; chroma of 1 to 4

Clay content—5 to 10 percent

Silt content—55 to 80 percent

Sand content—15 to 35 percent

Organic matter content—6 to 10 percent

Reaction—ultra acid or extremely acid

Bw horizon:

Color—value of 4 or 5; chroma of 3 to 6

Texture—silt loam, very flaggy very fine sandy loam

Clay content—5 to 10 percent

Silt content—35 to 55 percent

Sand content—40 to 60 percent

Organic matter content—2 to 6 percent

Reaction—extremely acid to strongly acid

C horizon:

Color—hue of 10YR or 2.5Y; value of 3 to 6; chroma of 2 to 4

Texture—silt loam

Clay content—5 to 10 percent

Silt content—55 to 80 percent

Sand content—15 to 35 percent

Reaction—strongly acid to neutral

Typic Eutrocryepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive Typic Eutrocryepts

Map unit component(s):

Boreal-forested gravelly till slopes, warm
 Boreal-woodland gravelly moraines
 Subalpine-scrub gravelly colluvial slopes, dry

Depth class: moderately deep to very deep

Drainage class: well drained

Landform: moraines, mountains

Parent material: gravelly colluvium, silty eolian deposits over gravelly ablation till, silty eolian deposits over gravelly till

Elevation: 183 to 1,320 m

Slope: 10 to 85 percent

Annual precipitation: 408 to 3,051 mm

Annual temperature: -7 to 1 °C

Frost-free period: 60 to 90 days

Representative Location

Map unit in which located: 7SA1—Rock Outcrop-Typic Haplogelolls, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal Association, 25 to 85 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Carlo Creek near McKinley Village; UTM coordinates: Zone 6, Easting 403046, Northing 7052541

Representative Pedon

Oe—0 to 6 cm; black (10YR 2/1) moderately decomposed plant material; many very fine and fine, many medium and few coarse roots; strongly acid; clear smooth boundary.

A—6 to 19 cm; very dark gray (2.5Y 3/1) gravelly loam; weak fine subangular blocky structure; friable, nonsticky and nonplastic; many very fine and fine and few medium roots; 20 percent gravel, 2 percent cobbles; moderately acid; clear wavy boundary.

Bw—19 to 47 cm; dark yellowish brown (10YR 3/4) very channery sandy loam; massive; friable, nonsticky and nonplastic; common very fine and fine roots; 30 percent channers, 10 percent flagstones; strongly acid; diffuse wavy boundary.

C—47 to 54 cm; dark grayish brown (2.5Y 4/2) very flaggy sandy loam; massive; friable, nonsticky and nonplastic; few very fine and fine roots; 10 percent channers, 20 percent flagstones, 20 percent stones; strongly acid; abrupt irregular boundary.

2Cr—54 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1 to 2 °C

Depth to contrasting textural stratification: 6 to 14 cm

Thickness of ochric epipedon: 2 to 9 cm

Thickness of cambic horizon: 5 to 58 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—slightly decomposed plant material, moderately decomposed plant material

Organic matter content—60 to 90 percent

Reaction—extremely acid to moderately acid

A horizon:

Color—value of 2 or 3; chroma of 1 or 2

Texture—silt loam, very cobbly loam, gravelly loam, extremely cobbly loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—40 to 80 percent

Sand content—5 to 40 percent

Organic matter content—4 to 12 percent

Rock fragments—0 to 60 percent strongly cemented gravel; 0 to 5 percent strongly cemented boulders; 0 to 25 percent strongly cemented cobbles

Reaction—ultra acid to very strongly acid

2Bw or Bw horizons:

Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 3 or 4

Texture—very cobbly sandy loam, very gravelly sandy loam, gravelly loam, extremely cobbly loam, extremely gravelly loam, very channery sandy loam, extremely channery sandy loam

Clay content—0 to 10 percent

Silt content—15 to 50 percent

Sand content—35 to 75 percent

Organic matter content—0 to 1 percent

Rock fragments—0 to 35 percent indurated cobbles; 0 to 60 percent subangular indurated gravel; 5 to 60 percent angular strongly cemented channers; 0 to 25 percent angular strongly cemented stones; 0 to 50 percent angular strongly cemented channers; 0 to 15 percent angular strongly cemented flagstones

Reaction—extremely acid to strongly acid

2C or C horizons:

Color—hue of 10YR, 2.5Y, or 5Y; value of 2 to 4; chroma of 1 to 4

Texture—very cobbly sandy loam, very gravelly sandy loam, gravelly loam, very flaggy sandy loam, very channery loam

Clay content—0 to 10 percent

Silt content—15 to 50 percent

Sand content—35 to 75 percent

Rock fragments—0 to 35 percent indurated cobbles; 20 to 60 percent indurated gravel; 0 to 30 percent indurated flagstones; 5 to 60 percent angular strongly cemented channers; 0 to 25 percent angular strongly cemented stones; 0 to 50 percent angular strongly cemented channers; 0 to 15 percent angular strongly cemented flagstones

Reaction—very strongly acid to neutral

Typic Eutrocryepts, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, mixed Typic Eutrocryepts

Map unit component(s):

Alpine-dwarf scrub gravelly fan terraces, warm

Boreal-forested gravelly outwash slopes

Boreal-forested gravelly terraces

Boreal-woodland gravelly terraces

Depth class: very deep

Drainage class: somewhat excessively drained

Landform: hills, outwash plains, pitted outwash plains, stream terraces, alluvial fans, mountains

Parent material: silty eolian deposits over sandy and gravelly alluvium, silty eolian deposits over sandy and gravelly alluvium and/or sandy and gravelly outwash, silty eolian deposits over sandy and gravelly outwash, silty volcanic ash and/or silty eolian deposits over sandy and gravelly alluvium

Elevation: 195 to 1,222 m

Slope: 0 to 30 percent

Annual precipitation: 344 to 3,285 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 110 days

Representative Location

Map unit in which located: 2ST—Typic Eutrocryepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Eastern part of large fan feature Minchumina; UTM coordinates: Zone 5, Easting 586454, Northing 7064434

Representative Pedon

Oi—0 to 3 cm; very dark brown (10YR 2/2) slightly decomposed plant material; many very fine and fine, many medium and few coarse roots; slightly acid; abrupt wavy boundary.

A/E—3 to 8 cm; brown (10YR 4/3) and dark gray (10YR 4/1) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine, few medium and few coarse roots; extremely acid; clear wavy boundary.

2Bw1—8 to 19 cm; dark brown (7.5YR 3/4) very gravelly loamy sand; single grain; loose, nonsticky and nonplastic; common very fine and fine, few medium and few coarse roots; 35 percent gravel; strongly acid; gradual wavy boundary.

2Bw2—19 to 30 cm; dark yellowish brown (10YR 3/4) very gravelly loamy coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 35 percent gravel; moderately acid; gradual wavy boundary.

2C1—30 to 68 cm; very dark gray (2.5Y 3/1) very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; 35 percent gravel; slightly acid; diffuse wavy boundary.

2C2—68 to 150 cm; very dark gray (2.5Y 3/1) very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; 40 percent gravel; slightly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1.5 to 3.0 °C

Depth to contrasting textural stratification: 10 to 29 cm

Thickness of ochric epipedon: 1 to 25 cm

Thickness of cambic horizon: 7 to 42 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 2 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to slightly acid

A or A/E horizons:

Color—hue of 5YR to 10YR; value of 2 to 4; chroma of 1 to 3

Texture—silt loam, very fine sandy loam, mucky silt loam

Clay content—5 to 10 percent

Silt content—40 to 75 percent

Sand content—15 to 55 percent

Organic matter content—6 to 12 percent

Rock fragments—0 to 5 percent gravel; 0 to 10 percent channers
 Reaction—extremely acid to moderately acid

Bw horizon (when present):

Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 2 to 6
 Texture—silt loam, loam
 Clay content—5 to 10 percent
 Silt content—45 to 75 percent
 Sand content—15 to 50 percent
 Organic matter content—2 to 5 percent
 Rock fragments—0 to 10 percent gravel
 Reaction—extremely acid to strongly acid

2Bw horizon:

Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 2 to 6
 Texture—very cobbly sandy loam, very gravelly loamy coarse sand, extremely gravelly loamy coarse sand, extremely cobbly loamy sand, extremely gravelly coarse sand, very gravelly loamy sand
 Clay content—0 to 5 percent
 Silt content—0 to 25 percent
 Sand content—75 to 95 percent
 Organic matter content—0 to 1 percent
 Rock fragments—15 to 70 percent gravel, 0 to 40 percent cobbles
 Reaction—very strongly acid to neutral

2BC horizon (when present):

Color—hue of 10YR or 2.5Y; value of 2 to 4; chroma of 1 to 4
 Texture—extremely gravelly coarse sand, extremely cobbly loamy sand, extremely gravelly loamy coarse sand
 Clay content—0 to 5 percent
 Silt content—0 to 15 percent
 Sand content—80 to 95 percent
 Rock fragments—0 to 30 percent rounded mixed rock fragments indurated cobbles; 25 to 70 percent rounded mixed rock fragments indurated gravel
 Reaction—extremely acid to strongly acid

2C horizon:

Color—hue of 10YR, 2.5Y, and 5Y; value of 2.5 to 4; chroma of 1 to 4
 Texture—extremely gravelly coarse sand, extremely cobbly loamy sand, extremely gravelly loamy coarse sand, extremely cobbly loamy coarse sand, very cobbly loamy sand, extremely cobbly sand, very gravelly coarse sand
 Clay content—0 to 5 percent
 Silt content—0 to 25 percent
 Sand content—75 to 95 percent
 Rock fragments—0 to 40 percent cobbles; 20 to 70 percent gravel
 Calcium carbonate equivalent—0 to 1 percent
 Reaction—strongly acid to moderately alkaline

Typic Eutrogelepts, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, subgelic Typic Eutrogelepts

Map unit component(s):

Alpine-dwarf scrub gravelly colluvial slopes
 Alpine-dwarf scrub gravelly colluvial slopes, moist
 Alpine-dwarf scrub gravelly diorite till hummocks and lobes
 Alpine-dwarf scrub gravelly till slopes
 Alpine-dwarf scrub gravelly till slopes, moist
 Alpine-dwarf scrub gravelly till steps and lobes
 Alpine-scrub gravelly colluvial slopes
 Alpine-scrub mosaic gravelly slopes
 Alpine-scrub mosaic gravelly till slopes
 Subalpine-forested hardwood gravelly colluvial slopes

Depth class: shallow to very deep

Drainage class: well drained or somewhat excessively drained

Landform: hills, mountains, ridges, plateaus

Parent material: gravelly till, gravelly till derived from diorite, silty eolian deposits over gravelly colluvium, silty eolian deposits over gravelly colluvium derived from shale, silty eolian deposits over gravelly colluvium derived from volcanic and sedimentary rock, silty eolian deposits over gravelly residuum, silty eolian deposits over gravelly till

Elevation: 415 to 2,053 m

Slope: 0 to 70 percent

Annual precipitation: 426 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: T7P2—Typic Haplogelods, loamy-skeletal-Typic Eutrogelepts, loamy-skeletal-Typic Historthels, loamy-skeletal Association, 2 to 35 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Muddy Creek near Muldrow Glacier; UTM coordinates: Zone 5, Easting 603381, Northing 7021980

Representative Pedon

Oe—0 to 3 cm; dark reddish brown (5YR 3/3) moderately decomposed plant material; many very fine and fine, few medium and few coarse roots; extremely acid; abrupt smooth boundary.

A—3 to 9 cm; dark reddish brown (5YR 2.5/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 2 percent gravel; extremely acid; abrupt wavy boundary.

2Bw—9 to 38 cm; dark yellowish brown (10YR 4/4) gravelly sandy loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; few very fine and fine roots; 20 percent gravel; very strongly acid; gradual smooth boundary.

2C1—38 to 52 cm; olive brown (2.5Y 4/3) very gravelly sandy loam; massive; friable, nonsticky and nonplastic; 30 percent gravel, 5 percent cobbles; strongly acid; gradual wavy boundary.

2C2—52 to 150 cm; dark grayish brown (2.5Y 4/2) very gravelly sandy loam; massive; friable, nonsticky and nonplastic; 30 percent gravel, 10 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -2 °C

Depth to contrasting textural stratification: 3 to 7 cm

Thickness of ochric epipedon: 1 to 15 cm

Thickness of cambic horizon: 10 to 67 cm

Oi horizon:

Texture—slightly decomposed plant material, moderately decomposed plant material

Organic matter content—60 to 90 percent

Rock fragments—0 to 2 percent cobbles, channers or gravel

Reaction—extremely acid to moderately acid

A horizon:

Color—hue of 10R to 10YR; value of 2 to 4; chroma of 1 to 4

Texture—silt loam, mucky silt loam, gravelly loam, loam

Clay content—0 to 15 percent

Silt content—35 to 80 percent

Sand content—10 to 50 percent

Organic matter content—1 to 12 percent

Rock fragments—0 to 2 percent very strongly cemented flagstones; 2 to 10 percent very strongly cemented channers; 0 to 2 percent subangular very strongly cemented cobbles; 0 to 25 percent subangular very strongly cemented gravel

Reaction—extremely acid to moderately acid

2Bw or Bw horizons:

Color—hue of 7.5YR to 2.5Y; value of 3 to 5; chroma of 3 to 6

Texture—extremely cobbly loam, extremely cobbly sandy loam, very cobbly loam, gravelly sandy loam, very gravelly loam, very gravelly sandy loam, very cobbly clay loam, very cobbly sandy loam, extremely channery loam, very channery loam

Clay content—0 to 30 percent

Silt content—20 to 50 percent

Sand content—35 to 75 percent

Organic matter content—0 to 6 percent

Rock fragments—20 to 40 percent very strongly cemented channers; 0 to 10 percent very strongly cemented flagstones; 10 to 55 percent very strongly cemented channers; 0 to 40 percent subangular very strongly cemented cobbles; 0 to 50 percent subangular very strongly cemented gravel

Reaction—extremely acid to slightly acid

2C or C horizons:

Color—hue of 10YR to 5Y; value of 2.5 to 6; chroma of 1 to 8

Texture—extremely gravelly loamy coarse sand, very cobbly sandy loam, very cobbly loam, very gravelly sandy loam, extremely channery loam, extremely cobbly loam, extremely flaggy loam, gravelly loam, very gravelly loam, very channery loam, very gravelly loamy sand, very channery clay loam

Clay content—0 to 30 percent

Silt content—5 to 50 percent

Sand content—35 to 90 percent

Rock fragments—10 to 65 percent subrounded indurated gravel; 0 to 40 percent subrounded indurated cobbles; 0 to 40 percent very strongly cemented flagstones; 15 to 80 percent angular mixed rock fragments very strongly cemented channers

Reaction—very strongly acid to neutral

Typic Eutrogelepts, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, mixed, subgelic Typic Eutrogelepts

Map unit component(s):

Alpine-dwarf scrub gravelly fan terraces
Alpine-dwarf scrub gravelly fan terraces, moist

Depth class: very deep

Drainage class: somewhat excessively drained

Landform: mountains

Parent material: silty eolian deposits over sandy and gravelly alluvium

Elevation: 604 to 1,974 m

Slope: 2 to 35 percent

Annual precipitation: 509 to 3,285 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7V11—Typic Gelorthents, sandy-skeletal-Riverwash-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Easy Pass on upper Bull River; UTM coordinates: Zone 6, Easting 368163, Northing 7029530

Representative Pedon

Oi—0 to 2 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine and few medium roots; moderately acid; abrupt wavy boundary.

A—2 to 8 cm; very dark brown (10YR 2/2) and dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent gravel, 2 percent cobbles; strongly acid; abrupt wavy boundary.

2Bw—8 to 29 cm; dark brown (10YR 3/3) extremely cobbly loamy coarse sand; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; 40 percent gravel, 25 percent cobbles; neutral; gradual smooth boundary.

2C1—29 to 62 cm; very dark grayish brown (2.5Y 3/2) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; 40 percent gravel, 25 percent cobbles; neutral; gradual smooth boundary.

2C2—62 to 150 cm; very dark grayish brown (2.5Y 3/2) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; slightly effervescent; 40 percent gravel, 25 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -2 °C

Depth to contrasting textural stratification: 3 to 13 cm

Thickness of ochric epipedon: 3 to 8 cm

Thickness of cambic horizon: 13 to 45 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 or 2

Organic matter content—60 to 90 percent

Reaction—very strongly acid to neutral

A horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 or 2
 Clay content—0 to 10 percent
 Silt content—55 to 75 percent
 Sand content—15 to 35 percent
 Organic matter content—4 to 8 percent
 Rock fragments—0 to 5 percent subrounded indurated gravel
 Reaction—very strongly acid to slightly alkaline

2Bw horizon:

Color—hue of 5YR to 2.5Y; value of 3 or 4; chroma of 2 to 4
 Texture—very gravelly sandy loam, very cobbly sandy loam, extremely cobbly loamy coarse sand
 Clay content—0 to 5 percent
 Silt content—15 to 60 percent
 Sand content—55 to 85 percent
 Organic matter content—0 to 1 percent
 Rock fragments—2 to 25 percent subrounded indurated cobbles; 15 to 50 percent subrounded indurated gravel
 Calcium carbonate equivalent—0 to 1 percent
 Electrical Conductivity (mmhos/cm)—0 to 0.2
 Reaction—strongly acid to slightly alkaline

2C horizon:

Color—hue of 10YR, 2.5Y, 5Y, or N; value of 2.5 to 5; chroma of 1 to 4
 Texture—extremely cobbly loamy sand, extremely gravelly loamy sand, extremely cobbly coarse sand
 Clay content—0 to 5 percent
 Silt content—5 to 20 percent
 Sand content—75 to 95 percent
 Rock fragments—0 to 30 percent subrounded indurated cobbles; 20 to 60 percent subrounded indurated gravel
 Calcium carbonate equivalent—0 to 1 percent
 Electrical Conductivity (mmhos/cm)—0 to 0.5
 Reaction—moderately acid to moderately alkaline

Typic Gelaquents, coarse-loamy over sandy-skeletal

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, subgelic Typic Gelaquents
- Coarse-loamy over sandy or sandy-skeletal, paramicaceous, superactive, nonacid, subgelic Typic Gelaquents

Map unit component(s):

Alpine-riparian scrub loamy wet diorite low flood plains, cool
 Alpine-riparian scrub loamy flood plains, wet
 Alpine-riparian scrub loamy schist flood plains, wet

Depth class: very deep

Drainage class: very poorly drained

Landform: flood plains

Parent material: sandy and silty alluvium over sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium derived from diorite, sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Elevation: 729 to 955 m

Slope: 0 to 2 percent

Annual precipitation: 497 to 1,229 mm

Annual temperature: -8 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7FP21—Typic Haplogelods, sandy-skeletal-Oxyaquic Gelorthents, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Turtle Hill; UTM coordinates: Zone 5, Easting 619159, Northing 7028088

Representative Pedon

Oi—0 to 9 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine and common medium roots; slightly acid; abrupt smooth boundary.

A—9 to 12 cm; very dark brown (10YR 2/2) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; 15 mm dark yellowish brown (10YR 4/4) high chroma redox concentrations (approximately 20 percent of horizon); slightly acid; abrupt wavy boundary.

Cg1—12 to 36 cm; dark gray (5Y 4/1) and dark grayish brown (2.5Y 4/2) stratified sand to silt; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 5 percent gravel; slightly acid; abrupt wavy boundary.

2Cg2—36 to 71 cm; dark gray (5Y 4/1) very cobbly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 35 percent gravel, 20 percent cobbles; 5 mm dark yellowish brown (10YR 4/6) high chroma redox concentrations (approximately 15 percent of horizon); neutral; gradual wavy boundary.

2C—71 to 150 cm; dark gray (2.5Y 4/1) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; 40 percent gravel, 25 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: 0.5 to -1 °C

Depth to contrasting textural stratification: 33 to 78 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—strongly acid to neutral

A horizon:

Color—value of 2 to 3; chroma of 1 to 3

Texture—stratified fine sand to silt, mucky silt loam

Clay content—0 to 10 percent

Silt content—15 to 70 percent

Sand content—30 to 85 percent

Organic matter content—3 to 14 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—strongly acid to neutral

Cg1 and Cg/Oa horizons:

Cg1 part: Color—hue of 2.5Y to 10Y; value of 3 or 4; chroma of 1 or 2

Texture—stratified highly decomposed plant material to sand to silt, stratified sand to silt

Clay content—0 to 10 percent

Silt content—15 to 35 percent

Sand content—55 to 85 percent

Organic matter content—8 to 12 percent

Rock fragments—0 to 5 percent rounded gravel

Electrical Conductivity (mmhos/cm)—0 to 0.3

Reaction—strongly acid to neutral

2C and 2Cg2 horizons:

Color—hue of 10YR or 2.5Y; value of 3 or 4; chroma of 1 or 2

Texture—extremely gravelly coarse sand, very cobbly loamy coarse sand, extremely cobbly coarse sand, extremely gravelly loamy coarse sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—80 to 95 percent

Rock fragments—0 to 40 percent rounded indurated cobbles; 20 to 65 percent rounded indurated gravel

Electrical Conductivity (mmhos/cm)—0 to 0.3

Reaction—moderately acid to neutral

Typic Gelifluvents, coarse-loamy over sandy-skeletal

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, subgelic Typic Gelifluvents
- Coarse-loamy over sandy or sandy-skeletal, paramicaceous, superactive, nonacid, subgelic Typic Gelifluvents

Map unit component(s):

Alpine-riparian scrub loamy flood plains

Alpine-riparian scrub loamy schist flood plains

Depth class: very deep

Drainage class: well drained

Landform: flood plains

Parent material: sandy and silty alluvium over sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium derived from schist

Elevation: 609 to 1,305

Slope: 0 to 10 percent

Annual precipitation: 446 to 2,266 mm

Annual temperature: -10.5 to -2.4 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7V11—Typic Gelorthents, sandy-skeletal-Riverwash-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes in the Denali National Park Area, Alaska

General location in survey area: East Refuge Valley; UTM coordinates: Zone 6, Easting 385258, Northing 7045157

Representative Pedon

- Oi—0 to 2 cm; very dark brown (10YR 2/2) slightly decomposed plant material; many very fine and fine and common medium roots; slightly acid; abrupt smooth boundary.
- AC1—2 to 9 cm; dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2) stratified sand to silt; weak coarse subangular blocky structure; loose, nonsticky and nonplastic; many very fine and fine and common medium roots; neutral; gradual smooth boundary.
- AC2—9 to 20 cm; dark brown (10YR 3/3) and very dark grayish brown (10YR 3/2) stratified sand to silt; weak coarse subangular blocky structure; loose, nonsticky and nonplastic; common very fine and fine and few medium roots; neutral; gradual smooth boundary.
- C1—20 to 96 cm; very dark grayish brown (10YR 3/2) stratified sand to silt; massive; loose, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; neutral; clear smooth boundary.
- 2C2—96 to 150 cm; variegated extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; slightly effervescent; 60 percent gravel, 5 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0 to -0.5 °C

Depth to contrasting textural stratification: 22 to 96 cm

Thickness of ochric epipedon: 4 to 29 cm

Oi horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid to moderately acid

AC horizon:

Color—hue of 10YR or 2.5Y; value of 2 or 3; chroma of 1 to 3

Clay content—0 to 10 percent

Silt content—15 to 35 percent

Sand content—55 to 85 percent

Organic matter content—2 to 4 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—very strongly acid to neutral

C1 horizon:

Color—hue of 10YR to 5Y; value of 2.5Y or 3; chroma of 1 to 4

Clay content—0 to 10 percent

Silt content—15 to 35 percent

Sand content—55 to 85 percent

Organic matter content—1 to 4 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—strongly acid to slightly alkaline

2C2 horizon:

Color—hue of 10YR or 2.5Y; value of 2 to 4; chroma of 1 to 3

Texture—extremely cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly sand, very cobbly loamy coarse sand

Clay content—0 to 5 percent

Silt content—0 to 15 percent

Sand content—80 to 95 percent
 Rock fragments—20 to 65 percent rounded indurated gravel; 0 to 45 percent rounded indurated cobbles
 Calcium carbonate equivalent—0 to 1 percent
 Electrical Conductivity (mmhos/cm)—0 to 0.3
 Reaction—very strongly acid to neutral

Typic Gelorthents, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, calcareous, subgelic Typic Gelorthents

Map unit component(s):

Alpine-scrub gravelly moraines, calcareous

Depth class: very deep

Drainage class: well drained

Landform: moraines

Parent material: gravelly till

Elevation: 758 to 1,496 m

Slope: 10 to 45 percent

Annual precipitation: 552 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7CE—Typic Gelorthents, loamy-skeletal-Nonvegetated Drift Association, 0 to 65 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Mount Eielson; UTM coordinates: Zone 5, Easting 631265, Northing 7029341

Representative Pedon

Oe—0 to 1 cm; very dark brown (10YR 2/2) moderately decomposed plant material; many very fine and fine and common medium roots; slightly alkaline; clear smooth boundary.

A—1 to 9 cm; very dark brown (10YR 2/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; slightly effervescent; 2 percent gravel; slightly alkaline; clear smooth boundary.

2C1—9 to 68 cm; very dark gray (5Y 3/1) extremely cobbly loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; common very fine and fine roots; strongly effervescent; 40 percent gravel, 20 percent cobbles; moderately alkaline; gradual smooth boundary.

2C2—68 to 150 cm; very dark gray (5Y 3/1) extremely gravelly loam; massive; friable, nonsticky and nonplastic; slightly effervescent; 60 percent gravel, 10 percent cobbles; slightly alkaline.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0 to -1 °C

Oi horizon:

Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Rock fragments—0 to 15 percent indurated gravel, 0 to 15 percent indurated cobbles; and 0 to 15 percent indurated stones

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.2

Reaction—neutral or slightly alkaline

A horizon:

Color—hue of 10YR to 5Y; value of 2 or 3; chroma of 1 to 3

Texture—very cobbly sandy loam, very gravelly sandy loam, gravelly loam, silt loam

Clay content—0 to 10 percent

Silt content—35 to 55 percent

Sand content—35 to 65 percent

Rock fragments—0 to 55 percent indurated gravel; 0 to 35 percent indurated cobbles; 0 to 10 percent indurated stones

Calcium carbonate equivalent—0 to 2 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—neutral to moderately alkaline

2C horizon:

Color—hue of 2.5Y, 5Y, or N; value of 2.5 to 4; chroma of 1 or 2

Texture—very cobbly sandy loam, very gravelly sandy loam, gravelly loam

Clay content—5 to 15 percent

Silt content—25 to 45 percent

Sand content—40 to 70 percent

Rock fragments—20 to 60 percent indurated gravel; 10 to 35 percent indurated cobbles; 0 to 10 percent indurated stones

Calcium carbonate equivalent—1 to 2 percent

Electrical Conductivity (mmhos/cm)—0.1 to 0.5

Reaction—neutral to moderately alkaline

Typic Gelorthents, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, paramicaceous, subgelic Typic Gelorthents
- Sandy-skeletal, mixed, subgelic Typic Gelorthents

Map unit component(s):

Alpine-dwarf scrub gravelly diorite moraines

Alpine-dwarf scrub-meadow mosaic gravelly fan swales

Alpine-riparian scrub gravelly flood plains

Alpine-riparian scrub gravelly flood plains, cool

Alpine-riparian scrub gravelly schist flood plains

Depth class: very deep

Drainage class: somewhat excessively drained or excessively drained

Landform: flood plains, moraines, mountains

Parent material: gravelly drift derived from diorite, sandy and silty alluvium over sandy and gravelly alluvium, silty alluvium over sandy and gravelly alluvium derived from schist, silty eolian deposits over sandy and gravelly alluvium

Elevation: 609 to 1,974 m

Slope: 0 to 45 percent

Annual precipitation: 446 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7V1—Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal-Typic Historthels, loamy-skeletal Association, 0 to 20 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Middle Sanctuary Valley; UTM coordinates: Zone 6, Easting 383554, Northing 7050800

Representative Pedon

Oi—0 to 5 cm; dark reddish brown (5YR 3/3) slightly decomposed plant material; many very fine and fine, many medium and few coarse roots; extremely acid; abrupt smooth boundary.

AC—5 to 12 cm; very dark brown (10YR 2/2) stratified fine sand to silt; weak medium granular structure; very friable, nonsticky and nonplastic; strongly acid; abrupt wavy boundary.

2C1—12 to 39 cm; black (5Y 2.5/1) stratified very gravelly sand to silt; weak coarse subangular blocky structure; loose, nonsticky and nonplastic; common very fine and fine and few medium roots; 25 percent gravel, 10 percent cobbles; moderately acid; clear smooth boundary.

2C2—39 to 150 cm; black (5Y 2.5/1) extremely cobbly loamy coarse sand; single grain; loose, nonsticky and nonplastic; 40 percent gravel, 20 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0 to -0.5 °C

Depth to contrasting textural stratification: 18 to 27 cm

Thickness of ochric epipedon: 0 to 18 cm

O horizon:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—slightly or moderately decomposed plant material

Organic matter content—60 to 90 percent

Rock fragments—0 to 10 percent rounded indurated gravel; 0 to 10 percent rounded indurated cobbles

Calcium carbonate equivalent: 0 to 2 percent

Reaction—extremely acid to slightly alkaline

A or AC horizons:

Color—hue of 10YR or 2.5Y; value of 2 to 3; chroma of 1 to 3

Texture—gravelly loam, loam, very cobbly sandy loam, stratified sand to silt, stratified fine sand to silt

Clay content—0 to 15 percent

Silt content—15 to 75 percent

Sand content—20 to 75 percent

Organic matter content—0 to 10 percent

Rock fragments—0 to 50 percent subrounded indurated gravel; 0 to 20 percent subrounded indurated cobbles

Calcium carbonate equivalent—0 to 2 percent

Electrical Conductivity (mmhos/cm)—0.1 to 0.5

Reaction—very strongly acid to moderately alkaline

2C or 2AC horizon:

Color—hue of 10YR or 2.5Y; value of 2.5 or 3; chroma of 1 or 2

Texture—extremely cobbly sandy loam, very gravelly sandy loam, extremely cobbly coarse sand, extremely gravelly loamy coarse sand, extremely gravelly coarse sand, stratified very gravelly sand to silt, extremely cobbly loamy coarse sandy, extremely gravelly loamy sand

Clay content—0 to 10 percent

Silt content—5 to 30 percent

Sand content—60 to 95 percent

Rock fragments—20 to 60 percent subrounded indurated gravel; 0 to 40 percent subrounded indurated cobbles

Calcium carbonate equivalent—0 to 2 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—strongly acid to moderately alkaline

Typic Haplocryods, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive Typic Haplocryods
- Loamy-skeletal, paramicaceous, superactive Typic Haplocryods

Map unit component(s):

Alpine-dwarf scrub gravelly diorite till slopes, cool
 Alpine-dwarf scrub gravelly diorite till slopes, warm
 Boreal-forested gravelly schist terraces
 Boreal-forested gravelly till slopes

Depth class: very deep

Drainage class: well drained

Landform: hills, mountains, till plains

Parent material: silty eolian deposits over gravelly alluvium derived from schist, silty eolian deposits over gravelly till, silty volcanic ash and/or eolian deposits over gravelly till, volcanic ash and/or silty eolian deposits over gravelly till derived from diorite

Elevation: 471 to 1,373 m

Slope: 0 to 80 percent

Annual precipitation: 344 to 3,285 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 80 days

Representative Location

Map unit in which located: 5V2—Typic Haplogelods, sandy-skeletal-Typic Historthels, coarse-loamy-Typic Gelorthents, loamy-skeletal Association, 2 to 15 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Hines Creek near Park Headquarters; UTM coordinates: Zone 6, Easting 397601, Northing 7067330

Representative Pedon

Oi—0 to 4 cm; dark brown (7.5YR 3/4) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; extremely acid; clear wavy boundary.

E—4 to 9 cm; dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 2 percent gravel, 5 percent cobbles; extremely acid; abrupt wavy boundary.

2Bs—9 to 22 cm; yellowish red (5YR 4/6) extremely cobbly sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 30 percent gravel, 30 percent cobbles; extremely acid; clear wavy boundary.

2BC—22 to 37 cm; dark yellowish brown (10YR 4/4) extremely cobbly sandy loam; weak coarse subangular blocky structure; friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent gravel, 30 percent cobbles; very strongly acid; clear wavy boundary.

2C1—37 to 58 cm; brown (10YR 4/3) very gravelly sandy loam; massive; friable, nonsticky and nonplastic; few very fine and fine roots; 25 percent gravel, 10 percent cobbles; strongly acid; gradual smooth boundary.

2C2—58 to 96 cm; brown (10YR 4/3) extremely cobbly sandy loam; massive; friable, nonsticky and nonplastic; 30 percent gravel, 30 percent cobbles; moderately acid; gradual smooth boundary.

2C3—96 to 150 cm; brown (10YR 4/3) extremely cobbly sandy loam; massive; friable, nonsticky and nonplastic; 30 percent gravel, 30 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 0 to -2.5 °C

Depth to contrasting textural stratification: 9 to 21 cm

Thickness of albic horizon: 1 to 8 cm

Thickness of spodic horizon: 1 to 18 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—ultra acid to very strongly acid

E horizon:

Color—hue of 5YR to 10YR; value of 4 or 5; chroma of 1 or 2

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—15 to 40 percent

Organic matter content—2 to 8 percent

Rock fragments—0 to 5 percent indurated gravel; 0 to 10 percent cobbles

Reaction—ultra acid to very strongly acid

A horizon (when present):

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—20 to 30 percent

Organic matter content—4 to 8 percent

Rock fragments—0 to 2 percent subangular indurated gravel

Reaction—extremely acid or very strongly acid

Bhs horizon (when present):

Color—hue of 10R to 5YR; value of 2.5 or 3; chroma of 2 or 3

Texture—loam, very fine sandy loam, fine sandy loam

Clay content—0 to 10 percent

Silt content—30 to 45 percent

Sand content—40 to 65 percent

Organic matter content—5 to 10 percent

Rock fragments—0 to 3 percent strongly cemented gravel, 0 to 3 percent subangular cobbles

Reaction—extremely acid or very strongly acid

2Bs horizon:

Color—hue of 2.5YR to 7.5YR; value of 2.5 to 4; chroma of 4 to 6

Texture—extremely cobbly sandy loam, very cobbly sandy loam, gravelly loam, gravelly sandy loam, very gravelly sandy loam, extremely gravelly coarse sandy loam

Clay content—0 to 10 percent

Silt content—15 to 45 percent
 Sand content—45 to 80 percent
 Organic matter content—0 to 1 percent
 Rock fragments—15 to 60 percent strongly cemented gravel; 0 to 40 percent strongly cemented cobbles
 Reaction—extremely acid to strongly acid

2BC horizon:

Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 3 or 4
 Texture—extremely cobbly sandy loam, extremely gravelly coarse sandy loam
 Clay content—0 to 10 percent
 Silt content—25 to 35 percent
 Sand content—65 to 75 percent
 Organic matter content—0 to 1 percent
 Rock fragments—25 to 60 percent strongly cemented gravel; 10 to 40 percent strongly cemented cobbles
 Reaction—extremely acid to strongly acid

2C horizon:

Color—hue of 10YR or 2.5Y; value of 3 to 5; chroma of 2 to 6
 Texture—very cobbly sandy loam, very gravelly loam, gravelly sandy loam, extremely cobbly sandy loam, extremely gravelly sandy loam, extremely gravelly coarse sandy loam
 Clay content—0 to 10 percent
 Silt content—15 to 45 percent
 Sand content—45 to 80 percent
 Rock fragments—0 to 40 percent indurated cobbles; 15 to 60 percent indurated gravel
 Reaction—extremely acid to slightly acid

Typic Haplocryods, sandy

Taxonomic Classification

- Sandy, mixed Typic Haplocryods

Map unit component(s):

Boreal-forested sandy hills

Depth class: very deep

Drainage class: somewhat excessively drained

Landform: hills

Parent material: silty eolian deposits over sandy eolian deposits

Elevation: 170 to 320 m

Slope: 5 to 38 percent

Annual precipitation: 359 to 651 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 3FU3—Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-loamy-Typic Haplocryods, sandy Association, 0 to 38 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Corner Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 561890, Northing 7059660

Representative Pedon

- Oi—0 to 7 cm; light gray (10YR 7/2) and very dark brown (10YR 2/2) slightly decomposed plant material; many very fine and fine, many medium and common coarse roots; extremely acid; abrupt smooth boundary.
- E—7 to 9 cm; grayish brown (10YR 5/2) and brown (7.5YR 4/3) silt loam; weak medium granular structure; very friable, nonsticky and nonplastic; many very fine and fine, common medium and few coarse roots; extremely acid; abrupt wavy boundary.
- Bs—9 to 16 cm; reddish brown (5YR 4/4) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; strongly acid; abrupt wavy boundary.
- 2BC1—16 to 21 cm; dark yellowish brown (10YR 4/6) fine sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; strongly acid; gradual wavy boundary.
- 2BC2—21 to 44 cm; yellowish brown (10YR 5/4) fine sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; moderately acid; gradual wavy boundary.
- 2C1—44 to 83 cm; dark grayish brown (10YR 4/2) fine sand; single grain; loose, nonsticky and nonplastic; slightly acid; diffuse wavy boundary.
- 2C2—83 to 150 cm; dark grayish brown (10YR 4/2) fine sand; single grain; loose, nonsticky and nonplastic; slightly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: 1 to 2 °C

Depth to contrasting textural stratification: 10 to 39 cm

Thickness of albic horizon: 2 to 5 cm

Thickness of spodic horizon: 8 to 22 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 7; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—ultra acid or extremely acid

E horizon:

Color—hue of 5YR to 10YR; value of 4 to 6

Texture—very fine sandy loam, silt loam

Clay content—0 to 10 percent

Silt content—35 to 80 percent

Sand content—20 to 55 percent

Organic matter content—2 to 6 percent

Rock fragments—0 to 3 percent fine gravel

Reaction—very strongly acid to moderately acid

Bs horizon:

Color—hue of 2.5YR to 7.5YR; value of 3 to 5; chroma of 4 to 8

Texture—very fine sandy loam, silt loam

Clay content—0 to 10 percent

Silt content—35 to 80 percent

Sand content—20 to 55 percent

Organic matter content—2 to 5 percent

Rock fragments—0 to 3 percent fine gravel

Reaction—extremely acid to moderately acid

2BC horizon:

Color—hue of 10YR or 2.5Y; value of 4 or 5; chroma of 4 to 8

Texture—fine sand, loamy fine sand

Clay content—0 to 5 percent
 Silt content—5 to 15 percent
 Sand content—80 to 95 percent
 Rock fragments—0 to 3 percent fine gravel
 Reaction—strongly acid to slightly acid

2C horizon:

Color—hue of 10YR or 2.5Y; value of 4 or 5; chroma of 2 to 4
 Texture—loamy fine sand, fine sand
 Clay content—0 to 5 percent
 Silt content—5 to 15 percent
 Sand content—80 to 95 percent
 Rock fragments—0 to 3 percent fine gravel
 Reaction—strongly acid to slightly acid

Typic Haplogelods, coarse-loamy over sandy-skeletal

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, subgelic Typic Haplogelods

Map unit component(s):

Alpine-scrub loamy terraces

Depth class: very deep

Drainage class: somewhat excessively drained

Landform: stream terraces

Parent material: silty eolian deposits over sandy and gravelly alluvium

Elevation: 663 to 1,286 m

Slope: 0 to 10 percent

Annual precipitation: 497 to 1,229 mm

Annual temperature: -8 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7FP21—Typic Haplogelods, sandy-skeletal-Oxyaquic Gelorthents, sandy-skeletal-Typic Haplogelods, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Cache Creek near Muldrow Glacier; UTM coordinates: Zone 5, Easting 611559, Northing 7022044

Representative Pedon

Oi—0 to 5 cm; dark reddish brown (5YR 2.5/2) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; ultra acid; clear wavy boundary.

E/A—5 to 17 cm; dark grayish brown (10YR 4/2) and very dark brown (10YR 2/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine, few medium and few coarse roots; extremely acid; abrupt wavy boundary.

2Bs—17 to 23 cm; strong brown (7.5YR 4/6) stratified fine sand to silt; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; very strongly acid; gradual wavy boundary.

2BC—23 to 34 cm; brown (10YR 5/3) stratified fine sand to silt; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; 2 percent gravel; moderately acid; gradual wavy boundary.

3C1—34 to 68 cm; brown (10YR 5/3) very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; 40 percent gravel; slightly acid; gradual wavy boundary.

3C2—68 to 150 cm; brown (10YR 5/3) extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; 40 percent gravel, 20 percent cobbles, 5 percent tones; slightly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -2 to -0.2 °C

Thickness of albic horizon: 1 to 12 cm

Thickness of spodic horizon: 4 to 19 cm

Oi horizon:

Color—hue of 2.5YR or 5YR; value of 2.5 to 5

Organic matter content—60 to 90 percent

Reaction—extremely acid or very strongly acid

E/A horizon:

A Part: Color—value of 2 to 5; chroma of 2 or 3

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—25 to 35 percent

Organic matter content—4 to 8 percent

Rock fragments—0 to 5 percent subrounded indurated gravel

Reaction—extremely acid or very strongly acid

2Bs horizon:

Color—chroma of 4 to 6

Clay content—0 to 10 percent

Silt content—15 to 35 percent

Sand content—55 to 85 percent

Organic matter content—2 to 4 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Reaction—extremely acid or very strongly acid

2BC horizon:

Color—hue of 10YR or 2.5Y; value of 4 or 5; chroma of 2 or 3

Clay content—0 to 10 percent

Silt content—15 to 35 percent

Sand content—55 to 85 percent

Rock fragments—0 to 5 percent rounded indurated gravel

Reaction—strongly acid to slightly acid

3C horizon:

Color—hue of 10YR or 2.5Y; value of 4 or 5; chroma of 2 or 3

Texture—extremely gravelly coarse sand, very gravelly loamy sand, extremely cobbly coarse sand, very gravelly coarse sand

Clay content—0 to 5 percent

Silt content—0 to 20 percent

Sand content—75 to 100 percent

Rock fragments—25 to 70 percent rounded indurated gravel; 10 to 30 percent rounded indurated cobbles; 0 to 5 percent stones

Reaction—moderately acid to neutral

Typic Haplogelods, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, subgelic Typic Haplogelods

Map unit component(s):

Alpine-scrub gravelly diorite till slopes

Alpine-scrub gravelly slopes

Alpine-scrub gravelly till slopes

Depth class: very deep

Drainage class: well drained

Landform: escarpments, hills, mountains, till plains

Parent material: silty eolian deposits over gravelly residuum, silty eolian deposits over gravelly till, silty eolian deposits over gravelly till derived from diorite

Elevation: 417 to 1,792 m

Slope: 4 to 60 percent

Annual precipitation: 506 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 80 days

Representative Location

Map unit in which located: 7TP8—Typic Haplogelods, loamy-skeletal-Typic Dystrogelepts, sandy-skeletal-(Oxyaquic) Humic Eutrogelepts, loamy-skeletal Association, 2 to 35 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Cache Creek near Muldrow Glacier; UTM coordinates: Zone 5, Easting 611172, Northing 7021609

Representative Pedon

Oi—0 to 2 cm; very dusky red (2.5YR 2.5/2) slightly decomposed plant material; many very fine and fine and common medium roots; extremely acid; abrupt wavy boundary.

A—2 to 5 cm; very dusky red (2.5YR 2.5/2) and very dark brown (10YR 2/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine roots; 2 percent gravel; extremely acid; clear wavy boundary.

E—5 to 9 cm; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine roots; 10 percent gravel; extremely acid; clear smooth boundary.

2Bs1—9 to 29 cm; dark reddish brown (5YR 3/4) very cobbly sandy loam; weak medium subangular blocky structure; friable, nonsticky and nonplastic; common very fine and fine roots; 25 percent gravel, 20 percent cobbles; strongly acid; gradual smooth boundary.

2Bs2—29 to 41 cm; dark reddish brown (5YR 3/4) very cobbly sandy loam; massive; friable, nonsticky and nonplastic; few very fine and fine roots; 20 percent gravel, 20 percent cobbles; moderately acid; gradual smooth boundary.

2C1—41 to 71 cm; yellowish brown (10YR 5/4) very cobbly sandy loam; massive; friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent gravel, 20 percent cobbles; moderately acid; gradual smooth boundary.

2C2—71 to 150 cm; yellowish brown (10YR 5/4) very cobbly sandy loam; massive; friable, nonsticky and nonplastic; 30 percent gravel, 20 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -2 to -0.2 °C

Depth to contrasting textural stratification: 9 to 21 cm

Thickness of albic horizon: 1 to 6 cm

Thickness of ochric epipedon: 3 to 6 cm

Thickness of spodic horizon: 13 to 42 cm

O_i horizon:

Color—2.5YR, 5YR, 7.5YR, or 10YR; value 2 to 3; chroma 1 to 4

Organic matter content—60 to 90 percent

Reaction—extremely acid or very strongly acid

A horizon:

Color—2.5YR, 5YR, 7.5YR, or 10YR; value 2 or 3; chroma 1 or 2

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—10 to 30 percent

Organic matter content—4 to 8 percent

Rock fragments—0 to 2 percent indurated gravel

Reaction—extremely acid or very strongly acid

E horizon:

Color—5YR, 7.5YR, or 10YR; value 4 or 5; chroma 2 or 3

Texture—silt loam

Clay content—0 to 10 percent

Silt content—60 to 80 percent

Sand content—5 to 20 percent

Organic matter content—2 to 4 percent

Rock fragments—0 to 2 percent indurated gravel

Reaction—extremely acid or very strongly acid

2B_{hs} or 2B_s horizons:

Color—10R, 2.5YR, 5YR, or 7.5YR; value 2.5 through 5; chroma 2 to 6

Texture—very cobbly sandy loam, very gravelly sandy loam, gravelly loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—45 to 80 percent

Organic matter content—0 to 1 percent

Rock fragments—10 to 45 percent indurated gravel, 0 to 30 percent indurated cobbles

Reaction—very strongly acid or strongly acid

2C horizon:

Color—10YR, 2.5YR, or 5YR; value 3 to 5; chroma 1 to 4

Texture—very gravelly sandy loam, very cobbly sandy loam, gravelly loam, extremely stony sandy loam

Clay content—0 to 10 percent

Silt content—10 to 45 percent

Sand content—45 to 80 percent

Rock fragments—10 to 40 percent subangular indurated gravel; 5 to 30 percent indurated cobbles; 0 to 30 percent indurated boulders

Reaction—very strongly acid to slightly acid

Typic Haplogelods, sandy-skeletal

Taxonomic Classification

- Sandy-skeletal, mixed, subgelic Typic Haplogelods
- Sandy-skeletal, paramicaceous, subgelic Typic Haplogelods

Map unit component(s):

Alpine-scrub gravelly outwash slopes
 Alpine-scrub gravelly schist terraces
 Alpine-scrub gravelly terraces
 Alpine-scrub mosaic gravelly diorite terraces

Depth class: very deep

Drainage class: somewhat excessively drained

Landform: hills, pitted outwash plains, stream terraces, alluvial fans, mountains

Parent material: silty eolian deposits over sandy and gravelly alluvium, silty eolian deposits over sandy and gravelly alluvium derived from diorite, silty eolian deposits over sandy and gravelly alluvium derived from schist, silty eolian deposits over sandy and gravelly outwash

Elevation: 280 to 1,514 m

Slope: 0 to 25 percent

Annual precipitation: 344 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 80 days

Representative Location

Map unit in which located: 7V11—Typic Gelorthents, sandy-skeletal-Riverwash-Typic Haplogelods, sandy-skeletal Association, 0 to 15 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Upper Savage River; UTM coordinates: Zone 6, Easting 389019, Northing 7055957

Representative Pedon

Oi—0 to 8 cm; black (10YR 2/1) slightly decomposed plant material; many very fine and fine, common medium and common coarse roots; clear smooth boundary.

E—8 to 10 cm; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam; weak medium granular structure; very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; extremely acid; abrupt wavy boundary.

Bs—10 to 15 cm; dark reddish brown (5YR 3/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; extremely acid; clear wavy boundary.

2Bs/C—15 to 21 cm; dark reddish brown (5YR 3/2) and black (2.5Y 2.5/1) loamy sand; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; very strongly acid; diffuse irregular boundary.

2C1—21 to 40 cm; black (10YR 2/1) gravelly sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 20 percent gravel; moderately acid; gradual smooth boundary.

2C2—40 to 150 cm; black (10YR 2/1) extremely gravelly loamy sand; single grain; loose, nonsticky and nonplastic; 60 percent gravel, 10 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.5 to -2.5 °C

Depth to contrasting textural stratification: 15 to 31 cm

Thickness of ochric epipedon: 0 to 17 cm

Thickness of spodic horizon: 8 to 32 cm

Oi horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 through 4
Organic matter content—60 to 90 percent
Reaction—extremely acid or very strongly acid

E horizon:

Color—hue of 7.5YR or 10YR; value of 4 to 6; chroma of 1 to 3
Clay content—0 to 10 percent
Silt content—55 to 75 percent
Sand content—20 to 45 percent
Organic matter content—4 to 8 percent
Rock fragments—0 to 5 percent indurated gravel
Reaction—extremely acid or very strongly acid

Bs horizon:

Color—hue of 10R to 7.5YR; value of 2.5 to 4; chroma of 2 to 6
Texture—silt loam, loam
Clay content—5 to 10 percent
Silt content—45 to 75 percent
Sand content—20 to 45 percent
Organic matter content—2 to 5 percent
Rock fragments—0 to 10 percent indurated gravel
Reaction—extremely acid to strongly acid

2Bs or 2Bs/C horizon:

Color—hue of 2.5YR to 7.5YR; value of 3 or 4; chroma of 2 to 6
Texture—extremely gravelly loamy coarse sand, extremely cobbly loamy sand, extremely gravelly coarse sand, loamy sandy
Clay content—0 to 5 percent
Silt content—0 to 30 percent
Sand content—70 to 95 percent
Rock fragments—0 to 70 percent rounded indurated gravel; 0 to 30 percent rounded indurated cobbles
Reaction—extremely acid to strongly acid

2C or 3C horizon:

Color—hue of 10YR to N; value of 2 to 4; chroma of 1 to 4
Texture—extremely gravelly coarse sand, extremely cobbly loamy sand, extremely gravelly loamy coarse sand, gravelly sand, extremely gravelly loamy sand
Clay content—0 to 5 percent
Silt content—0 to 30 percent
Sand content—70 to 95 percent
Rock fragments—0 to 30 percent rounded indurated cobbles; 25 to 70 percent rounded indurated gravel
Reaction—strongly acid to slightly acid

Typic Haplogelolls, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, mixed, superactive, subgelic Typic Haplogelolls

Map unit component(s):

- Alpine-dwarf scrub dark gravelly colluvial slopes
- Alpine-dwarf scrub dark gravelly colluvial slopes, moist

Depth class: moderately deep to very deep

Drainage class: well drained

Landform: mountains

Parent material: silty eolian deposits over gravelly colluvium derived from shale

Elevation: 656 to 1,806 m

Slope: 25 to 70 percent

Annual precipitation: 552 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 70 days

Representative Location

Map unit in which located: 7MSHD—Rock Outcrop-Typic Haplogelolls, loamy-skeletal Association, 25 to 150 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Upper Muldrow Glacier; UTM coordinates: Zone 5, Easting 634955, Northing 7021998

Representative Pedon

Oe—0 to 3 cm; reddish black (2.5YR 2.5/1) moderately decomposed plant material; common very fine and fine roots; 5 percent gravel, 5 percent cobbles; slightly alkaline; abrupt smooth boundary.

A1—3 to 9 cm; very dark brown (10YR 2/2) silt loam; weak thin platy structure; very friable, nonsticky and nonplastic; common very fine and fine roots; slightly effervescent; 5 percent gravel, 5 percent cobbles; slightly alkaline; clear wavy boundary.

2A2—9 to 48 cm; black (10YR 2/1) very channery loam; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; slightly effervescent; 40 percent channers, 10 percent flagstones; slightly alkaline; gradual wavy boundary.

2C—48 to 72 cm; very dark gray (2.5Y 3/1) extremely channery loam; massive; very friable, nonsticky and nonplastic; few very fine and fine roots; slightly effervescent; 55 percent channers, 25 percent flagstones; slightly alkaline; abrupt wavy boundary.

2Cr—72 to 150 cm; fractured bedrock.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -2 to -0.2 °C

Depth to contrasting textural stratification: 5 to 20 cm

Depth to bedrock (paralithic): 53 to 150 cm

Thickness of mollic epipedon: 20 to 50 cm

O horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 5; chroma of 1 to 4

Texture—slightly and moderately decomposed plant material

Organic matter content—60 to 90 percent

Rock fragments—0 to 2 percent angular shale fragments strongly cemented channers

Reaction—extremely acid to slightly alkaline

A1 horizon:

Color—chroma of 1 or 2

Texture—mucky silt loam, silt loam

Clay content—5 to 10 percent

Silt content—50 to 70 percent

Sand content—20 to 40 percent

Organic matter content—6 to 12 percent

Rock fragments—2 to 10 percent angular shale strongly cemented channers

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—moderately acid to slightly alkaline

2A2 horizon:

Color—hue of 10YR to 5Y; value of 2 to 3; chroma of 1 to 3

Texture—very channery loam, extremely flaggy loam, extremely channery loam

Clay content—5 to 15 percent

Silt content—35 to 50 percent

Sand content—35 to 50 percent

Organic matter content—4 to 8 percent

Rock fragments—0 to 40 percent angular sedimentary rock fragments strongly cemented flagstones; 30 to 60 percent angular sedimentary rock fragments strongly cemented channers; 0 to 10 percent angular strongly cemented stones

Calcium carbonate equivalent—0 to 2 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—moderately acid to moderately alkaline

2C horizon:

Color—hue of 10YR to N; value of 2.5 or 3; chroma of 1 or 2

Texture—extremely channery loam, extremely flaggy loam, very channery loam

Clay content—10 to 15 percent

Silt content—35 to 50 percent

Sand content—35 to 50 percent

Rock fragments—30 to 60 percent angular sedimentary rock fragments strongly cemented channers; 5 to 40 percent angular sedimentary rock fragments strongly cemented flagstones; 0 to 10 percent angular strongly cemented stones

Calcium carbonate equivalent—0 to 2 percent

Electrical Conductivity (mmhos/cm)—0 to 0.5

Reaction—moderately acid to moderately alkaline

Typic Historthels, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic Typic Historthels
- Coarse-loamy, mixed, superactive, subgelic Typic Historthels
- Coarse-loamy, paramicaceous, superactive, subgelic Typic Historthels

Map unit component(s):

Alpine-scrub gravelly schist colluvial toeslopes, frozen
 Boreal-taiga deep loamy terraces, frozen
 Boreal-taiga high elevation loamy terraces, frozen
 Boreal-taiga loamy channels, frozen
 Boreal-taiga loamy drift slopes, frozen
 Boreal-taiga loamy eolian slopes, frozen
 Boreal-taiga mica rich loamy channels, frozen
 Boreal-taiga mica rich loamy terraces, frozen

Depth class: shallow to very deep

Drainage class: very poorly drained or poorly drained

Landform: outwash plains, plains, stream terraces, alluvial fans, mountains

Parent material: mossy organic material and/or woody organic material over sandy and silty alluvium derived from schist, loamy drift, and loamy eolian deposits

Elevation: 149 to 1,226 m

Slope: 0 to 25 percent

Annual precipitation: 336 to 1,229 mm

Annual temperature: -8 to -2 °C

Frost-free period: 50 to 110 days

Representative Location

Map unit in which located: 1STW—Typic Histoturbels, coarse-silty-Typic Historthels, coarse-loamy Association in the Denali National Park Area, Alaska

General location in survey area: Billberg Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 563602, Northing 7085766

Representative Pedon

Oi—0 to 22 cm; dark reddish brown (5YR 2.5/2) slightly decomposed plant material; many very fine and fine, many medium and many coarse roots; ultra acid; clear smooth boundary.

A—22 to 31 cm; black (10YR 2/1) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; very strongly acid; clear smooth boundary.

2C—31 to 53 cm; very dark grayish brown (2.5Y 3/2) stratified sand to silt; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 10 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 35 percent of horizon); 2 mm dark gray (5Y 4/1) low chroma redox depletions (approximately 10 percent of horizon); strongly acid; abrupt smooth boundary.

2Cf—53 to 150 cm; very dark grayish brown (2.5Y 3/2) permanently frozen stratified sand to silt; 10 mm dark reddish brown (5YR 3/4) high chroma redox concentrations (approximately 35 percent of horizon); 2 mm dark gray (5Y 4/1) low chroma redox depletions (approximately 10 percent of horizon); strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1 °C

Depth to contrasting textural stratification: 33 to 62 cm

Depth to permafrost: 33 to 62 cm

Thickness of histic epipedon: 21 to 41 cm

O_i horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 5; chroma of 1 to 6

Organic matter content—60 to 90 percent

Reaction—ultra acid to slightly acid

A and A/C horizons:

A Color—hue of 10YR to 5Y; value of 2 to 4; chroma of 1 to 3

Texture—silt loam, mucky silt loam, very fine sandy loam

Clay content—0 to 15 percent

Silt content—40 to 75 percent

Sand content—15 to 55 percent

Organic matter content—2 to 20 percent

Rock fragments—0 to 2 percent indurated gravel

Reaction—extremely acid to neutral

C_g, 2C, C_g/O_{eb}, and 2C_g horizons:

Color—hue of 10YR to N; value of 2.5 to 5; chroma of 1 to 3

Texture—stratified sand to silt, stratified gravelly sand to silt, silt loam, fine sandy loam, sandy loam, gravelly sandy loam, gravelly loam, stratified silt to fine sand to muck

Clay content—0 to 15 percent

Silt content—20 to 70 percent

Sand content—15 to 75 percent

Organic matter content—0 to 12 percent

Rock fragments—0 to 30 percent very strongly cemented gravel; 0 to 10 percent indurated cobbles

Reaction—very strongly acid to neutral

C_{gf}, C_f, and 2C_f horizons:

Color—hue of 10YR to N; value of 2.5 to 5; chroma of 1 to 5

Texture—stratified fine sand to silt, fine sandy loam, sandy loam, gravelly sandy loam, gravelly loam, stratified sand to silt, gravelly silt loam, loam, extremely gravelly coarse sand, very cobbly sand, stratified gravelly sand to silt

Clay content—0 to 15 percent

Silt content—20 to 65 percent

Sand content—15 to 75 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 30 percent indurated cobbles; 0 to 5 percent indurated gravel

Reaction—very strongly acid to neutral

Typic Historthels, coarse-loamy over sandy-skeletal

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, subgelic Typic Historthels
- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, subgelic Typic Historthels

Map unit component(s):

Alpine-scrub loamy diorite terraces, frozen
Alpine-scrub-sedge loamy terraces, frozen
Boreal-taiga loamy terraces, frozen

Depth class: shallow to very deep

Drainage class: poorly drained

Landform: stream terraces

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over sandy and silty alluvium over sandy and gravelly alluvium

Elevation: 195 to 1,569 m

Slope: 0 to 17 percent

Annual precipitation: 359 to 2,466 mm

Annual temperature: -11 to -2 °C

Frost-free period: 50 to 110 days

Representative Location

Map unit in which located: 2ST—Typic Eutrocryepts, sandy-skeletal-Typic Historthels, coarse-loamy over sandy-skeletal Complex in the Denali National Park Area, Alaska

General location in survey area: Lower Herron Creek in Minchumina Basin; UTM coordinates: Zone 5, Easting 551545, Northing 7008437

Representative Pedon

Oi—0 to 20 cm; dark yellowish brown (10YR 3/4) and very dark brown (10YR 2/2) peat; many very fine and fine, many medium and few coarse roots; extremely acid; clear wavy boundary.

Oe—20 to 37 cm; very dark brown (10YR 2/2) mucky peat; many very fine and fine and common medium roots; extremely acid; abrupt wavy boundary.

A—37 to 41 cm; very dark brown (10YR 2/2) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; extremely acid; clear wavy boundary.

2C—41 to 44 cm; dark olive gray (5Y 3/2) stratified sand to silt; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; extremely acid; abrupt wavy boundary.

2Cf1—44 to 90 cm; dark olive gray (5Y 3/2) permanently frozen stratified sand to silt; extremely acid; clear wavy boundary.

3Cf2—90 to 150 cm; dark olive gray (5Y 3/2) permanently frozen extremely cobbly coarse sand; 40 percent gravel, 20 percent cobbles; moderately acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1 °C

Depth to contrasting textural stratification: 41 to 68 cm

Depth to permafrost: 41 to 68 cm

Depth to strongly contrasting textural stratification: 22 to 31 cm

Thickness of histic epipedon: 20 to 41 cm

Oi and Oe horizons:

Color—hue of 2.5YR to 10YR; value of 2 to 4; chroma of 1 to 4

Organic matter content—60 to 90 percent

Reaction—ultra acid to moderately acid

A horizon:

Color—value of 2 to 3; chroma of 2 or 3

Texture—mucky silt loam, silt loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—10 to 20 percent

Rock fragments—0 to 5 percent indurated gravel

Reaction—ultra acid to strongly acid

2C and Cg horizons:

Color—hue of 10YR to N; value of 2 to 4; chroma of 1 to 4

Texture—stratified gravelly sand to silt, stratified sand to silt

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Rock fragments—0 to 20 percent indurated gravel; 0 to 5 percent indurated cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—extremely acid to slightly acid

2Cf1 and 3Cf2 horizons:

Color—hue of 10YR to N; value of 2 to 4; chroma of 1 to 3

Texture—extremely cobbly loamy coarse sand, extremely gravelly coarse sand, very cobbly loamy coarse sand, stratified sand to silt, extremely cobbly coarse sand

Clay content—0 to 5 percent

Silt content—0 to 40 percent

Sand content—55 to 95 percent

Organic matter content—0 to 2 percent

Rock fragments—0 to 55 percent rounded indurated gravel; 0 to 35 percent rounded indurated cobbles

Calcium carbonate equivalent—0 to 1 percent

Electrical Conductivity (mmhos/cm)—0 to 0.1

Reaction—very strongly acid to slightly alkaline

Typic Historthels, coarse-silty

Taxonomic Classification

- Coarse-silty, mixed, superactive, subgelic Typic Historthels
- Coarse-silty, mixed, superactive, subgelic Typic Historthels

Map unit component(s):

Boreal-taiga high elevation silty loess slopes, frozen
 Boreal-taiga mica rich silty colluvial slopes, frozen
 Boreal-taiga mica rich silty frozen colluvial slopes, Kuskokwim Mountains
 Boreal-taiga silty colluvial slopes, frozen
 Boreal-taiga silty loess slopes, frozen
 Boreal-taiga silty outwash plains, frozen

Depth class: shallow to moderately deep

Drainage class: poorly drained

Landform: hills, mountains, plains, plateaus, outwash plains

Parent material: mossy organic material and/or woody organic material over silty alluvium, mossy organic material and/or woody organic material over silty colluvium, mossy organic material and/or woody organic material over silty colluvium derived from schist, mossy organic material and/or woody organic material over silty eolian deposits

Elevation: 153 to 997 m

Slope: 0 to 20 percent

Annual precipitation: 336 to 651 mm

Annual temperature: -3 to -1 °C

Frost-free period: 60 to 110 days

Representative Location

Map unit in which located: 3FU4—Typic Historthels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 2 to 35 percent slopes in the Denali National Park Area, Alaska

General location in survey area: White Creek in Minchumina Basin; UTM coordinates: Zone 5, Easting 553370, Northing 7018847

Representative Pedon

Oi—0 to 9 cm; dark reddish brown (5YR 3/4) peat; any very fine and fine, many medium and many coarse roots; extremely acid; clear smooth boundary.

Oe—9 to 23 cm; very dark brown (10YR 2/2) mucky peat; many very fine and fine, common medium and few coarse roots; extremely acid; clear smooth boundary.

A—23 to 39 cm; very dark brown (10YR 2/2) mucky silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; many very fine and fine roots; extremely acid; abrupt wavy boundary.

Cf1—39 to 49 cm; very dark gray (2.5Y 3/1) and dark brown (10YR 3/3) permanently frozen silt loam; few very fine and fine roots; very strongly acid; gradual wavy boundary.

Cf2—49 to 150 cm; very dark gray (2.5Y 3/1) permanently frozen silt loam; strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1 °C

Depth to permafrost: 35 to 62 cm

Thickness of histic epipedon: 20 to 34 cm

Oi and Oe horizon:

Color—hue of 2.5YR to 10YR; value of 2 to 4; chroma of 1 to 4
 Organic matter content—60 to 90 percent
 Reaction—extremely acid to strongly acid

A horizon:

Color—value of 2 or 3; chroma of 1 to 3
 Texture—mucky silt loam, silt loam
 Clay content—0 to 10 percent
 Silt content—55 to 75 percent
 Sand content—15 to 35 percent
 Organic matter content—8 to 16 percent
 Reaction—extremely acid to moderately acid

Cg horizon (when present):

Color—hue of 10YR to 5Y; value of 3 or 4; chroma of 1 or 2
 Texture—silt loam
 Clay content—0 to 10 percent
 Silt content—55 to 75 percent
 Sand content—15 to 35 percent
 Organic matter content—4 to 9 percent
 Reaction—very strongly acid to slightly acid

Cgf and Cf horizons:

Color—hue of 10YR to 5Y; value of 3 or 4; chroma of 1 or 2
 Texture—silt loam, very fine sandy loam
 Clay content—0 to 10 percent
 Silt content—55 to 75 percent
 Sand content—15 to 35 percent
 Organic matter content—4 to 9 percent
 Reaction—very strongly acid to neutral

Typic Historthels, loamy-skeletal

Taxonomic Classification

- Loamy-skeletal, paramicaceous, superactive, subgelic Typic Historthels
- Loamy-skeletal, mixed, superactive, subgelic Typic Historthels
- Loamy-skeletal, paramicaceous, superactive, subgelic Typic Historthels

Map unit component(s):

Alpine-scrub-sedge gravelly slopes, frozen
 Alpine-scrub-sedge gravelly till slopes, frozen
 Alpine-sedge-dwarf scrub gravelly schist slopes, frozen
 Alpine-sedge-dwarf scrub gravelly swales, frozen
 Boreal-taiga gravelly schist slopes, frozen
 Boreal-taiga gravelly slopes, frozen
 Boreal-taiga gravelly till slopes, frozen
 Boreal-taiga silty schist slopes, frozen

Depth class: shallow to very deep

Drainage class: very poorly drained or poorly drained

Landform: hills, mountains, till plains, plateaus

Parent material: mossy organic material and/or woody organic material over silty eolian deposits over gravelly colluvium derived from schist, mossy organic material and/or woody organic material over silty eolian deposits over gravelly residuum, mossy organic material and/or woody organic material over silty eolian deposits over gravelly till, woody organic material and/or grassy organic material over silty eolian deposits over gravelly till

Elevation: 194 to 1,920 m

Slope: 0 to 30 percent

Annual precipitation: 345 to 2,466 mm

Annual temperature: -11 to -1 °C

Frost-free period: 50 to 100 days

Representative Location

Map unit in which located: TTP—Typic Historthels, loamy-skeletal-(Oxyaquic) Humic Eutrogelepts, coarse-loamy-Ruptic-Histic Aquiturbels, coarse-loamy Association, 0 to 16 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Savage River; UTM coordinates: Zone 6, Easting 386574, Northing 7063669

Representative Pedon

Oi—0 to 14 cm; very dark brown (7.5YR 2.5/3) peat; many very fine and fine, many medium and many coarse roots; extremely acid; gradual smooth boundary.

Oe—14 to 29 cm; black (10YR 2/1) mucky peat; many very fine and fine and common medium roots; strongly acid; clear smooth boundary.

A—29 to 32 cm; black (10YR 2/1) mucky silt loam; weak thick platy structure; very friable, nonsticky and nonplastic; common very fine and fine roots; strongly acid; clear smooth boundary.

2Cgf1—32 to 41 cm; dark gray (5Y 4/1) and strong brown (7.5YR 4/6) permanently frozen gravelly loam; 15 percent gravel, 5 percent cobbles; strongly acid; gradual wavy boundary.

2Cgf2—41 to 150 cm; dark gray (5Y 4/1) permanently frozen very gravelly loam; 30 percent gravel, 5 percent cobbles; strong brown (7.5YR 4/6) high chroma redox concentrations (approximately 15 percent of horizon); strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -1 to -2.5 °C

Depth to contrasting textural stratification: 25 to 49 cm

Depth to permafrost: 25 to 49 cm

Depth to bedrock (paralithic): 70 to over 150 cm

Thickness of histic epipedon: 20 to 36 cm

Oi and Oe horizons:

Color—hue of 2.5YR to 10YR; value of 2 to 5; chroma of 1 to 4

Texture—peat, mucky peat

Organic matter content—60 to 90 percent

Reaction—ultra acid to neutral

A horizon:

Color—hue of 2.5YR to 10YR; value of 2 or 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam, gravelly silt loam, mucky gravelly loam

Clay content—0 to 15 percent

Silt content—40 to 75 percent

Sand content—15 to 50 percent

Organic matter content—6 to 20 percent

Rock fragments—0 to 20 percent indurated gravel; 0 to 10 percent angular mixed rock fragments strongly cemented cobbles; 0 to 20 percent strongly cemented channers

Reaction—extremely acid to neutral

2Cg horizon (when present):

Color—hue of 10YR to N; value of 2.5 to 5; chroma of 1 to 4

Texture—very gravelly silt loam, very channery silt loam, very gravelly loam, very channery loam, very gravelly sandy loam, very cobbly sandy loam, gravelly loam

Clay content—0 to 20 percent

Silt content—10 to 65 percent

Sand content—25 to 80 percent

Rock fragments—10 to 55 percent strongly cemented gravel; 0 to 25 percent strongly cemented cobbles; 0 to 25 percent strongly cemented flagstones; 10 to 40 percent strongly cemented channers

Reaction—very strongly acid to neutral

2Cgf and 2Cf horizons:

Color—hue of 10YR to N; value of 2.5 to 5; chroma of 1 to 4

Texture—very gravelly silt loam, very channery silt loam, very gravelly loam, very cobbly loam, very gravelly sandy loam, very cobbly sandy loam, gravelly loam, extremely channery silt loam, extremely flaggy loam

Clay content—0 to 20 percent

Silt content—5 to 65 percent

Sand content—25 to 80 percent

Rock fragments—0 to 55 percent strongly cemented gravel; 0 to 40 percent strongly cemented cobbles; 0 to 60 percent strongly cemented flagstones; 5 to 60 percent strongly cemented channers

Reaction—very strongly acid to neutral

Typic Histoturbels, coarse-loamy

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic Typic Histoturbels

Map unit component(s):

Boreal-taiga/tussock loamy eolian slopes, frozen

Depth class: shallow to moderately deep

Drainage class: very poorly drained

Landform: plains

Parent material: grassy organic material over loamy cryoturbate over loamy eolian deposits

Elevation: 170 to 320 m

Slope: 0 to 4 percent

Annual precipitation: 359 to 651 mm

Annual temperature: -3 to -2 °C

Frost-free period: 80 to 110 days

Representative Location

Map unit in which located: 3FU3—Typic Historthels, coarse-loamy-Typic Histoturbels, coarse-loamy-Typic Haplocryods, sandy Association, 0 to 38 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Hot Slough in Minchumina Basin; UTM coordinates: Zone 5, Easting 544229, Northing 7062906

Representative Pedon

Oi—0 to 24 cm; dark reddish brown (5YR 2.5/2) peat; many very fine and fine and few medium roots; extremely acid; clear wavy boundary.

A—24 to 46 cm; very dark brown (10YR 2/2) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; common very fine and fine roots; moderately acid; abrupt broken boundary.

C/Afjj—46 to 58 cm; brown (10YR 4/3) and dark brown (10YR 3/3) permanently frozen mixed fine sandy loam and silt loam; strongly acid; abrupt broken boundary.

Cf—58 to 150 cm; brown (10YR 4/3) permanently frozen fine sandy loam; moderately acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1 °C

Depth to permafrost: 38 to 66 cm

Thickness of histic epipedon: 24 to 36 cm

Oi horizons:

Color—hue of 5YR to 10YR; value of 2 to 3; chroma of 1 to 3

Organic matter content—60 to 90 percent

Reaction—ultra acid or extremely acid

A horizon:

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—25 to 35 percent

Organic matter content—6 to 10 percent

Reaction—very strongly acid to moderately acid

C/Afjj horizon:

Cg Color—hue of 2.5Y to 5GY, and N; value of 3 to 5; chroma of 1 or 2

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Organic matter content—6 to 12 percent

Reaction—strongly acid to slightly acid

Cf horizon:

Color—hue of 10YR or 2.5Y; value of 2 to 4; chroma of 1 to 3

Clay content—0 to 5 percent

Silt content—20 to 40 percent

Sand content—55 to 75 percent

Organic matter content—0 to 2 percent

Reaction—strongly acid to slightly acid

Typic Histoturbels, coarse-silty

Taxonomic Classification

- Coarse-silty, mixed, superactive, subgelic Typic Histoturbels

Map unit component(s):

Alpine-scrub-sedge silty hummocks, frozen
 Alpine-tussock-scrub mica rich silty slopes, Kuskokwim Mountains
 Alpine-tussock-scrub mica rich silty slopes, frozen
 Alpine-tussock-scrub silty loess slopes, frozen
 Boreal-taiga/tussock silty loess slopes, frozen
 Boreal-taiga/tussock mica rich silty loess slopes, frozen
 Boreal-taiga/tussock silty colluvial slopes, frozen
 Boreal-taiga/tussock silty loess slopes, frozen
 Boreal-taiga/tussock silty terraces, frozen
 Boreal-taiga/tussock silty frozen terraces, Alaska Mountains
 Boreal-taiga/tussock mica rich silty terraces, frozen
 Boreal-tussock-scrub mica rich silty loess slopes, frozen

Depth class: shallow to moderately deep

Drainage class: very poorly drained or poorly drained

Landform: basin floors, hills, mountains, outwash plains, plains, plateaus, stream terraces

Parent material: grassy organic material over sandy and silty cryoturbate, grassy organic material over silty colluvium and/or silty cryoturbate, grassy organic material over silty cryoturbate, grassy organic material over silty cryoturbate derived from schist, grassy organic material over silty cryoturbate over silty alluvium, grassy organic material over silty cryoturbate over silty eolian deposits, mossy organic material and/or woody organic material over silty cryoturbate, mossy organic material and/or woody organic material over silty cryoturbate over gravelly cryoturbate derived from schist, woody organic material and/or grassy organic material over silty cryoturbate, woody organic material and/or grassy organic material over silty cryoturbate over silty eolian deposits

Elevation: 149 to 1,119 m

Slope: 0 to 20 percent

Annual precipitation: 336 to 1,229 mm

Annual temperature: -8 to -1 °C

Frost-free period: 50 to 110 days

Representative Location

Map unit in which located: 2FG—Typic Histoturbels, coarse-silty-Glacic Folistels, dysic Association in the Denali National Park Area, Alaska

General location in survey area: About 8 kilometers south of Chilchukabena Lake in Minchumina Basin; UTM coordinates: Zone 5, Easting 573334, Northing 7078134

Representative Pedon

Oi—0 to 19 cm; dark reddish brown (2.5YR 2.5/3) peat; many very fine and fine, many medium and few coarse roots; very strongly acid; abrupt irregular boundary.
 Oe/Oajj—19 to 48 cm; dark yellowish brown (10YR 3/4) and black (10YR 2/1) mixed mucky peat and muck; many very fine and fine and common medium roots; moderately acid; abrupt broken boundary.
 Cg/Oajj—48 to 64 cm; very dark gray (5Y 3/1) and very dark brown (10YR 2/2) mixed silt loam and highly decomposed plant material; massive; very friable, nonsticky and nonplastic; many very fine and fine roots; slightly acid; abrupt broken boundary.
 Cgf—64 to 150 cm; very dark gray (5Y 3/1) permanently frozen stratified very fine sand to silt; strongly acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -0.2 to -1 °C

Depth to permafrost: 51 to 82 cm

Thickness of histic epipedon: 19 to 52 cm

O horizons:

Color—hue of 2.5YR to 10YR; value of 2 to 4; chroma of 1 to 4

Texture—peat, mucky peat, muck

Organic matter content—60 to 90 percent

Reaction—ultra acid to moderately acid

A horizon:

Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma of 1 or 2

Texture—mucky silt loam, silt loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—10 to 20 percent

Reaction—extremely acid to moderately acid

Cg/Oajj horizon:

Cg Color—hue of 2.5Y to N; value of 3 or 4; chroma of 1 or 2

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—12 to 20 percent

Reaction—very strongly acid to slightly acid

Cgf horizon:

Color—hue of 2.5Y to 5GY, and N; value of 3 or 4; chroma of 1 or 2

Texture—stratified very fine sand to silt, silt loam, very fine sandy loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—4 to 9 percent

Reaction—very strongly acid to neutral

Typic Histoturbels, loamy-skeletal***Taxonomic Classification***

- Loamy-skeletal, paramicaceous, superactive, subgelic Typic Histoturbels

Map unit component(s):

Alpine-scrub-sedge gravelly schist hummocks, frozen

Alpine-scrub-sedge-gravelly schist hummocks, frozen

Alpine-tussock-scrub gravelly schist slopes, frozen

Depth class: shallow to very deep

Drainage class: very poorly drained or poorly drained

Landform: mountain slopes, mountains

Parent material: mossy organic material and/or woody organic material over silty and gravelly cryoturbate derived from schist

Elevation: 197 to 1,238 m

Slope: 0 to 20 percent

Annual precipitation: 356 to 1,229 mm

Annual temperature: -8 to -2 °C

Frost-free period: 50 to 80 days

Representative Location

Map unit in which located: 8LM1—Typic Histoturbels, loamy-skeletal-Ruptic-Histic Aquiturbels, loamy-skeletal Association, 0 to 20 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Upper Sandless Creek in Minchumina Basin; UTM coordinates: Zone 5, Easting 622402, Northing 7090930

Representative Pedon

Oi—0 to 20 cm; dark brown (7.5YR 3/4) peat; extremely acid; abrupt irregular boundary.

A/Oajj—20 to 34 cm; very dark grayish brown (2.5Y 3/2) and dark reddish brown (2.5YR 3/3) mixed silt loam and highly decomposed plant material; weak medium subangular blocky structure; very friable, nonsticky and nonplastic; 5 percent gravel, 5 percent cobbles; extremely acid; abrupt broken boundary.

2Cg—34 to 42 cm; dark grayish brown (2.5Y 4/2) very cobbly silt loam; massive; very friable, nonsticky and nonplastic; 20 percent gravel, 25 percent cobbles; extremely acid; abrupt wavy boundary.

2Cgf—42 to 150 cm; dark grayish brown (2.5Y 4/2) permanently frozen very cobbly silt loam; 20 percent gravel, 25 percent cobbles; extremely acid.

Range in Characteristics

Soil moisture class: Aquic

Annual soil temperature: -1.0 to -2.5 °C

Depth to contrasting textural stratification: 29 to 44 cm

Depth to permafrost: 33 to 77 cm

Thickness of histic epipedon: 20 to 38 cm

Oi and Oe horizons:

Color—hue of 2.5YR to 10YR; value of 2 to 3; chroma of 1 to 4

Texture—peat, mucky peat

Organic matter content—60 to 90 percent

Reaction—extremely acid to strongly acid

A/Oajj horizon:

A Color—hue of 10YR to 5Y; value of 2 to 3; chroma of 1 to 3

Oajj Color—hue of 10YR to 2.5Y; value of 2 or 3; chroma of 1 or 2

Texture—silt loam, muck

Clay content—5 to 10 percent

Silt content—40 to 70 percent

Sand content—20 to 35 percent

Organic matter content—8 to 18 percent

Rock fragments—0 to 10 percent strongly cemented channers

Reaction—extremely acid to strongly acid

2Cg horizon:

Color—hue of 2.5Y to N; chroma of 1 or 2

Texture—cobbly loam, very cobbly silt loam, very channery silt loam, very channery loam, very cobbly loam

Clay content—10 to 20 percent

Silt content—45 to 65 percent
 Sand content—25 to 45 percent
 Rock fragments—0 to 50 percent strongly cemented channers and cobbles; 0 to 40 percent strongly cemented flagstones and gravel
 Reaction—extremely acid to moderately acid

2Cgf horizon:

Color—hue of 2.5Y, 5Y, or N; chroma of 1 or 2
 Texture—very channery loam, cobbly loam, very cobbly silt loam
 Clay content—10 to 20 percent
 Silt content—45 to 65 percent
 Sand content—25 to 45 percent
 Rock fragments—20 to 50 percent strongly cemented channers; 2 to 40 percent strongly cemented flagstones
 Reaction—very strongly acid to moderately acid

Typic Umbrorthels, coarse-silty

Taxonomic Classification

- Coarse-silty, mixed, superactive, subgelic Typic Umbrorthels

Map unit component(s):

Boreal-taiga high elevation silty loess hills, frozen
 Boreal-taiga high elevation silty mica rich loess hills, frozen
 Boreal-taiga silty loess hills, frozen

Depth class: shallow to moderately deep

Drainage class: well drained

Landform: hills, mountains

Parent material: mossy organic material and/or woody organic material over silty eolian deposits

Elevation: 165 to 649 m

Slope: 5 to 33 percent

Annual precipitation: 358 to 776 mm

Annual temperature: -4 to -2 °C

Frost-free period: 60 to 110 days

Representative Location

Map unit in which located: 3FU4—Typic Historthels, coarse-silty-Typic Umbrorthels, coarse-silty Association, 2 to 35 percent slopes in the Denali National Park Area, Alaska

General location in survey area: Between Birch and Slippery Creeks in Minchumina Basin; UTM coordinates: Zone 5, Easting 570085, Northing 7035039

Representative Pedon

Oi—0 to 23 cm; very dark brown (7.5YR 2.5/2) slightly decomposed plant material; many very fine and fine, common medium and common coarse roots; extremely acid; clear wavy boundary.

A—23 to 27 cm; very dark brown (10YR 2/2) silt loam; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common very fine and fine roots; strongly acid; abrupt smooth boundary.

Af—27 to 39 cm; very dark brown (10YR 2/2) permanently frozen silt loam; strongly acid; gradual wavy boundary.

Cf—39 to 150 cm; very dark grayish brown (10YR 3/2) permanently frozen silt loam; strongly acid.

Range in Characteristics

Soil moisture class: Udic

Annual soil temperature: -0.2 to -1.0 °C

Depth to permafrost: 33 to 75 cm

Thickness of umbric epipedon: 24 to 27 cm

Oi and Oe horizons:

Texture—slightly decomposed plant material, and moderately decomposed plant material

Organic matter content—60 to 90 percent

Reaction—extremely acid or very strongly acid

A or A1 horizons:

Color—value of 2 or 3; chroma of 1 to 3

Texture—silt loam, mucky silt loam

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—6 to 14 percent

Reaction—very strongly acid to moderately acid

Af horizon:

Color—value of 2 or 3; chroma of 1 to 3

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—4 to 9 percent

Reaction—very strongly acid to slightly acid

Cf horizon:

Color—hue of 10YR to 5Y; value of 3 or 4; chroma of 1 to 3

Clay content—0 to 10 percent

Silt content—55 to 75 percent

Sand content—15 to 35 percent

Organic matter content—4 to 9 percent

Reaction—very strongly acid to slightly acid

Soil Properties

This section provides soil properties that may be useful in providing baseline information and applications for various land use interpretations.

Soil Texture and Particle Size Data

Table 9 gives the soil texture and particle size properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Representative and other textures are given in the standard terms used by the USDA. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. *Loam*, for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, *gravelly*. Textural terms are defined in the [Glossary](#).

Rock fragments are the estimated volume percentages of the soil fraction greater than 2 millimeter in size. These are reported as a range including low (lo) representative (rv) and high (hi) values expected. *Kind* includes the size and shape of the rock fragment and includes gravel, cobbles, channers, flags, and stones.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller. These are reported as a range including low (lo) representative (rv) and high (hi) values expected.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In table 9, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In table 9, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 9, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties.

Chemical Properties

Table 10 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of

fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate is the quantity of carbonate in the soil expressed as calcium carbonate and as a weight percentage of the less than 2 millimeter size fraction.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in this survey.

Physical Properties

Table 11 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $1/3$ - or $1/10$ -bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 °C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates in the table indicate the rate of water movement, in centimeters per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in centimeters of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 11, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tith. It is a source of nitrogen and other nutrients for soil organisms.

Erosion factors are shown in table 11 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict

the average annual rate of soil loss by sheet and rill erosion in tons per hectares per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per hectares per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. Soils are grouped according to the amount of stable aggregates more than 0.84 millimeter in size. Soils containing rock fragments can occur in any group. The groups are as follows:

Group 1: 1 to 9 percent dry soil aggregates. These soils are very highly erodible.

Group 2: 10 to 24 percent dry soil aggregates. These soils are highly erodible.

Groups 3 and 4: 25 to 40 percent dry soil aggregates. These soils are moderately erodible.

Group 5: 41 to 44 percent dry soil aggregates. These soils are moderately erodible.

Group 6: 45 to 50 percent dry soil aggregates. These soils are slightly erodible.

Group 7: more than 50 percent dry soil aggregates and fibric material. These soils are slightly erodible.

Group 8: wet or stony soils not normally subject to wind erosion. Grouping is based on soil properties (i.e. armor) not management.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per hectares per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Physical and Chemical Analysis of Selected Soils

The results of physical and chemical analysis of several typical pedons in the survey area are given in Tables 12 and 13. The data are for soils sampled at carefully selected sites. Unless otherwise indicated, the pedons are representative of the taxonomic class; however, the horizon designations may differ slightly from the typical soil profile described in the taxonomic unit descriptions. The National Soil Survey Laboratory in Lincoln, Nebraska analyzed soil samples.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are indicated in the lists that follow. The codes in parentheses refer to published methods in the *Soil Survey Laboratory Methods Manual* (USDA 1996).

Table 12 procedures:

Horizons are designated for each layer.

Depth to the upper and lower boundaries of each layer is indicated.

Particle-size distribution:

Clay=(fraction less than 0.002 millimeter) pipette extraction, weight percentages of material less than 2 millimeters (3A1)

Silt=(0.002-0.05 millimeter fraction) pipette extraction, weight percentages of all material less than 2 millimeters (3A1)

Sand=(0.05-2.0 millimeters fraction) weight percentages of material less than 2 millimeters (3A1)

Percent of whole soil greater than 2 millimeter by weight=(3B1a) the 20 to 75 millimeter fraction is sieved weighed and discarded in the field. The 2 to 20 millimeter fraction are determined in the laboratory.

Bulk density=of less than 2 millimeters material, saran-coated clods field moist (4A1a), 1/3 bar (4A1d), oven-dry (4A1h)

COLE=coefficient of linear extensibility (4D), Fractional change in volume from dry to moist state and is used to calculate linear extensibility percentage (LEP). $LEP = COLE \times 100$.

Water Content=Water retention difference between 1/3 and 15 bars for whole soil (4C1)

Table 13 procedures:

Horizons are designated for each layer.

Depth to the upper and lower boundaries of each layer is indicated.

Organic carbon=wet combustion; Walkley-Black modified acid-dichromate, ferric sulfate titration (6A1c)

Cation-exchange capacity:

Cation-exchange capacity=sum of cations (5A3a)

Cation-exchange capacity=ammonium acetate, pH 7.0, steam distillation (5A8b)

Base saturation:

Base saturation=sum of cations (5C1)

Base saturation=Ammonium acetate (5C3)

Reaction (pH)=1:1 water dilution (8C1f)

Soil Features, Hydric Soils, and Water Features

Tables 14, 15, and 16 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Soil Features

In Table 14, *restrictive layers* are given if bedrock, permafrost, or a strongly contrasting textural stratification is within a depth of 150 centimeters. The depth is based on many soil borings and on observations during soil mapping.

Subsidence is the settlement of organic soils, of saturated mineral soils of very low density, or permafrost soils with high ice content. Subsidence generally results from desiccation, shrinkage, and oxidation of organic material following drainage or reduction in volume due to the phase change of water from ice to liquid. Subsidence takes place gradually, usually over a period of several years. Table 14 shows the expected initial subsidence, which usually is a result of drainage, initial volume change by melting permafrost, and annual subsidence.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty soils that have a high water table in winter are the most susceptible to frost action. Well drained or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses. A *moderate* potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength. A *high* potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil.

Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Hydric Soils

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and hydrology (Cowardin et al. 1979; United States Army Corp of Engineers 1987; National Research Council 1995; Tiner 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. However, in order to determine whether a specific soil is a hydric soil or nonhydric soil more specific information, such as information about the depth and duration of the water table, is needed. Criteria which identify those estimated soil properties unique to hydric soils have been established (Federal Register 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in *Soil Taxonomy and Keys to Soil Taxonomy* (Soil Survey Staff 1975; 1998) and in the *Soil Survey Manual* (Soil Survey Division Staff 1993).

If soils are wet for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators that can be used to make on-site determinations of hydric soils in the Denali Park Survey Area are specified in *Field Indicators of Hydric Soils in the United States* (Hurt et al. 1996).

Hydric soils are identified by examining and describing the soil to a depth of about 50 centimeters. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described as deep as necessary to understand the redoximorphic processes. Then, using the completed soil description, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if one or more of the approved indicators is present.

This survey can be used to locate probable areas of hydric soils. This information can help in planning land uses; however, further on-site investigation is required to determine the hydric soil status on a specific site for wetland determination purposes. Table 15 indicates the hydric soil status for each map unit. Each dominant soil component, as well as each inclusion, is rated. The criteria used to rate each soil component and inclusion is also given.

Water Features

Table 16 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as *none*, *very rare*, *rare*, *occasional*, *frequent*, and *very frequent*. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods is also considered. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 16 indicates surface water *depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as *none*, *rare*, *occasional*, and *frequent*. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Soil moisture and temperature status indicates the water content in the soil at a specified depth during the months of April through September. The *Status* is expressed as *wet*, *moist*, or *dry*. *Wet* refers to soil in which most of the pore space is filled with water and the water is retained at less than 0.00001 bar suction. *Moist* refers to soil in which some of the pore space is filled with water and the water is retained at between 0.00001 and 15 bar suction. *Dry* refers to soil with little to no water in the pore spaces. Little water is retained at greater than 15 bar suction, which is generally near or above the wilting point of common agricultural crops. Temperature is used to indicate the estimated temperature of the soil layers identified.

Soil Formation

Soil is the unconsolidated mineral and organic material on the surface of the earth that serves as the natural medium for the growth of land plants (Soil Survey Division Staff 1993). Soil differs from the material from which it was derived in many physical, chemical, and morphological properties and characteristics. Environmental factors such as climate, parent material, topography, and living organisms, all acting over time, influence soil development. The influence of any one of these factors varies from place to place, but the interaction of all of them determines the kind of soil that forms. The exact combination of physiochemical and biological reactions that transforms materials into the soil horizons of a specific soil can not be determined with certainty. Soil processes are best described as a package of soil forming factors with associated characteristics that may be observed in the field. The fluvial process, described in detail below in Soil Processes and Indicators, provides an example of a package of soil forming factors. A discussion of individual soil forming factors including climate, parent material, topography, living organisms, and time with reference to important processes associated with each factor are provided. This is followed by an independent discussion of the major soil and geomorphic processes identified for Denali Park and a section on permafrost and soil formation.

Soil Forming Factors

Climate

The climate of Denali Park, which is described in the section General Nature of the Area, is characterized by two distinctive climatic zones corresponding to the Polar and Humid-Temperate Domains of Bailey (1994) (see Figure 7). The climate of the Polar Domain north of the Alaska Range, often referred to as the Interior climatic zone, is continental with long cold winters, short warm summers, relatively low precipitation, and a moisture deficit during the growing season. The Humid-Temperate Domain south of the Alaska Range, often referred to as the South Central climatic zone, is transitional maritime-continental with comparatively warmer winters, cooler summers, higher cloud cover and precipitation during all seasons, and a moisture surplus during the growing season.

Landscape indicators characteristics of the Interior climatic zone include permafrost, the presence of periglacial features such as circles, stripes, and earth hummocks within the alpine biome (see Plates 6 through 9), and extensive areas of stunted spruce forests within the boreal biome (see Plate 38). The Interior zone lies within the zone of discontinuous permafrost described by Péwé (1975). Much of the lowlands and lower alpine biomes are underlain by shallow permafrost. The most extensive soil Order are the Gelisols, soils with a mean annual temperature less than 0 °C (see temperature graph for *Typic Historthels*, coarse-silty) and permafrost within a depth of 2 meters. Permafrost is an uncommon feature throughout the steeper alpine areas. Gelepts, the coldest soil Suborder identified within the Order of Inceptisols, are common in the alpine biome and on periglacial features. Though mean annual temperatures within these soils are less than 0 °C, permafrost is generally lacking within 2 meters depth (see temperature graph for *Typic Eutrogelepts*, loamy-skeletal).

Climatic variables contributing to the widespread occurrence of permafrost include sub-zero air temperatures and low snow cover during the long winters. A more complete description of the complex relationship between soils and permafrost is provided in the section Permafrost and Soil Formation.

The Interior climatic zone experiences a significant moisture deficit during most summers (evapotranspiration in excess of precipitation). As a result, the amount of water available for weathering and translocation of soil minerals is low and soil horizon expression is generally only weak to moderate (Plate 29).

Landscape indicators characteristic of the South Central climatic zone include a profound lack of permafrost and periglacial features, with the exception of earth hummocks in the alpine biome. Lack of permafrost and periglacial features can be attributed to a large degree to the warmer air temperatures and deeper snow cover in winter. Maximum frost penetration is generally less than 50 centimeters (see temperature graph for *Andic Humicryods, medial over loamy-skeletal*), compared to 2 meters or more in the Interior zone.

In contrast to the Interior zone, the South Central zone has a moisture surplus (precipitation in excess of evapotranspiration) during most summers. Surplus water percolates through soils encouraging weathering and translocation of soil minerals from surface horizons into underlying horizons. Because of abundant moisture and deep percolation of water, soils in the South Central zone frequently have well expressed horizons that often extend to depths of 75 centimeters or more. The most extensive soil Order on stable upland landscapes are the Spodosols. Spodosols have well developed, highly contrasting, and often bright colored horizons indicative of extensive weathering and leaching of soils materials (see Plate 19).

Parent Material

Soil parent materials are divided into organic and mineral. Organic materials consist of a predominance of non-living, partially to highly decomposed plant materials. Surface mats of organic materials cover most soils of Denali Park with the exception of exposed bedrock, active talus slopes, and soils on low flood plain positions. The thickness of organic materials varies widely. On steep meta-stable mountain slopes the organic mat is discontinuous and generally less than 2 centimeters thick. On plains and hills within the alpine and boreal biomes, the mat generally ranges from a few centimeters to 40 centimeters, and in wet depressions ranges from 50 centimeters to several meters thick. Origins of organic materials that form these mats are tied to three specific soil processes: braunification, podzolization, and hydromorphism.

On well drained mineral soils a dynamic equilibrium exists between organic material production and decomposition. Percolation of water through mineral soils removes soil bases and acidifies the soils. Acidic surface conditions favor both the establishment of moss and the preservation of surface litter from vascular plants. Long term preservation of organic materials is enhanced by low soil temperatures, which suppress microbial activity. However, significant accumulations of organic materials are rarely observed in well drained soils and this is attributed to high organic turnover from oxidation. Organic mats on well drained soils are typically only a few centimeters thick (see Plate 29) and rarely exceed 20 centimeters. Two soil processes associated with soil acidification and organic mat establishment on well drained soils are braunification and podzolization.

Thicker organic deposits are frequently associated with saturated soil conditions where organic materials accumulate under acidic, saturated, anaerobic conditions (see Plate 22). These conditions are represented by the process hydromorphism. The most extensive areas of soils with moderately thick hydromorphic organic surface mats (20 to 50 cm) are in the Yukon-Kuskokwim Bottomlands and Alaska Mountains Sections, where soils have shallow water tables perched over permafrost. Though of minor extent, soils with thick hydromorphic organic deposits (50 cm to over 150 cm thick) are found in depressions on all landscapes throughout Denali Park with locally extensive areas within the Yukon-Kuskokwim Bottomlands and the Cook Inlet Lowlands Sections.

Mineral parent materials include colluvium, glacial, fluvial, and eolian deposits. Within the mountainous regions, soils are predominately formed in gravelly colluvium derived from bedrock. Soils formed in colluvium derived from specific bedrock types have been separated where possible. Elsewhere, the variable nature of rock types over short distances made tying specific soil properties to individual rock types difficult at the scale of this project.

Within the mountainous sections of Denali Park four groups of rock types or bedrock parent material groups were identified, with specific soil components designated. These include soils formed in materials derived from diorite (see Plate 44), schist (see Plate 30), dark sedimentary rocks (see Plate 45), and mixed rock types (see Plate 46). A distribution map of general rock types and parent materials is provided in

Figure 11. Soil properties and other characteristics consistently correlated with each rock type include chemical and physical products of weathering, color, and soil reaction.

Soils derived from diorite occur in the Alaska Range Section between the Muldrow Glacier and the Straightaway Glacier and throughout the South Central Mountains Section. Soils formed in these materials have a high amount of quartz and a low percentage of minerals easily weathered by oxidation or hydrolysis processes and are considered as very acid soils. Soil materials tend to be sandy or sandy loam in texture with light brown or yellowish brown color because of the absence of iron and other weathered products that provide soil pigmentation. Diorite materials also contain very low amounts of cations or basic minerals such as calcium, magnesium, and potassium, so soils tend to be very acidic. *Alpine-dwarf scrub gravelly diorite colluvial slopes*, is a typical soil component found in map unit [7TM24](#) (see Plate 44).

Schist soils dominate the Outer Ranges, Kantishna Hills, and Kuskokwim Mountains in the northern part of Denali Park and are considered as acid soils. Weathering of iron-bearing and micaceous minerals imparts a reddish brown color to soils and texture of the soil matrix is typically silt loam or loam with clay content that often approaches 20 percent, the highest in Denali Park. Though not as acidic or as poor in bases as the diorite derived soils, these soils have acidic reaction and low amounts of calcium, magnesium, and potassium. *Alpine dwarf scrub gravelly schist colluvial slopes*, is a typical soil component found in map unit [8MS](#) (see Plate 12).

Dark sedimentary rocks occur throughout the Alaska Range Section in Denali Park and soils formed in these materials are considered as basic soils. Soils derived from these materials are very dark and contain high levels of organic carbon with very dark soil colors throughout. Weathered products include loam textures and abundant soil bases with calcium carbonate often forming coatings on rock fragments. Soil reaction is generally slightly acid to moderately alkaline. *Alpine-dwarf scrub dark gravelly colluvial slopes*, is a typical soil component formed in colluvium derived from these materials and is represented in map unit [7MSHD](#) (see Plate 47).

Mountainous areas throughout the remainder of Denali Park consist of a mixture of rock types that vary considerably in physical appearance and chemical properties over short distances. Soils in these areas are formed in a variety of rock types including sedimentary, igneous, and metamorphic. Variability is the norm within these units, but soils typically have fairly light colors ranging from reddish brown to olive brown and moderately acid to neutral reaction. Weathering products include loam or sandy loam textures, and a medium level of soil cations such as calcium, magnesium, and potassium. *Alpine dwarf scrub gravelly colluvial slopes*, is a typical soil component formed in colluvium derived from variable bedrock and is represented in map unit [7MSHL](#) (see Plate 48).

Other parent materials include alluvium, glacial drift, and eolian materials. The physical and chemical properties of these materials influence the type of soil that forms. Within the Yukon-Kuskokwim Bottomlands, Alaska Mountains, and Kuskokwim Mountains Sections, well drained upland soils that form in a thin layer of loess over coarse-textured glacial drift, alluvium, or sandy eolian deposits all have well expressed soil horizons (see Plate 13). Coarse, porous materials maximize percolation of rainwater and melting snow, which promotes weathering and translocation of minerals in soils. Also, these soils have the warmest summer soil temperatures of the regional soils, which enhances biological activity and weathering processes. Elsewhere, soils formed in loess and till of mixed lithology have significantly finer textures with lower permeability, properties less favorable to the development and expression of soil horizons.

The texture of the unconsolidated materials influences the thermal properties of the soil and whether or not permafrost is a commonly occurring landscape phenomenon. Soils formed in till of mixed lithology have loamy textures with low rock fragment content and relatively low thermal conductivity properties and permafrost is common. In contrast, soils formed in till derived from diorite have sandier textures with a higher rock fragment content, higher thermal conductivity properties, and permafrost is rare. Thermal conductivity properties are discussed further in the Permafrost and Soil Formation section.

Parent materials consisting of volcanic ash are unique to soils lying south of the Alaska Range crest. Only occasionally are ash deposits observed in soils on the north side of the Alaska Range. Field evidence of volcanic ash parent materials includes observable very pale brown or yellow lenses or pockets of ash within the soil profile (see Plates 27 and 28). A unique array of physical and chemical properties are associated with

the weathering products of volcanic ash materials, including low bulk density, high cation exchange capacity, high phosphate retention, and high available water capacity. These properties jointly provide the basis for the andisolization process described in the Soil Processes section. Soils formed in thick deposits of ash on stable slopes in the subalpine and boreal biomes have some of the best expressed horizon development of soils in Denali Park (see Plate 19). On long talus slopes volcanic ash is mixed with colluvium to provide a unique combination of soil parent materials representing the joint influences of parent material and topography on soil formation. Soils on these slopes support productive herbaceous alpine plant communities (see Plates 16 and 17).

Topography

Topography influences the degree of down slope movement of materials, the collection or dispersion of water, flooding, and soil temperature and moisture relations associated with aspect and snow distribution. Slope steepness is one example of topographic influences on soil formation. Steeper slopes are inherently unstable and more subject to down-slope movement, conditions unfavorable to soil weathering and the differentiation of soil horizons. For example, on steep mountains above about 1,700 meters barren rock outcrops and scree slopes are dominated by colluvial processes with no apparent soil development (see Plate 1).

Elsewhere, the topography factor combines with one or more of the other soil forming factors. Soils on mountains (topography) with a continuous mat of vegetation (living organisms) illustrates the combined influences of two soil forming factors. Below about 1,700 meters, even on very steep slopes, colluvial processes are offset somewhat by the stabilizing affects of dense root and vegetation mats formed by avens (*Dryas spp.*), cassiope (*Cassiope spp.*), and other dwarf ericaceous shrubs. The biological mat stabilizes soils favoring braunification. The product of this combination of factors and processes includes a very thin organic mat, and a thin dark "A" horizon underlain by a moderately thick reddish brown "Bw" horizon, illustrated in the typical soil photo for map unit [8MS](#) (see Plate 12).

Topography and parent material factors combine to provide distinctive soil conditions on steep mountain slopes in the South Central Mountains Section. On steep herbaceous mountain backslopes and footslopes, colluvial processes have mixed gravelly scree from the steep bedrock exposures above with volcanic ash originating from distant volcanoes in the Alaska and Aleutian Ranges to the west. Properties associated with these gravelly colluvial-ash soils include high available water and cation exchange capacities, properties that support a productive herbaceous plant community (see Landtype Description-[Gravelly Colluvial Slopes \(M135S_421\)](#)).

Topography also influences the accumulation of water on the landscape. On various landforms within the alpine and subalpine biomes, snow drifts into swales and persists into late spring and early summer. As drifts melt they provide a steady discharge of water, which saturates soils down slope, enhancing anaerobic conditions and forming thick organic-rich mineral horizons. Elsewhere, closed depressions on all landforms pond water promoting anaerobic conditions and the accumulation of thick organic mats (see Plate 22). Large areas of ground water discharge are found on map unit [1STW2](#) where the regional aquifer approaches the surface. Heat transfer from this aquifer system warms soils on most landforms preventing permafrost formation.

Flooding is another expression of the topography factor. Flooding frequency and elevation above active river channels influences the texture of flood deposits and the type of vegetation. Areas adjacent to active channels are regularly scoured by high velocity flood waters and soils are gravelly (see Plate 15) with near-surface water tables. Topographic-vegetation relations on these positions include the presence of young willow scrub and herbaceous communities that have established between flooding events or managed to survive previous events. On more elevated and less frequently flooded positions water velocity of over-bank flooding is slowed by the dense stands of mixed tall alder-willow scrub, and alluvium consists of finer textured stratified sandy and silty deposits (see Plate 23).

Topographic exposure also influences the type of soils that form. In mountainous alpine areas, a stark contrast exists in vegetation on leeward mountain slopes where snow accumulates versus exposed

windblown slopes. On windblown exposures within the alpine biome of the Alaska Mountains Section, the light green color characteristic of white mountain avens (*Dryas octoptala*) dwarf scrub (see Plate 39) contrasts with the darker green signature associated with four angled cassiope (*Cassiope tetragona*) dwarf scrub (see Landtype Photos-*Gravelly Mountains, Moist* (M135A_306)) located where snow drifts and persists into late spring. Soil differences on these two sites include slightly thicker organic mats and darker mineral surface layers in the moister sites under cassiope scrub.

Patterned ground features are micro-relief associated with mixing of the soil by frost action or cryoturbation and this phenomenon is represented throughout the alpine and, in a more limited extent, the boreal biomes of Denali Park's Interior climatic portion. Two general groups of patterned ground are identified and include those features with permafrost and those without permafrost within the 1.5 meter deep soil profile. Patterned ground features with permafrost include turf hummocks, peat mounds, circles, and ice wedge polygons. Stripes, steps, and earth hummocks generally lack permafrost. Specific cryogenic processes that form the various patterned ground features are described in the following paragraphs.

Earth and turf hummocks are swarms of irregular or bumpy features each with local horizontal and vertical relief of up to 75 centimeters (see Plate 49). Earth hummocks are the only patterned ground feature identified within the South Central climatic zone and these micro-features are limited to more gently sloping positions within the mountainous alpine biome. Turf hummocks are extensive throughout the boreal biomes of the Interior climatic zone with a more limited distribution in the alpine biomes. Both hummock forms are described as the result of ice segregation, differential freezing, and differential ground heaving with or without permafrost present (Embleton and King 1968 and Sigafos and Hopkins 1951). Origin of these features has been attributed to deeper frost penetration in micro-low positions where saturated conditions often exist and conduct cold temperatures downward, causing lateral thrusting or squeezing, often injecting mineral and organic material into or beneath the micro-highs, resulting in hummock growth. Turf hummocks or cottongrass (*Eriophorum spp.*) tussocks are common features on slopes less than about 6 percent and underlain by permafrost (see Landtype Description-*Loamy Frozen Terraces, Wet* (131B_105) and Plate 10).

Steps, stripes, and solifluction lobes are patterned ground features found on slopes generally over 8 percent throughout the alpine biomes of the Interior climatic zone in the absence of permafrost. The process of formation is similar to that for hummocks, with the addition of a significant gravity factor caused by steep slopes. During freezing, ice crystals grow and displace soil particles in a direction controlled by the direction of freezing. In other words, the soil particles move toward the direction from which the frost enters and penetrates the ground. On thaw, the particles re-settle in a direction controlled by gravity. Thus, if the cooling surface is inclined, the displaced particles will always re-settle slightly down-hill from their original position (Embleton and King 1968). Steps are elongated or lobate earth hummocks on steeper slopes with the long axis of the step orientated in a down slope direction with overall slopes from about 8 to 35 percent (see Plate 6). Stripes form patterned ground with a striped appearance, due to parallel strips of vegetation-covered ground and intervening strips of relatively bare ground, oriented down the steepest available slope. Stripes are primarily less than a meter wide, occur on slopes up to 20 percent, with slope lengths of several hundred meters or more. The best examples of stripes are found on the north-facing slopes of Mount Margaret near Park headquarters (see Plate 7). Similar to observations made elsewhere by Washburn (1956), in some places the vegetated and non-vegetated strips are equally wide; in other places vegetated strips of 0.3-0.6 meter are spaced from 3 to 4.5 meters apart. Solifluction lobes consist of relatively shallow lobes or inclined terrace-like benches 0.5 to 2 meters in vertical relief and several meters horizontally with slopes from about 8 to 25 percent (see Plate 9).

Peat mound development is described by Williams and Smith (1989) as attributed to a thin cover of snow, which allows for deep frost penetration and frost heaving. These features are underlain by permafrost at shallow depths in Denali Park. Peat mounds form discrete, irregularly spaced bumps a meter or more across and several centimeters to a meter or more in height. The drier peat near the surface of these elevated areas increases the overall insulating qualities of the peat, maintaining frozen soil conditions throughout the summer and promoting the formation of ice crystals and masses. Abundant water from the adjacent wet meadows and ponds feeds the developing ice core of the mound. Free water in contact with the frozen core then freezes, increasing the size and extent of the frozen core. Peat mounds are usually formed as the core of massive ice enlarges and pushes the surface up several centimeters or meters above the surrounding landscape. Peat mounds are common features within the Toklat Basin Lowlands Subsection (see map unit 11P1).

Circles (or mud boils) are clusters of more or less circular features a meter or two in diameter with slightly raised centers that are often free of vegetation (see Plate 8). Circles are found throughout the alpine biome within the Interior climatic zone in Denali Park, generally on slopes less than 20 percent. Beneath the center of the circles, permafrost is intermittent and relatively deep in the soil profile. The troughs surrounding the circles are one to several meters wide, have alpine scrub vegetation, thick organic mats, shallow permafrost, and a shallow water table perched over the frost. Swanson and others (1999) attribute the formation of circles to upward movement of relatively low density saturated soil material above the permafrost table by a process described as "diapirism." Soil material with low bulk density because of a very high ice content is described as being present just below the permafrost table. This material has bulk density that is up to 0.8 g/cm³ less than the overlying drier mineral soil material. As a result of this unstable bulk density profile, upward movement of the low-density soil material is likely to occur when the soil surface is disturbed or favorable weather causes it to thaw. The flow upward to the surface forms the slightly elevated, often vegetation-free micro-feature.

Ice wedge polygons are patterned ground features more commonly found in the arctic. In Denali Park, these features are limited to the Toklat Basin Lowlands Subsection. Here winter winds remove much of the snow cover and expose the soil to extremely low winter temperatures (see map units *11P* and *11P1* and Plate 11). Contraction and cracking of the soil at soil temperatures below -6 °C are conditions that favor the initiation of ice wedge polygon formation. With maturity, a network of more or less vertical cracks develops, commonly with a mesh of 10 meters or more but which may be much smaller, down to perhaps 20 centimeters. The large cracks, which at their coldest may open several millimeters, extend vertically downwards some tens of centimeters to a meter or more, and become filled with ice. Many years accumulation gives ice wedges substantial size and great geotechnical significance (Williams and Smith 1989). Any disturbance of the organic mat that insulates these features results in substantial surface subsidence or thermokarst (see Plate 11).

Living Organisms

The living organisms factor includes animals, lower plants, and higher plants. Many biochemical processes involving the cycling of different elements occur in soil where the organic compounds exuded by the roots and produced by microbial degradation of organic debris are involved and provide the energy needed in the biological weathering process. Also, mixing and breakdown of organic materials by animals are important to soil formation.

Animals contribute, to various degrees, to the mixing and decomposition of organic materials in all soils in Denali Park. Large mammals like moose, caribou, black bears, and brown bears contribute locally to mixing of soils, but are rarely responsible for determining the type of soil that forms. Earthworms, though significant contributors in more temperate climates, are minor contributors in soils of the South Central and Interior climatic zones because of their small size and very low density. Voles are observed as significant contributors to surface organic matter accumulation and mixing in some soils, especially soils of the Landtype-*Loamy Slopes, Wet (M135A_354)* which has white spruce/willow woodland vegetation. Thick organic accumulations are commonly observed on the soil surface from extensive burrowing by voles, which possibly contribute to the thick dark surface mineral "A" horizon (see Landtype Distribution Maps and Photos (M135A_354)).

The lower plants include moss, fungi, bacteria, and algae. Observing lower plants, especially micro-organisms in a field setting, and correlating these with specific soil processes is very difficult and beyond the scope of this project. Also, it is difficult to isolate the exclusive role of micro-organisms in the soil system considering their diversity and proportion of the soil biota. The effectiveness of micro-organisms in decomposing rocks and minerals was demonstrated by Glazovskaya (1950). He described fungi as being the most destructive of the microflora, producing chelating organic acids similar to fulvic and humic acids. Mosses and lichens are the only members of the lower plants consistently documented during this survey. The presence of a continuous moss or lichen layer on the soil surface is indicative of soil stability and suggests that soil processes such as braunification and podzolization are active on the site. Lack of a surface moss layer suggests surface disturbance by colluvial processes, flooding, fire, or the presence of productive herbaceous plant communities that prevents moss establishment.

The higher plants are the vascular plants including trees, shrubs, grasses, and forbs. This category of living organisms provide the most profound affect on soils of Denali Park, since the higher plants contribute significantly to the organic matter content of soils as well as soil stability. Certain tree species like spruce (*Picea glauca* and *P. mariana*) are susceptible to wildfire, which directly influences thermal properties and permafrost dynamics on many soils. In addition to the stabilizing affects of vegetation various plant communities contribute to the braunification process because of the acidity of their litter. Precipitation percolating downward through surface litter and moss acidifies mineral soils. At lower elevations in alpine areas, the resinous litter from shrub birch is an important contributor to soil acidification and braunification. In the subalpine and boreal biomes alder (*Alnus* spp.), a strong soil acidifier (Crocker and Major 1955), and white spruce (*Picea glauca*) contribute to surface acidification promoting braunification. A discussion of the significance of higher plants and plant communities on soil formation follows.

In the high alpine mountains of the Alaska Mountains Section at the upper limit of vegetation (from 1,100 to 1,700 m), vegetation is dominated by dwarf scrub types. Within this harsh environment two dominant cover types that occur in a repeating pattern are white mountain avens (*Dryas octoptala*) dwarf scrub on more convex and wind blown ridges and four angled cassiope (*Cassiope tetragona*) dwarf scrub on more northerly aspects and leeward slopes where snow drifts during winter. Both types form a dense thin surface root mat, which provides considerable stability to what otherwise would be expected to be steep unstable slopes. Both are considered meta-stable with braunification and colluviation the principle processes identified. Subtle soil differences observed in the soils that support these two types include a slightly thicker organic-root mat and surface mineral "A" horizon under the dwarf four angled cassiope scrub type. Micro-site characteristics of this cover type include leeward positions on mountain slopes where snow drifts and traps windblown organic materials and silt. Moister site conditions and delayed green-up during spring as well as the thicker surface organic and mineral layer are associated with these micro-site characteristics and appear to favor cassiope dwarf scrub. The white mountain avens dwarf scrub occupies harsher deflation areas where snow cover is thinner and often absent during winter. Soil temperature measurements in these two major dwarf types also illustrates significant differences between these vegetation types with mean annual soil temperatures of 0.2 °C under four angled cassiope dwarf scrub and -0.5 under dwarf white mountain avens dwarf scrub. The warmer annual soil temperatures on the (*Dryas octoptala*) dwarf scrub are also attributed to deeper snow accumulations which insulate the soil from extreme winter air temperatures.

At lower elevations within the alpine biome of the Alaska Mountain Section (below about 1,100) alpine vegetation is dominated by shrub birch (*Betula glandulosa* and *B. nana*)-bog blueberry (*Vaccinium uliginosum*) scrub (see Landtype Description-[Gravelly Slopes \(M135A_358\)](#)), and shrub birch-dwarf ericaceous scrub mosaic communities (see Landtype Description-[Gravelly Slopes, High Elevation \(M135A_356\)](#)). Micro-site characteristics and their affect on snow redistribution are generally less apparent with decreasing elevation within this zone. At the upper limits, a mosaic of shrub birch (*Betula glandulosa* and *B. nana*) and lichen types are found on ridge crests on mountains, and glaciated hills where micro-relief changes dramatically over short distances. Ridges are exposed to wind and often have a sparse cover of alpine bearberry and lichen with a high percentage of exposed rock fragments. More protected concave to plain shaped surfaces and leeward slopes of hills support shrub birch scrub types. Soils with shrub birch scrub types are meta-stable on steeper mountain slopes and stable elsewhere with braunification and podzolization the primary processes. Soils under shrub birch-ericaceous scrub communities are significantly more acid than under other alpine communities. Typical soil reactions are extremely acid (pH 3.5 to 4.4) in the surface mineral horizon under shrub birch with strongly or moderately acid (pH 5.1 to 6.0) reaction under various dwarf scrub types. Also, the presence of gray leached elluvial "E," indicative of acid leaching and the podzolization process, is more common in soils that support shrub birch scrub types than the other alpine scrub types.

At tree-line, upland white spruce forest and woodland types are frequently found on soils that are seasonally wet with perched water tables over slowly permeable materials such as till or schist bedrock (see Landtype Description-[Loamy Slopes, Wet \(M135A_354\)](#)). These soils have thick organic-rich mineral surface "A" horizons that receive nutrient enrichment from the mobile perched water table that imports nutrients to the site. Soil reaction in the surface mineral layer is moderately acid or slightly acid, significantly less acidic than

adjacent well drained soils. The most productive forests in Denali Park are on flood plains of the Yukon-Kuskokwim Bottomlands Section and include white spruce-poplar (*Populus balsamifera*)/alder (*Alnus spp.*) forest types (see Landtype Description-[Loamy Flood Plains \(131B_100\)](#)) that occasionally flood and have productive white spruce stands that often reach 25 meters or more in height. Soils have a thick loamy alluvial mantle that is enriched by occasional, brief flooding and sediment depositions that provide favorable physical and chemical soil properties for productive forest establishment and maintenance.

Relations exist between various scrub communities and soils in riparian areas throughout Denali Park. These relations are best expressed in terms of relative elevation above active flood channels, with several discrete flood plain levels evident on the landscape. Low flood plain positions include areas with a high recurrence of flooding and are often in proximity to active flood channels (see Landtype Description-[Gravelly Low Flood Plains, High Elevation \(M135A_257\)](#)). Cover consists of sparse feltleaf willow (*Salix alaxensis*) scrub and herbaceous meadow communities formed primarily in gravelly alluvial soils with water table surfaces between 50 centimeters and a meter in depth during summer. Mid-flood plain positions have closed scrub poplar-willow scrub and alder scrub communities on well drained soils (see Landtype Description-[Loamy Flood Plains \(M135A_100\)](#)). Organic mats are thin with mineral soil materials consisting of loamy alluvial mantles of variable thickness over sand and gravel. The dense scrub cover on these sites slows the velocity of flood waters, favoring deposition of sands and silts. A thin, discontinuous surface organic mat and slight acidification of the surface "A" horizon suggests periods of from years to decades between individual flood episodes. High flood plains are the next discrete flood plain level. These landform positions flood infrequently for brief durations allowing the formation of a relatively thick continuous organic mat and acidification of the surface "A" horizon. The period between flooding events is likely decades, allowing for periods of stability that favor the replacement of scrub types with the more slow growing forest species such as white spruce and larch (*Larix laricina*). A distinctive plant community consisting of mixed spruce-larch/alder forest is found on high flood plain positions within the Yukon-Kuskokwim Bottomlands Section. This landscape position and Landtype receives intermittent disturbance by flooding with long periods of stability, acidification and organic mat formation. The soil profile consists of alternating thin layers of organic material up to several centimeters thick inter-bedded with sandy and silty alluvium. Soils are also poorly drained with shallow permafrost. The white spruce-tamarack (*Larix laricina*)/thinleaf alder (*Alnus tenuifolia*) forest plant community has components common to both stable upland sites, as indicated by the presence of permafrost, and to unstable sites disturbed by periodic flooding, as indicated by the moderately alkaline reaction and stratified soil profile. These stands are highly diverse and species rich (see Landtype Description-[Loamy Wet Flood Plains, Frozen \(131B_156\)](#)).

Dwarf spruce (*Picea glauca* and *P. mariana*) woodlands often referred to as "taiga" are the single most extensive potential natural vegetation group found in Denali Park (see Landtype Description-[Loamy Frozen Terraces \(131B_104\)](#)). Soil and site properties normally associated with this vegetation includes a thick, saturated, acidic, organic mat 20 to 50 centimeters thick over a thin layer of mineral soil several centimeters thick underlain by permafrost. Natural disturbance by wildfire has a profound affect on the vegetation types on these sites. Wildfire of moderate to server intensity kills the moss, initiating collapse of the insulating organic mat and initiates thermal change and ultimately the subsidence of permafrost. Post fire vegetation succession often includes establishment of various scrub communities (see Landtype Description-[Loamy Frozen Terraces \(131B_104\)](#)), gradual acidification of the soil surface, and reestablishment of the insulating organic mat and permafrost. A more complete description of the influences of fire on vegetation and permafrost are provided in the Permafrost and Soil Formation section.

Time

The time that a soil is exposed to soil-forming processes also determines the degree of mineral weathering and horizon development. Soils of Denali Park are grouped into four relative age categories including young, intermediate, old, and paleosols. Young soils are those subject to episodic or continuous disturbance that restricts the development of soil horizons other than thin surface accumulation of organic material or organic enrichment of the mineral surface horizon. These soils lack significant surface stability and the age of these

soils may be categorized as ranging from months to decades. Included within this group are actively flooded soils (see Plate 15), soils on recent moraines (see map unit photo-7CE), and soils on steep scree and talus slopes (see map unit photo NV1).

Soils categorized as intermediate are those that are in dynamic equilibrium between a process that favors vertical percolation of water and horizon differentiation and a process that favors the destabilization or halting of the soil forming processes. Generally speaking, associated surfaces are considered to be Holocene in age (less than 10 thousand years old). Members of this group include well drained soils on meta-stable slopes with continuous root mats (see Plate 12), well drained soils on high flood plains and stream terraces, and soils with permafrost (see Plate 21) on all landforms. With the exception of soils with permafrost, the braunification process has formed surface "A" and subsurface "Bw" horizons. However, the destabilizing influences of colluvial processes or the absolute age of the surface have minimized the degree of expression of braunification. This horizon sequence rarely extends to depths below 50 centimeters. Also included within this age group are soils that have thick surface organic horizons and associated permafrost and poor drainage. These soils are often altered by fire, resulting in a thinner surface organic mat and significant subsidence of the permafrost table. Within the fire cycle are periods following fire in which soil conditions include a well drained, permafrost-free environment; conditions that favor the braunification process. Once permafrost reestablishes, the associated poorly drained conditions return and soil processes shift to hydromorphism. Specific properties associated with hydromorphism in these soils include establishment of a thick saturated organic mat and saturated conditions over permafrost. Assigning a range in surface age to all members of this group is difficult since weathering processes are either intermittent in nature, interrupted by fire or occasional flooding episodes, or minimized by surface creep or cryoturbation.

Soils categorized as old are those formed on landforms that are not subject to the significant destabilizing affects of disturbance or other processes that alter or halt weathering of soil minerals. Surface age is estimated as early Pleistocene (9 to 250 thousand years). Members of this group provide the best expression and overall depth of soil horizon development under the current climate conditions. A typical sequence of mineral horizons includes "A, E, Bhs, Bs, BC" and this sequence extends to depths of 75 centimeters or more. Included in this group are soils formed in volcanic ash and loess over drift on glacial plains and hills in the Cook Inlet Lowlands Section and on mountain foot slopes of the South Central Mountains Section (see Plate 19). Also included are less extensive soils formed in loess over drift on glacial plains within the Alaska Mountains Section and loess over eolian sands on relict sand dunes within the Yukon-Kuskokwim Bottomlands Section (see Plate 50).

The final age group of soils is the "Paleosols" or soils that are relicts from a past climate. This group includes soils formed in the Pliocene age Nenana Gravels within the Alaska Mountains Section, along the northern edge of Denali Park. The Nenana Gravels consist of alluvial and glacial materials deposited during a period of significant tectonic uplift of the Alaska Range during Pliocene time (1 to 13 million years before present) ([Wahrhaftig, 1958](#)). The period marks a change from a more temperate climate than the present to one of progressive cooling. During this period of warmer climate, relict soils or "paleosols" formed in alluvial and drift deposits extruded from the Alaska Range. These soils were weathered to a distinctive pale brown or yellow color that is readily identified in a soil pit (see soil photo for Landtype Description-[Escarpments \(M135A_800\)](#)). Several map units ending in "Nenana Gravels" have been identified to differentiate soils formed in these relict soil materials from those formed in more recent glacial drift.

Soil Processes and Indicators

Soil processes are defined as a combination of physiochemical and biological reactions that have actually transformed materials into soil horizons. The factors of soil formation previously recognized are thought of as controls on process that result in observable and measurable features. Simplified concepts of solution, oxidation, reduction, hydrolysis, hydration, chelation, ionic substitution, synthesis, and crystallization have been applied to transformations of individual compounds and components of soils. Combinations of these elementary processes are believed to occur in the development of soils. Where a combination has been dominated by a particular process, or by a rate of a particular process, the resulting combination has often

been given a name (Wilding, et al. 1984). Each process discussed is related to observable sets of soil properties, or field indicators, used to establish dominant processes. Figure 12 provides a map of the major soil and geomorphic processes for Denali Park.

Colluviation is a depositional process by mass wasting or overland flow. Sediment deposited by mass wasting is generally non-sorted and non-stratified. Individual particles are not rounded. These characteristics distinguish colluvium from sediments deposited by fluvial processes (Longwell et al. 1969). Products of colluvial processes include talus and solifluction deposits. In Denali Park, this process is enhanced by extreme temperature variations throughout the year. Multiple freeze-thaw cycles not only fracture exposed bedrock but also destabilize the slopes where the rock fragments accumulate. This process is extensive throughout the mountains and along river escarpments. Field indicators of this process include long plain slopes or conical features extending down slope from steep exposures of bedrock to the base of the slope. Soils within colluvial cones consist of non-sorted soil materials with 30 percent or more by volume angular rock fragments. The unstable nature of colluvial slopes result in weakly expressed soil horizons. On very active colluvial cones, soils lack a continuous surface organic mat and typically have a thick dark surface "A" horizon from the mixing of the surface layers by gradual but continuous surface creep. This is underlain by a "C" horizon. Examples of a typical colluvial slope and associated soil are provided in Plates 16 and 17. On more stable or "meta-stable" colluvial slopes, a continuous organic mat underlain by a "A", "Bw", "C", and "Cr" horizon sequence is more common. These characteristics are expressed in the typical soil profile provided in Plate 18.

Fluvial processes include the erosion, transportation, and deposition of alluvium by water. This process is a good example of the topographic and time factors of soil formation. Periodic flooding results in soils that exhibit minimal horizon development. Along low gradient streams, such as those found within the Yukon-Kuskokwim Bottomlands, Flood Plains and Terraces Subsection, low velocity flood waters deposit thick deposits of sandy and silty sediments (see Plate 23). A typical valley profile of this low gradient, meandering stream is provided in Figure 13. Along higher gradient streams, such as those found within the Alaska Mountains, Interior Flood Plains and Terraces Subsection, high velocity floodwaters deposit gravelly and cobbly alluvium as channel deposits (see Plate 15). Higher flood plain positions along these higher gradient streams consist of loamy over sandy and gravelly alluvium (see Figure 14). Surface evidence of fluvial processes includes the presence of barren or sparsely vegetated gravel bars, channels, and alluvial flats adjacent to active river channels, as well as debris, ice gouged trees, and watermarks on vegetation. Vegetation indicators of fluvial disturbance include the presence of young stands of willow (*Salix alaxensis*) and alder (*Alnus spp.*) shrub (see Plate 51), and balsam poplar (*Populus balsamifera*) forest types adjacent to stream channels. Soil indicators include stratification of sandy and silty textured sediments and buried organic layers (see Plate 23).

Fluvial processes in conjunction with other landscape factors result in variation in nutrient productivity between riparian systems. Two broad categories of alluvial soils have been identified in Denali Park, those with excess bases and those without. A specific fluvial process called "Enrichment" is assigned to those soils with excess bases. Enrichment includes the saturation or accumulation of basic soil metals such as calcium, magnesium, potassium, and sodium in surface soil layers. Enrichment includes both the deposition of base rich sediments by flooding and the concentration of bases in the upper soil profile by upward diffusion of base-rich water from a near-surface water table to the drier soil surface during periods of dry, warm weather. Enrichment results in the accumulation of calcium and magnesium carbonate compounds that sometimes form a white or brown crust on the soil surface. Soils with excessive carbonates effervesce when dilute hydrochloric acid is added. Effervescence is often observed in the surface mineral layers of the *Alpine-scrub gravelly low flood plains, moderately wet* soil component of map unit *7FP2*. On low flood plains, pH of 7.6 or more in soil surface mineral layers also is a general indication of enrichment.

In alpine areas, two specific factors that influence riparian productivity are the sediment bedrock source and the nature of the aquifer. Alpine streams are small and the associated aquifer is commonly localized and water chemistry is correlated closely with rock type. Generally, sedimentary rocks are inherently high in bases, acid igneous rocks typically low, and metamorphic rocks variable. Alpine alluvial soils that lack excess bases include those formed in acid igneous rocks, primarily diorite. These rocks are common throughout the

southern and western parts of the Alaska Range within the Park (see Plate 44). Also included in this group are metamorphic rocks, specifically schist, found extensively in the Outer Ranges and Kantishna Hills Subsections in the northern part of the Park (see Plate 30). Soils formed in alluvium derived from diorite and schist have relatively low EC and pH values and the enrichment process is not considered significant. Measured EC values in the upper part of the water table ranged from 0 to 300 micro-siemens in the diorite and 100 to 400 micro-siemens in the schist with pH values ranging from 4.0 to 6.6 in both lithologic types. Soils with excess soil bases are primarily found in soils formed in alluvium from a mixture of rock types, especially, mixed sedimentary and volcanic rocks (see Plate 46). Alpine riparian soils formed in alluvium derived from mixed sedimentary and volcanic rocks tend to have high EC values ranging from 500 to 1,500 micro-siemens, high pH values ranging from 7.6 to 8.4, and free carbonates.

Within the boreal biome, elevation is lower, streams are generally larger and associated aquifers are more regional in extent. The correlation between alluvial source material and stream productivity is less apparent. Alluvial soils on low flood plains commonly have high pH and EC levels and free carbonates are present throughout the soil, with EC values ranging from about 500 to 1,500 micro-siemens and pH values from 7.6 to 8.4.

Soils on low flood plains such as the component *Boreal-riparian scrub loamy low flood plains, moderately wet* in map unit *1FP* have additional concentration of carbonates in surface soil layers attributed to a combination of hydrologic processes and evapotranspiration. Soil surfaces are readily warmed and surface evaporation is high where there is a lack of an organic mat. The dry mineral surface layer promotes upward diffusion of water from the underlying water table. This process generally occurs during late spring and early summer when long spells of warm, clear weather are common. The combined affect of surface evaporation and plant respiration concentrates carbonate rich materials in the surface layers. This enrichment process within the boreal biome is observed elsewhere in Interior Alaska. Marion, Van Cleve et al., and Dyrness (1993), in studies along the Tanana River in Interior Alaska, observed high levels of calcium carbonate in flood plain soils formed in alluvium from mixed rock types.

Hydromorphism is associated with near-surface saturated conditions and is an extensively occurring process throughout Denali Park. Hydromorphism provides a good example of the topographic factor of soil formation, since water collects locally in small concave micro-positions on all landforms as well as regionally in broad depressions. A distribution of map units with hydromorphism identified as a primary or secondary process is provided in Figure 12. This process includes the chemical reduction, mobilization, and movement of soluble minerals and the formation of thick surface organic mats under saturated anaerobic conditions. Plant roots and soil microbes deplete the soil oxygen in these saturated soils, causing anaerobic conditions. Subsequently, iron and manganese, the primary pigments in mineral soils, are converted to reduced forms. These reduced compounds are mobile in the soil solution and are easily stripped from the soil by the water table. Soils stripped of mineral pigments in this way take on a neutral gray through bluish color, as illustrated in Plate 52, and referred to as redox depletions. Soil morphological features indicative of this process are noted with the "Cg" horizon description for *Typic Cryaquents, coarse-loamy over sandy-skeletal* in the taxonomic unit descriptions. The mobilized minerals are transported through the soil by ground water to an oxidized zone. Here, mineral oxidation and precipitation occur, imparting a yellowish through reddish color to the soil, features referred to as redox concentrations. Where the water table fluctuates near the surface, the soil environment commonly alternates between reduced and oxidized states, and soils frequently display a complex mottled pattern of both reddish-oxidized (concentrations) and grayish-reduced colors (depletions). Permanently saturated soils often have thick organic layers (see Plate 22). The accumulation and stability of organic deposits in these soils is attributed to prolonged saturation and the associated anaerobic environment.

There are three general groups of hydromorphic soils in Denali Park. These include aquifer-wet, topographically-wet, and climatically-wet soils. Aquifer-wet soils include those on flood plains and depressions in which a local or regional water table is present within the soil profile. An example of an aquifer-wet soil and associated landscape is illustrated in Plates 53 and 54. On flood plains and alluvial fans, a unrestricted water table moves readily through porous alluvial deposits. Flow-through enriches the groundwater with nutrients from surrounding mineral soils. Landform features associated with these nutrient rich aquifer-wet soils include

oxbows and cutoff meanders on flood plains, ground water discharge areas on low gradient alluvial fans, and kettles on glacial plains and hills. Soil indicators of hydromorphism on these landforms include an organic horizon up to 1 meter thick over a mineral soil substrate, soil reaction ranging from moderately acid to moderately alkaline, and moderately low to high water table electrical conductivity levels. Vegetation indicators include a prevalence of wet sedge meadow, bluejoint wet meadow, or tufted bulrush wet meadow types. These indicators and properties are described in *Boreal-riparian fen organic depressions*, a major component in map unit [1STW2](#) (see Plate 54).

Topographically-wet soils include both open swales and closed depressions where the source of water is run-in from adjoining uplands or from precipitation. Soils in these depressions are generally nutrient poor, have a water table at or very near the surface much of the growing season, have very acid pH values, and very low EC levels. Soil indicators of hydromorphism in these soils include a thick organic soil a meter or more thick with layers of water common. Vegetation indicators on these nutrient poor wet soils include vegetation dominated by sphagnum and sphagnum/sedge bog. An example of topographically-wet soils in depressions is *Boreal-bog organic depressions*, a minor component within many map units within the Kuskokwim Plain Section (see Plate 55). Topographically-wet mineral soils in swales or nivation hollows occupied by snow beds are common to the alpine and subalpine biomes. Saturated conditions result from melting snow-drifts that persist well into the summer and saturate soils down slope. Soil indicators of these seasonally saturated topographically-wet soils include a thick dark mineral surface horizon, faint reddish redox concentrations in subsoil horizons, slightly acid to neutral soil reaction in surface and subsurface layers, and moderately low to medium EC values. Often these soils have slightly higher pH values in the surface layers and become more acidic with depth. An example of these conditions are provided in the description of *Alpine-scrub-meadow mosaic gravelly till swales* a component in map unit [7TM1](#) and a typical landscape on which this component is found is illustrated in Plate 56.

The most extensive group of hydromorphic soils in Denali Park, climatically-wet soils, includes saturated soils overlying permafrost. A combination of melting snow, summer precipitation and progressive melting of the active layer during summer maintain saturated conditions. Climatically-wet soils are very poorly or poorly drained with permafrost present within one-half meter of the soil surface during summer. Soil indicators of hydromorphism in these soils include a thick surface organic mat, weakly to moderately expressed redoximorphic features, and saturated conditions in the thawed zone above the permafrost. Vegetation indicators of hydromorphism include taiga woodland or taiga/tussock woodland in which spruce trees are stunted with a tipped or “drunken” growth habit (see Plate 33). An example of a typical soil component is *Boreal-taiga silty loess slopes, frozen* a major component in map unit [3FU](#) (see Plate 21).

Braunification is the release of iron from primary minerals by oxidation or hydration. This gives the soil matrix brownish, reddish-brown, and red colors respectively ([Wilding et al. 1984](#)). This process provides a good example of the joint influences of the time and topographic factors of soil formation. Braunification is common on vegetated mountain slopes, terraces, glacial plains, and hills throughout the Alaska Range-Interior Mountains Section and less extensive in the South Central Section (see Figure 12). The process is common to soils on relatively stable surfaces not influenced by flooding or excessive down-slope movement of soil materials. Here downward movement of water through the soil profile and free movement of oxygen promote weathering of primary iron minerals. Surface stability promotes the removal of excess basic metal cations from the soil through leaching and plant use. This is normally accompanied by a lowering in soil reaction (pH) in surface layers. The weathering and translocation of primary soil minerals, including iron and organic matter, accompany soil acidification. Surface indicators of braunification include the presence of a continuous surface organic mat or dwarf scrub cover and a thin dark surface mineral horizon, all indicative of surface stability. Additional soil indicators include the presence of a light brown to yellowish brown subsurface layer that indicates weathering and translocation of primary soil minerals (see Plate 29). Soil reaction also gradually increases with depth, as illustrated in the detailed soil description for *Typic Eutrogelepts, loamy-skeletal*.

Podzolization includes the chelation and chemical migration of aluminum and iron and organic matter downward in the soil profile, leaving silica in the leached layer ([Wilding et al. 1984](#)). This process provides a good example of the combined influences of climate and parent material factors of soil formation. A

distribution of map units affected by the podzolization process is provided in Figure 12. This process of alteration and translocation is normally active under extremely acid soil conditions that are normally associated with high precipitation. Indicators of this process include a thin gray leached surface "E" horizon over a reddish or reddish brown "Bs" or "Bhs" subsoil horizon (see Plate 19). Soils displaying indicators of podzolization, or "podzols," are extensive in uplands throughout the Alaska Range-South Central Mountains and Cook Inlet Sections. Climate appears to be an important factor in defining this process within these Sections. The relatively high precipitation provides abundant water which percolates through surface and subsurface soil layers, acidifying soils, and weathering and translocating iron and aluminum downward.

Podzols in the Alaska Mountains and Yukon-Kuskokwim Bottomlands Sections in Denali Park are less extensive. Here, podzolization is more dependent on specific site and soil properties and soil morphologic properties are weakly expressed compared to those on the south side of the Alaska Range. Podzols typically are found on coarse-textured soils on stream terraces, relict sand dunes, and glacial plains and hills. Environmental variables that favor podzolization here are diverse. They include shrub birch (see Plate 57) or ericaceous scrub vegetation (which contributes resinous, acidic litter to the soil), loess surface materials that are readily weathered, unrestricted drainage, and highly permeable coarse-textured substratum materials (see Plates 50 and 58). Mid-summer soil temperatures are relatively warm in coarse-textured soils, commonly exceeding 8 °C. Warm soil temperatures initiate relatively high biological activity, enhancing weathering rates in the thin loess layers that mantle these coarse-textured soils.

Andisolization is the weathering of amorphous materials weathered from volcanic ash or "tephra." This process provides a good example of the parent material factor of soil formation. A distribution of map units associated with andisolization is provided in Figure 12. Soils affected by andisolization have unique properties. These include low bulk density, high phosphate retention, and high available water capacity. Unlike other processes, the field indicators for andisolization are more difficult to ascertain and the criteria used may be somewhat subjective. Field Indicators include a light-weight silt fraction in which most fine particles float when submerged in water. Observable lenses or pockets of very pale brown or yellow volcanic ash within the soil profile provide additional evidence (see Plates 27 and 28). Field indicators can only be verified by laboratory procedures. Analysis of tephra content in soils of Denali Park indicates major ash deposits are generally limited to soils on the south slopes of the Alaska Range in the South Central Mountains and Cook Inlet Lowlands Sections. Occasionally, ash deposits were observed on the north side of the Alaska Range. Most of these observations were along the western boundary of the Park. The source of volcanic materials requisite for andisolization is volcanoes of the western Alaska Range and the Aleutian Range. In steep mountainous areas andisolization processes are identified on slopes consisting of an admixture of volcanic ash and gravelly colluvial deposits and illustrated in Plate 18. On gentler mountain foot slopes and glacial hills and plains, andisolization processes are observed within the thick loamy mantle consisting of an admixture of volcanic ash and loess 50 centimeters thick over colluvial or glacial deposits (see Plate 19).

Cryoturbation includes the churning of surface and subsoil layers by frost action and the micro-relief features associated with this process are often referred to as "periglacial features." This process is well expressed within the thin, annually thawed zone in soils underlain with permafrost but permafrost is not requisite. Indicators of cryoturbation include disrupted and broken soil horizons, mixing of materials from different horizons, and mechanical sorting of materials ([Agriculture Canada Expert Committee on Soil Survey 1987](#)). Cryoturbation is most evident in soils with abundant soil moisture, high rates of cooling (affected by vegetation and snow cover), and frequent freeze-thaw cycles ([Embleton and King 1968](#)). The presence of earth and turf hummocks, circle, stripes, steps, solifluction lobes, peat mounds, and ice wedge polygons provide surface evidence of cryoturbation in underlying soils (see Plates 6 through 11). Micro-relief features associated with cryoturbation were described previously in [Topography](#).

Permafrost and Soil Formation

Permafrost is soil or geologic material that is continuously at or below 0° C. ([National Research Council of Canada 1988](#)). Permafrost, though not considered a soil or landscape process, has a unique set of associated properties and processes. This landscape feature provides a good example of the climate factor of

soil formation. Permafrost is found extensively on terraces, plains, hills, and mountain toeslopes throughout the Yukon-Kuskokwim Lowlands and Alaska Mountains Sections. A distribution of soil map units with permafrost is provided in Figure 8. Permafrost in soils commonly occurs as fine ice crystals between individual soil grains with occasional seams and lenses (see Plate 21). The overall ice content ranged from about 60 to 70 percent by volume in ice cores removed from two typical soil profiles from *Boreal-taiga silty slopes, frozen*, and *Boreal-taiga/tussock loamy terraces, very wet* soil components. Ice was significantly higher and was measured at about 80 percent by volume in the *Boreal-taiga peat plateaus, frozen* soil component and higher ice contents were expected at depth. Soil components in which significant thermokarst subsidence has been observed or is expected include *Boreal-taiga peat plateaus, frozen*, *Alpine-scrub organic mounds, frozen*, and *Alpine-tussock-scrub silty loess slopes, frozen* (see Plates 34 and 37). Soil components with low ice content, or those with thaw stable gravelly substrates with only minor thermokarst subsidence either observed or expected include: *Boreal-taiga loamy terraces, frozen*, a component in several flood plain units within the Kuskokwim Plain Section; and *Alpine-scrub-sedge gravelly till slopes, frozen*, and *Boreal-taiga gravelly till slopes, frozen*, which are common components to many map units within the Alaska Range-Interior Section. Disturbance of the surface organic mat of permafrost soils on slopes of 10 percent or more often results in melting of permafrost and slope failure as soils liquify and flow down-slope. Slope failures associated with melting permafrost in soils due to natural disturbance have been observed on map units [7MS3](#), [7MS4](#), [7MS31](#), and [7SA3](#).

Permafrost is generally absent in the South Central Mountains and Cook Inlet Lowland Sections as well as on flood plains and most mountains throughout the remaining areas of the Park. The South Central Mountains and Cook Inlet Lowlands are influenced by relatively warm maritime airflow from the Cook Inlet that moderates air temperatures and prevents permafrost formation in soils. Site characteristics also influence whether permafrost is present. Permafrost is generally absent on low to mid-level flood plains due to hydrologic factors. The rapid exchange of the relatively warm, mobile waters of the riverine system with the shallow water tables of the riparian system contributes to the lack of permafrost. Soil temperatures available for *Aquic Cryofluvents, coarse-loamy over sandy-skeletal* illustrate the moderating affects of the water table on soil temperatures. Shallow permafrost is not present on low flood plain positions and its first occurrence is on high flood plain surfaces that are elevated above the water table.

Within the Alaska Mountains, Yukon-Kuskokwim Bottomlands, and Kuskokwim Mountains Sections in Denali Park the formation of permafrost depends on various factors. In valleys, natural stream entrenchment lowers the riverine associated water table and removes a vital warming mechanism from the soil. Natural incision of streams reduces flooding and provides more stable surface conditions for the establishment of continuous insulating organic mats. Significant areas of soils with shallow permafrost only occur where terrace heights exceed 1.5 to 3.7 meters above the mean summer channel. Permafrost formation within these Sections also requires the presence of a loamy alluvial mantle 50 centimeters or more thick. Thermal conductivity values quantify how rapidly heat is conducted through soil. These values are relatively low in moist organic materials and moist mineral soils with loamy or finer textures (Jury et al. 1991). Low conductivity favors slow warming of soils and overall low summer soil temperatures, conditions favorable to permafrost formation. As for soils formed in gravelly alluvium on flood plains and colluvium in mountains, higher thermal conductivity properties favor heat transfer from the atmosphere during summer, resulting in rapid warming and relatively high summer soil temperatures, conditions unfavorable to permafrost formation.

Wildfires are common to the boreal and lowland subsections of the Park and impact landscapes both with and without permafrost. However, the most widespread impacts of fire are on landscapes underlain by permafrost (see Plates 35 and 36). The short-term impact following most wildfires is increased soil temperature resulting in an increase in the thickness of the active layer, the surface layer that thaws during summer. As near surface permafrost thaws, a large volume of water is liberated and either accumulates in depressions or runs off through surface or subsurface drainage outlets. Differential subsidence of the soil surface and slumping on steeper slopes can occur, depending on the ice content of the permafrost and the rate of thawing (see Plate 37). Gradually, in the absence of additional fires or disturbances, the moss-organic layer reestablishes and the permafrost level returns to the pre-fire condition (Foote 1976; Viereck 1973). Return to the pre-burn state depends, in part, on the depth of the organic layer consumed by the fire and the rate of revegetation (Viereck and Dyrness 1979) and soil texture is also an important factor in Denali Park.

The pre-burn state returns as post-fire vegetation succession progresses and the organic mat reestablishes. Dyrness (1982) reported that, four years after burning in the black spruce type, thaw layer thickness increased three-fold where one-half of the organic mat was consumed by the fire and five-fold where the entire surface was consumed and mineral soil exposed. In Denali Park, within the Yukon-Kuskokwim Bottomlands-Eolian Lowlands Subsection the maximum thaw layer observed on soils ten to fifty years following fire was only 80 centimeters. Foote (1976) and Viereck (1973) agree that, in the black spruce type in Interior Alaska, the forest canopy, forest floor, and active layer thickness return to their original state within 50 to 70 years following fire. Based on tree core observation from Denali Park, similar return intervals of organic mat thickness are expected on soils formed in thick loess deposits. However, in Denali Park, a return interval of from 100 to 150 years is estimated for stream terrace soils with a loamy alluvium surface mantle 50 centimeters or more thick that overlies sand and gravel. The higher thermal conductivity properties of these coarser textured materials is attributed to warmer soil temperatures and a longer return interval of organic mat thickness.

Specific soil processes are associated with each part of the fire cycle. The accumulation of basic soil metals and nutrients, such as calcium, magnesium, potassium, sodium, and nitrates in surface soil layers originates from the ash residue left behind after fire. The ash layer typically effervesces when dilute hydrochloric acid is added. This reaction can often be observed in the remaining surface organic layer of soils for a year or more following a fire. Associated with effervescence is a soil reaction (pH) of 8 to 8.2. Other changes in nutrient status following fire, such as improved phosphorus and nitrate status of soils, are usually related to this increase in pH (Heilman 1966). Heilman reports that the removal of low-density and low-nitrogen containing layers of moss by fire maximizes nitrogen content of soils at the surface. This restoration of the bulk of the soil nitrogen to the warmest portion of the soil profile explains the substantial improvement in productivity and nitrogen availability following burning. Acidification is associated with the aerobic, well drained, permafrost free portion of this cycle. As conditions become more acid and organic mats thicken, rates of biological decomposition slow and litter and moss tend to accumulate on the soil surface. Nutrients for plant growth become less available. Thickening of the organic mat is important in terms of nutrient cycling. Without a corresponding increase in the quantity of available nutrients, the quantity of available nutrients in the organic mat and upper portion of the soil is considerably diluted as the organic mat becomes progressively thicker. As succession proceeds, elements that are at low levels and potentially limited, such as N, P, and K, are cycled by the vegetation and dispersed throughout the increasingly thick organic layer (Heilman 1966, 1968). This gradual thickening of the surface organic mat is accompanied by a lowering of soil temperatures in underlying soils. In areas with a loamy alluvial mantle 51 centimeters or more thick, permafrost may begin to form as a result of the low thermal conductivity properties associated with the loamy mantle.

Appendixes

Appendix A—Mapping and Classification Hierarchies

Ecological Mapping Hierarchy

The National Hierarchical Framework of Ecological Units used in this inventory is a "...system for stratifying the Earth into progressively smaller areas of increasingly uniform ecological potentials" (ECOMAP 1993). The hierarchy consists of eight levels of ecological units from the Domain, which is the highest and most general level, to the Landtype Phase. A map of the upper four levels (Domain, Division, Province, and Section), developed using a top-down approach of progressively subdividing the land surface into smaller segments, was developed for Alaska by Nowacki and Brock (1995). Descriptions and other data for the Section level are included in McNab and Avers (1994), Bailey et al. (1994), and Cleland et al. (1997). One addition to the Section level is provided as a part of this project.

The upper four levels of the hierarchy were modified based on Nowacki and Brock (1995). The lower four levels of ecological mapping were developed during this survey representing the Subsection, Landtype Association, Landtype, and Landtype Phase levels of the National Hierarchical Framework of Ecological Units (ECOMAP 1993). The criteria for each of these levels are listed in the following paragraphs. Table 4 illustrates the hierarchy of ecological units for the project area. The Subsection and Landtype Association levels are described in the Resource Descriptions sections ECOMAP Subsections and ECOMAP Landtype Associations. The soil map and soil map units are equivalent to the Landtype Association level described in the Hierarchy. "Soil map" and "soil map unit" are used in place of Landtype Association in reference to the Landtype Association level throughout this survey report. General summary of principal map unit design criteria for the eight levels in the hierarchy are provided below modified for Denali Park from Cleland et al. (1997). An up-to-date list of descriptions of the upper four levels of the hierarchy for the United States is currently maintained at the following website <http://www.fs.fed.us/land/pubs/ecoregions/toc.html>.

Hierarchy Description

Ecoregion Scale

At the Ecoregion scale, ecological units are recognized by differences in global, continental, and regional climatic regimes and gross physiography. The basic assumption is that climate governs energy and moisture gradients, thereby acting as the primary control over more localized ecosystems. Three levels of ecoregions, adapted from Bailey (1980), are identified in the hierarchy:

1. *Domains* are subcontinental divisions of broad climatic similarity, such as lands that have the dry climates defined by Koppen (1931), which are affected by latitude and global atmospheric conditions. For example, the climate of the Polar Domain is controlled by arctic air masses, which create cold, dry environments where summers are short. In contrast, the climate of the Humid Tropical Domain is influenced by equatorial air masses and there is no winter season. Domains are also characterized by broad differences in annual precipitation, evapotranspiration, potential natural vegetation, and biologically significant drainage systems. The four Domains are named according to the principal climatic descriptive features: Polar, Dry, Humid Temperate, and Humid Tropical. Two domains are represented in Denali Park: Polar and Humid Temperate. The line between these two domains has been modified for the purpose of this project and follows the crest of the Alaska Range with the Polar Domain to the north and the Humid Temperate to the south.

2. *Divisions* are subdivisions of domains determined by isolating areas of definite vegetational affinities (for example, prairie or forest) that fall within the same regional climate, generally at the level of the basic types defined by Koppen (1931) as modified by Trewartha (1968). Divisions are delineated according to: the amount of water deficit (which subdivides the Dry Domain into semi-arid, steppe, or arid desert), and the winter temperatures, which have an important influence on biological and physical processes and the duration of any snow cover. This temperature factor is the basis of distinction between temperate and tropical/subtropical dry regions. Divisions are named for the main climatic regions they delineate, such as subarctic. Two Divisions are included in Denali Park:

Subarctic Division
Subarctic Regime Mountains

Several modifications to this level were incorporated as part of this project. The previous two Divisions were used only within the Polar Domain to maintain the integrity of the hierarchy. The Marine Regime Mountains Division was extended to include areas of the Alaska Range within the Humid Temperate Domain. Addition of a Marine Regime Division was necessary to include areas of the Cook Inlet Lowlands within the Humid Temperate Domain.

3. *Provinces* are climatic subzones, controlled primarily by continental weather patterns such as length of dry season and duration of cold temperatures. Provinces are also characterized by similar soil orders. The climatic subzones are evident as extensive areas of similar potential natural vegetation such as those mapped by Kuchler (1964). Provinces are named typically using a binomial system consisting of a geographic location and vegetative type such as Yukon Intermontane Plateaus-Tayga Province (Bailey et al. 1985).

Highland areas that exhibit altitudinal vegetation zonation and that have the climatic regime (seasonality of energy and moisture) of adjacent lowlands are classified as provinces (Bailey et al. 1985). The climatic regime of the surrounding lowlands can be used to infer the climate of the highlands. For example, in the Mediterranean division along the Pacific Coast, the seasonal pattern of precipitation is the same for the lowlands and highlands except that the mountains receive about twice the quantity. The provinces are named for the lower-elevation and upper-elevation (subnival) belts, for example, Rocky Mountain forest-alpine meadows. Four Provinces are included in Denali Park based on the province levels listed on the U.S. Forest Service website (<http://www.fs.fed.us/land/pubs/ecoregions/toc.html>):

M135 Alaska Range Humid Tayga-Tundra-Meadow Province
135 Coastal Trough Humid-Tayga Province
131 Yukon Intermontane Plateaus-Tayga Province
M131 Yukon Intermontane Plateaus-Tayga-Meadow Province

One modification to the Provinces level was made—a split of the M135 Province was necessary along the crest of the Alaska Range in order to separate the “Interior” Polar Domain from the “South Central” Humid-Temperate Domain.

Subregional Scale

Subregions are characterized by combinations of climate, geomorphic process, topography, and stratigraphy that influence moisture availability and exposure to radiant solar energy, which in turn directly control hydrologic function, soil-forming processes, and potential natural community distributions. Sections and Subsections are the two ecological units mapped at this scale.

1. Sections are broad areas of similar sub-regional climate, geomorphic process, stratigraphy, geologic origin, topography, and drainage networks. Such areas are often inferred by relating geologic maps to potential natural vegetation “series” groupings such as those mapped by Kuchler (1964). In recent years, numerical analyses of weather station and remotely sensed climatic information have assisted in determining Section boundaries. Boundaries of some sections approximate geomorphic provinces (for example, Blue Ridge) as recognized by geologists. Section names generally describe the predominant geomorphic type or feature upon which the ecological unit delineation is based, such as Yukon-Kuskokwim Bottomlands. Four Sections were illustrated for Denali Park by Nowacki and Brock (1995). As a result of this project, the M135A Alaska Mountains Section was split based on regional climate differences along the crest of the Alaska Range. Areas south of the crest were included in M135S South Central Mountains Section, where as slopes lying north of the crest were maintained in the M135A Alaska Mountains Section. The criteria used to make this division includes the absence of permafrost in the South Central Mountains Section as well as a distinctive difference in plant communities and soils when compared to the Alaska Mountains Section. A map and description of Sections for Denali Park are provided in the [Resource Descriptions](#) section of this document.

2. *Subsections* are smaller areas within Sections with similar surficial geology, lithology, geomorphic process, soil groups, subregional climate, and potential natural communities. Subsection boundaries usually correspond with discrete changes in geomorphology. Names of Subsections are usually derived from geologic features, such as Toklat Basin Lowlands. A map and description of Subsections for Denali Park are provided in the [Resource Descriptions](#) section of this document.

Landscape Scale

At the landscape scale, ecological units are defined by general topography, geomorphic process, surficial geology, associations of soil families, and potential natural communities, patterns, and local climates ([Forman and Godron 1986](#)). These factors affect biotic distributions, hydrologic function, natural disturbance regimes, and general land use. Local landform patterns become apparent at this level in the hierarchy, and differences among units are usually obvious to on-the-ground observers. At this level, terrestrial features and processes may also have a strong influence on ecological characteristics of aquatic habitats ([Platts 1979](#), [Ebert et al. 1991](#)).

1. *Landtype association* is the only ecological unit represented at this scale in the hierarchy. These are groupings of landtypes or subdivisions of subsections based on similarities in geomorphic process, geologic rock types, soil complexes, stream types, lakes, wetlands, subseries, or plant association vegetation communities. Repeatable patterns of soil complexes and plant communities are useful in delineating map units at this level. Names of Landtype Associations are often derived from geomorphic history and vegetation community. Landtype Associations are synonymous with the 152 detailed soil map units described in the Resource Description section of this document. Digital maps at the Landtype Association level are a principle product of this project.

Land Unit Scale

At the basic land unit scale, ecological units are designed and mapped in the field based on properties of local topography, rock types, soils, and potential natural vegetation. These factors influence the structure and composition of plant communities, hydrologic function, and basic land capability. Landtypes and landtype phases are the ecological units mapped at this scale.

1. *Landtypes* are subdivisions of landtype associations or groupings of landtype phases based on similarities in soils, landform, rock type, geomorphic process, and plant associations. Land surface form influences hydrologic function (for example, drainage density, dissection, and relief) and is often used to delineate different landtypes in mountainous terrain. Valley bottom characteristics (for example, confinement) are commonly used in establishing riparian landtype map units. Names of landtypes include an abiotic and biotic component. For Denali Park, only the abiotic component was used in the naming of Landtypes. The 101 Landtypes occurring in Denali Park are described in the [Resource Descriptions](#) section of this document.

2. *Landtype Phase* are subdivisions of Landtypes based on topographic criteria (for example, slope shape, steepness, aspect, position), hydrologic characteristics, associations and consociations of soil taxa, and plant associations and phases that influence or reflect the microclimate and productivity of a site. Landtype phases are often established based on interrelationships between soil characteristics and potential natural plant communities. In riparian mapping, landtype phases may be established to delineate different stream-type environments ([Herrington and Dunham 1967](#)). The naming convention is similar to Landtypes. Landtype Phases are not identified for all Landtypes and have not been specifically designated in this document. The Landtype phase is the smallest ecological unit recognized in the hierarchy. These are subdivisions of Landtypes based on topographic criteria such as slope shape or position, hydrologic characteristics, and plant associations and phases that influence or reflect microclimate and productivity of the site. Landtype Phases are used in this project to describe subordinate areas of micro-relief or micro-climate within a Landtype. These areas have a significantly different plant community than the dominant condition observed within the Landtype. Examples of micro-relief include areas of micro-highs or micro-lows on periglacial landforms such as circles, gelifluction lobes, steps, and stripes where micro-climate differences produce one or more significantly different subordinate plant communities. Another example of a soil micro-

climate difference that warrants the use of a Landscape Phases is stream terraces that have two or more potential plant communities occurring together in a mosaic. A slight variation in the thickness of the loamy surface layer over sand and gravel affects rooting depth and plant available water, which results in two significantly different potential plant communities. The subordinate community is assigned a Landtype Phase. Landtype Phases are also used when two or more significantly different potential plant communities occur on the same soil component and the differences between the communities can not be distinguished based on obvious disturbance or site properties. Again, the subordinate community is assigned a Landtype Phase. Within the Landtype descriptions, an Ecological Status assignment of “wetter microsite,” “drier microsite,” “beaver-impacted site and vegetation,” or various pond succession designations are used to designate Landtype Phases.

Plot Data

Point or plot sampling units are used to gather ecological data for inventory, monitoring, and quality control, and for developing classifications of vegetation, soils, or ecological types. This plot data is feed into a database for analysis, description, and interpretation of ecological units (Keane et al. 1990). Plots, while not mappable, can be shown on maps as point data and these data are provided as a product of this project.

Ecological Mapping Hierarchy as Used in Denali

For the Denali Park area, the Subsection, Landtype Association, Landtype, and Landtype Phase levels were developed using a bottom-up approach by aggregating detailed units into more generalized units. The two most detailed levels, Landtype and Landtype Phase, were identified and described as part of the field mapping procedure. The Landtype level represents a defined array of soil and site properties that result in a unique potential natural plant community and predictable seral communities. These are thought to be stable properties that are not likely to change significantly over time. Criteria that are often important in distinguishing Landtypes include surface soil texture and associated pH, slope, elevation, the presence of a shallow water table or permafrost, and flooding regime. Common disturbance factors resulting in the various seral communities within Landtypes in Denali Park include fire and flooding. Landtype Phases are used to describe subordinate areas within a Landtype with micro-relief or micro-climate that results in one or more potential natural plant communities. Landtype Associations (Soil Map Units) are scale dependent landscape units that include natural aggregations of spatially related Landtypes that can be consistently delineated on aerial photography. An example of a Landtype Association in Denali is map unit *7FP1-Boreal Flood Plains and Terraces*. Landtype Associations were grouped into Subsections based on surficial geology and lithology, geomorphic and ecological processes, soils groups, and potential vegetation. An example of a Subsection in Denali is map unit M135A.M2—Alaska Mountains. Interior Alpine Mountains.

Most soil map units in this survey are associations and complexes. Associations are map units with two or more soil components that could be delineated at the map scale of 1:63,360 but instead are grouped together because of their association on similar landforms. Complexes are map units consisting of two or more soil components, which are mapped together in a single unit because of a complex repeating pattern within which the individual soil components cannot be delineated at the map scale of 1:63,360 (see [ECOMAP Landtype and Landtype Phases](#)). Many of the map units on flood plains are complexes and most upland units are associations.

National Hierarchical Framework of Ecological Units provides a basis for assessing resource conditions at multiple scales and levels of information resolution. The Subsection level developed during this survey is applicable to area-wide planning, modeling, and management activities. The Landtype Association or Soil Map Unit level is applicable to project and management unit and sub-unit planning and modeling.

Ecological Classification Hierarchy

This survey makes use of two levels of ecological classification—Landtype classification and soil classification. A Landtype, which is the more general level of ecological classification, is a basic unit of ecological land classification and represents a type of land with a distinctive combination of potential natural

plant communities, soils, landforms, hydrology, climate, and ecological properties and processes. Landtypes of Denali Park are described in the [ECOMAP Landtypes and Landtype Phases](#).

Soils are the building blocks of Landtypes. Usually, soils have a more narrowly defined range of morphological, physical, and chemical properties than a Landtype. One or more soils that have similar vegetative and ecological potentials and processes are grouped together to define a Landtype. Soils of Denali Park are described in [Detailed Soil Descriptions](#).

Landtype-Soil Correlation

To effectively build a Landtype classification from the soil classification, a high degree of correlation between soils, vegetation, and ecological potential is necessary. To establish the relationships and maintain correlation, vegetative characteristics and ecological patterns and processes observed in the field are used in conjunction with soil characteristics and other criteria specified in *Soil Taxonomy* and *Keys to Soil Taxonomy* (Soil Survey Staff 1975; 1998). Denali Park soils are classified mostly to the family taxonomic level with a few soils classified to the subgroup level (see [Classification of the Soils](#)). One example of a taxonomically based name used to represent a soil classified to the family level is *Typic Eutrogelepts, loamy-skeletal*. Soil phases (Soil Survey Staff 1998) are defined if the range in properties for a soil is too broad to maintain the correlation with vegetative and other ecological properties. Phases are applied at any level of the soil classification. When a soil is split into multiple soil phases, phase name modifiers are added to the soil name to identify the phases. This was often necessary when two distinctive aspect related alpine plant communities exist on what otherwise appears to be the same soil. To accommodate these two distinctive communities, a cold phase was assigned to the more northerly aspect component so the component name is represented as *Typic Eutrogelepts, loamy-skeletal, cold*. A common name has been assigned to each soil map unit and each component so as to remove the technical terminology associated with the soil classification system. The common name is based on the general landscape-biome and is more easily used and visualized. For example, the landscape names associated with the previously named soil phases are *Alpine dwarf scrub colluvial slopes, high elevation* and *Alpine dwarf scrub colluvial slopes, cold*. A table of taxonomically based names and alternate landscape-biome names for each soil phase is provided in Table 17.

Landtype [M135A_356—Gravelly slopes, high elevation](#), is an example of how soils are defined and grouped into a Landtype. Within this site are eleven unique soil components. Vegetation is similar on all of these and is primarily alpine dwarf scrub dominated by white mountain avens (*Dryas octopetala*). Depth to fractured bedrock ranges from about 50 to over 150 centimeters. The primary difference between these eleven soil components is the depositional origin or rock type that comprises the soil. Materials range from gravelly colluvium, alluvium to till and the lithology of rock fragments includes schist, diorite, shale, and a mixture of types. The eleven soil components have a similar sequence and morphology of soil horizons, other site and soil properties, and all share similar vegetative and ecological properties and potentials.

Relationship Between Ecological Classifications and Mapping

As noted previously, four levels of ecological mapping—Subsections, Landtype Associations, Landtypes, and Landtype Phases—were developed during this survey. Subsections represent aggregations of Landtype Associations, which are aggregations of Landtypes. Landtype Phases describe variations in potential natural communities due to micro-relief or micro-climate. The soils themselves are components or building blocks of the Soil Map Units. A Soil Map Unit represents an area on the landscape and consists of one or more soils or miscellaneous areas (see [Resource Descriptions](#) section). For example, soil map unit [7FP1-Boreal Flood Plains and Terraces](#) represents a segment of the landscape made up of three dominant soils. The proportion of each soil, where it occurs within the unit, and other characteristics of the unit are described in the map unit description.

Because each soil component is correlated to a Landtype, a Landtype Association map can be derived from the soil map. In soil map unit [7FP1](#), the soil component *Boreal-riparian forested loamy high flood plains* correlates with Landtype [M135A_151—Loamy high flood plains](#). The soil component *Boreal-riparian scrub gravelly low flood plains, moderately wet* correlates with Landtype [135A_200-Gravelly low flood plains](#). The

soil component *Boreal-riparian scrub loamy flood plains* correlates with Landtype [M135A_100—Loamy flood plains](#). In a Landtype map, soil map unit [7FP1](#) would be included in a Landtype map unit named *Loamy high flood plains-Gravelly low flood plains-Loamy flood plains complex*.

Appendix B—Field Documentation Procedures

Soils Data

Soils data were collected to document physical and chemical properties of soils and to determine the kinds and percentages of soils that make up map units of Denali Park. Selection of representative landscapes called “study sites” for field sampling were determined by evaluating high altitude infrared photography and satellite imagery. Study sites represent two or three adjacent representative delineations that can be documented during a single field day. Study sites were plotted using a geographic information system (GIS) and coordinates obtained for helicopter navigation. Field documentation was collected and recorded on the Alaska Soil Data Form AK-232. This form consists of six basic fields: transect, component, stop, horizon, diagnostic features, and notes. A general description of each is provided below.

Soils Sampling

1. The transect field includes information pertaining to the entire delineation, such as map unit assignment, date of the field visit, AHAP photo, and study site name.
2. The component field is used to record the estimated composition of the major and minor soil components observed within the delineation.
3. The stop field is used to record pertinent information for each stop along a transect. Each stop is assigned a unique number. UTM coordinates are recorded for each stop. Landscape level observations, such as slope, elevation, depth to water table, and depth to permafrost, are recorded in this field. Also, a soil component is assigned to each stop.
4. Soil properties such as soil horizons, texture, rock fragments, and reaction observed at each stop are recorded in the horizon data field. These data provide the basic documentation from which soil map unit descriptions and interpretations are based.
5. The diagnostic features field groups soil horizons in the horizon field for interpretive purposes. In other words, this allows one to aggregate horizons for interpretive purposes such as grouping all “A,” “B,” and “C” horizons for the purpose of describing the range in soil characteristics based on major horizon groups. This field is also used to describe other soil characteristics, such as charcoal, that may occur in the soil profile but the depth or thickness is not described elsewhere in the field data.
6. The notes field is shared between the soils and vegetation sections of the database and infrequently occurring elements are recorded in this field. This may include items like the shape and hardness of rock fragments in the soil. Since rock fragments are not present in all soils, this is an infrequently made observation. Other miscellaneous observations are recorded here as well as information about plant species collected as specimens for lab identification purposes.

During fieldwork, samples of some of the soils in the area were collected for laboratory analyses. Laboratory data, together with the observed soil characteristics and properties, were used to provide baseline information of soil properties.

Vegetation Data

Vegetation data were collected to compile descriptions of the potential natural vegetation (and seral communities, if any) for the Landtypes that were identified as occurring in Denali Park. A separate vegetation map was not within the scope of this project, but a general potential vegetation map was produced from grouping the Landtypes and is presented in Figure 9.

Analysis of vegetation patterns on high altitude infrared photographs was one of the preliminary steps in site and transects selection (reconnaissance). At each stop where a soil test pit was dug, information about the vegetation was gathered and all vegetation data in the field database are tied to the stop field of the soil data. These were then stratified according to map unit and analyzed to determine the major and minor components within each unit.

Vegetation data can be grouped into two categories: those derived from field documentation (species lists, cover data, etc.), and those derived from analysis (Landtype determinations, etc.). Four different

botanists gathered vegetation data during the first two field seasons and a fifth for the remaining four field seasons. Data collection methodologies between the five botanists differed slightly. Discrepancies such as the use of different stratum codes were rectified, though some differences in the data between the first two and last four years remain.

Vegetation Sampling

At each stop the vegetation was sampled by the relevé method, using a subjective approach without preconceived bias (Mueller-Dombois and Ellenberg, 1974). The soil map unit, or polygon, was identified along a predetermined transect and the sampling stop was located near the map unit center. In the case of large map units, the sampling stop was located far enough into the polygon to minimize the effect of the ecotone. Polygons were chosen for their homogeneity. Certain map units consisted of a mosaic of two very different vegetation types, such as those found in frost-patterned ground, or the Sitka alder scrub/tall herbaceous meadow mosaics. In other cases, certain vegetation types were regularly encountered as small inclusions within map units, such as sedge/sphagnum bog meadows within black spruce woodland. In these cases, each type was surveyed separately. Very small inclusions and anomalies in the landscape (such as small drainages) were omitted from the sampling. Plants characteristic of very small inclusions, such as moist gravelly spots in dwarf alpine tundra of a few square meters, were only regarded as trace elements.

Stand size was variable, and depended on the homogeneity and extent of the map unit. The area of each polygon sampled was recorded in square meters. A typical polygon size was from 300 to 500 square meters.

Field documentation was collected and recorded on a modified version of the Alaska Soil Survey Vegetation Data Form. The form, which was developed for this project and changed slightly each field season, included several fields for: species cover, vegetation structure, vegetation cover type, seral status, fire record, animal browse, and notes. For selected forest and woodland sites, tree productivity data were recorded in a separate field and included basal area, diameter at breast height, and age.

The following steps were used to document the vegetation at each stop:

1. Species cover. A list of all vascular plants was made, as well as mosses, lichens, and fungi. Physical attributes of each stop, such as exposed soil, herbaceous litter/mulch, woody litter, standing water, and rock type were also recorded. Plants whose species could not be determined because of early phenology or vegetative growth form were recorded to genus, or in some cases, to unknown graminoid, forb or shrub. The 'unknown' category represented the total of the unknowns, and could contain more than one species. From 1999 to 2002, unknown vascular plants, as well as some non-vascular species, were collected for later determination.

All species were assigned a stratum category (tall tree, stunted tree, shrub, graminoid herbaceous, forb, etc.). Trees were sometimes found in two or more strata and each were recorded separately. The actual height for a representative species of each stratum was recorded in decimeters. An ocular estimation of percentage of cover was made for each species and recorded in increments of 5 percent. In areas of low cover (1 to 7 percent) the percentage was recorded in single increments. Those with less than 1 percent cover were recorded as a trace and given a numerical value of .1 percent in the database to allow them to be included in the statistical analysis. Since not all bryophytes and lichens could be identified, total moss and total lichen cover were recorded separately. Fungi were always recorded as a trace. Emergent and aquatic plants were recorded at the immediate margin of ponds less than one foot deep.

2. Vegetation structure. As many as five individual strata of vegetation were described for each stop. These were grouped by stratum code, and assigned a cover class of scattered, woodland/sparse, moderately open, open, moderately closed, and closed. The three dominant species, or in some instances a general description, were recorded for each stratum. The variability in this field is due to the different approaches of the five botanists.

3. Vegetation cover type (vegtype2). A general overview of the cover type was recorded in this field and later refined in the office (process described below). These cover type designations were meant to give a general thumbnail sketch of the site and then used to make the Landtype determinations.

4. Seral status/fire record. Successional status was recorded for each stand. Apparent fire history was determined by the presence of charcoal in the soil profile or by fire scarring on living woody species or on litter. Fire history was given a code of: freshly burned; burned within the last 10 years; burned from 10 to 50

years ago; burned from 50-100 years ago; burned more than 100 years ago; unknown; or, no evidence of fire. Ecostate or the seral status as it relates to the Landtype was assigned in the office.

5. Animal browse. Degree of browsing (slight, moderate, severe, unknown, or none) was recorded for willow, tree regeneration, other woody species, graminoids, forbs, moss, or lichen. If known, the animal species responsible for the browsing (moose, caribou, Dall sheep, other, or unknown) was recorded.

6. Tree productivity. At selected stops, stand productivity data were recorded for conifers. Basal area for the stand and total canopy cover were recorded. Tree cores were taken at breast height for representative species (in the case of thin-stem black spruce, a trunk slice was taken from near the base of the trunk). For each tree, the following measurements were taken: species, crown class (dominant, co-dominant, open, intermediate/suppressed, or relict), diameter at breast height in centimeters, height in meters, overall number of rings, and number of rings in the outer centimeters of the trunk. During the first field season, a measurement was taken of the last 10 rings in the trunk. Since those cores were not saved, the number of rings in the outer centimeters was estimated from the measurement.

7. Notes. This field contains a number of types of data that did not fit anywhere else in the database. Occasionally specific descriptions of the site were recorded in this field. Beginning with the 1999 field season, this field was used to record the identification numbers of photos taken at each stop. The soil pit profile, general vegetation, aerial photos of transects, rare plants or fungi, and other photos were taken using slide film. In 2001 and 2002 a digital camera was used. Photos were only taken of representative sites in 1997 and 1998, but were taken at each stop from 1999 to 2002. Identification numbers of the specimens collected at the stop and specific habitat notes were recorded here.

Also beginning in 1999, Denali Park staff requested that three categories of data be collected when possible: berry abundance, an estimation of fire laddering potential for wooded sites, and an estimation of the area of the polygon inventoried at each stop. For berry abundance, the species was recorded and given a value of 1 for a low abundance level, 2 for medium, or 3 for very abundant. For laddering, the species of tree was recorded, and a numerical value assigned to describe, in meters, the distance between the lowest branches of the tree and the ground. Approximate area represented by the vegetation descriptions is given in square meters. Of the 1,384 stops where area was recorded, the average size was 1,234 square meters.

Nomenclature

Vascular plant nomenclature used for the project is that used by The University of Alaska-Fairbanks Museum/Herbarium. Where this differs from that used in the most commonly referred to floras ([Hulten 1968 and 1973](#); [Welsh 1974](#); [Viereck and Little 1972](#); [Argus 1973](#)) synonyms or references are given in the species list presented in [Appendix D](#). A more up to date reference is [Cody \(1996 and 2000\)](#). Some records from 1997-1998 are recorded above the species level; for those that refer to genera recently revised and split, the original entry has been retained, *sens. lat.* Name codes used in the database for vascular plants, bryophytes, and mosses were taken from the Alaska Database of Plants, a subset of the USDA PLANTS Database ([USDA 2001](#)). Codes for fungi and for plants not yet included in the PLANTS database, were prepared in-house.

There were 1,551 specimens, including a few non-vascular specimens and tree cores, collected during the 1999-2002 field seasons. These were donated to Denali Park. Carolyn Parker of the University of Alaska Fairbanks Museum/Herbarium reviewed difficult to identify and rare vascular plant taxa and some were sent to specialists for verification. Bryophytes, lichens, and fungi have not been verified. The fungi were keyed using common field guides ([Arora 1986](#); [Schalkwijk-Barendsen 1994](#); [Lincoff 1981](#)) and the species are only preliminary determinations.

Landtype and cover type naming conventions

Codes were devised to describe structure (a numerical prefix), the dominant and co-dominant or sub-dominant species (using two letter codes for common names), and a suffix for general vegetation pattern. Designations follow commonly accepted categories similar to those of [Viereck and others \(1992\)](#), including forest (XFO), woodland (XWO), scrub (XSC), and meadow (XME), and also include slightly modified categories of alpine dwarf shrubs (XTU), wet meadow (XMW), and wet meadow-bog (XMQ). Two

designations for types with less than 10 percent vegetation were used: sparsely vegetated (XSV) and talus or scree slope (XTS). Physical features for forest and scrub categories and their codes include canopy closure (4=closed or 1=open) and stature (5=tall, 7=low, and 8=dwarf).

For example:

45SA-SWXSC closed tall Sitka alder-Sitka willow scrub
 15SA-SWXSC open tall Sitka alder-Sitka willow scrub
 4PB-WSXFO closed paper birch-white spruce woodland

These codes were later correlated in the office. For scrub types, stature and canopy closure were removed and correlated to more general categories (45SA-SWXSC became SA-SWXSC). Canopy closure was retained for forest types in the correlated codes. The vegetation cover types were the basic building blocks for the Landtype reports, but are no longer a part of the reports.

These designations were meant to represent cover type only, and no distinction was made for seral status, which was recorded in a separate field. A classification of vegetation communities was beyond the scope of this project. The cover types used here are somewhere between Viereck Level IV and Level V classifications (Viereck et al. 1992). The Denali National Park and Preserve Land Cover Mapping Project (Boggs et al. 2001) was completed during the course of our fieldwork and produced a digital land cover map with extensive vegetation interpretation. This, along with data from Heebner (1982), helped refine our type categories.

Closely related or very similar species were sometimes considered as one in preparing the cover types. For example dwarf birch, resin birch, and shrubby hybrid birches were lumped together as shrub birch. Alaska white mountain avens was not separated from the common white mountain avens early on in the fieldwork. Although both are found in many alpine situations, the Alaska white mountain avens was found to prefer snowbeds and, thus, was kept distinct in those communities.

The following is a list of closely related plants that were treated as one in the vegetation cover type classification:

Included Species	Aggregated Name
<i>Betula nana</i>	"shrub" birch
<i>Betula glandulosa</i> shrubby <i>Betula</i> hybrids <i>Carex rostrata</i>	beaked sedge
<i>Carex utriculata</i> <i>Carex bigelowii</i>	Bigelow sedge
<i>Carex lugens</i> <i>Carex microchaeta</i> ssp. <i>Microchaeta</i> <i>Carex microchaeta</i> ssp. <i>Nesophila</i>	small awned sedge
<i>Dryas alaskensis</i> (<i>D. octopetala</i> ssp. <i>alaskensis</i>) <i>Dryas octopetala</i>	white mountain avens
<i>Empetrum nigrum</i> (<i>E. nigrum</i> ssp. <i>nigrum</i>)	crowberry
<i>Empetrum hermaphroditum</i> (<i>E. nigrum</i> ssp. <i>hermaphroditum</i>)	
<i>Eriophorum brachyantherum</i>	tussock cottongrass
<i>Eriophorum vaginatum</i> <i>Ledum palustre</i> ssp. <i>Decumbens</i> <i>L. groenlandicum</i> (<i>L. palustre</i> ssp. <i>groenlandicum</i>)	Labrador tea

Populus balsamifera ssp. *balsamifera*
Populus balsamifera ssp. *trichocarpa*

poplar

Landtype. The Landtype description identifies the primary potential vegetation community for a site. For some sites there is also a dry or moist Landtype Phase, which is often encountered as a mosaic with the primary type. In areas with regular disturbance regimes, seral communities were identified. Some of the disturbance processes are fire, flooding, pond succession, and to a lesser extent, beaver activity. Seral communities were identified as pioneering, early, middle, and late stage. In some cases post potential (decadent) stands were identified.

To describe the potential community, vegetation data were stratified according to Landtype and seral status (Ecstate). Vegetation cover types found in the Ecstate were listed and the data from those stops pooled. The minimum, maximum, and average cover for each species was calculated. Frequency within the stands was measured as well. An importance value was calculated as the square root of the product of the average cover and frequency. Plants with an importance value of less than 10 were omitted from the report. For each site, species richness was reported as the total number of vascular plants found within the primary community or sere, and the average species richness encountered in them. Other data, such as cover class (tall tree, tree regeneration, tall shrub, dwarf shrub, etc.) and minimum, maximum, and average height were also included.

Unusual or uncommon vegetation types were examined more closely. Most of these were errors in stratification assignment. In some, the vegetation was not characteristic of the normal variation within the set, but the stop could not be reassigned to a different site because of its physical aspects. These were omitted from the analysis. Once the data set was checked and the data analyzed, a name for the potential community (and seres, if any) was chosen based on the dominant vegetation. The name was chosen to reflect the community as a whole, and may not include all of the dominant species found there.

Appendix C—Vegetation Description and Floristics

Denali National Park and Preserve encompasses two major climate and floristic zones. The transitional maritime-continental climate of the south side supports a very different set of plant species and communities from the Interior climate of the north side (see Figure 7). Precipitation south of the range is much greater (see Table 3) than on the north side (see Tables 1 and 2), as evidenced by huge glaciers. A distribution of potential natural plant communities is provided in Figure 9.

Denali Park is dominated by the Denali massif, and its non-vegetated peaks of ice and rock take up almost one-sixth of its total area. The transition from barren rock and ice to the vegetated portions of the Park begins on high talus and scree slopes with sparse plant cover. Immediately below is a belt of low vegetation consisting of dwarf shrub scrubs and herbaceous meadows (see Plate 59). Mid-elevation slopes are covered with low to medium-sized shrubs of willow or birch. These are interspersed with and grade into taller scrubs of alder (see Plate 60). Most of Denali Park is above tree line. Woodlands and forests occupy well-drained lower slopes and floodplains. Extensive areas of poor drainage (due notably to permafrost on the north side of the range) are covered by woodland muskegs, wet meadows, bogs, and fens (see Plate 61).

There were 1,928 data stops made during the six field seasons and vegetation at those stops can be summarized as follows:

- 37 percent low to tall shrub scrubs
- 25 percent coniferous forests and woodlands (mostly woodlands)
- 17 percent alpine dwarf shrub scrubs
- 7 percent alpine herbaceous meadows
- 7 percent lowland herbaceous meadows
- 6 percent broadleaf-mixed coniferous forests and woodlands

A few stops (about one percent) were made in sparsely vegetated scree slopes and gravel bars. These habitats are grouped with the non-vegetated units, but have characteristic plant associations.

Vegetation of the North Side: Alaska Mountains, Kuskokwim Mountains and Yukon-Kuskokwim Bottomlands Sections

Roughly three quarters of Denali Park is north of the Alaska Range and there is a higher diversity of plant communities there than on the south side. The road into Denali Park meanders for approximately 136 kilometers. At the Park entrance, mixed forests of white spruce (*Picea glauca*) and quaking aspen (*Populus tremuloides*) are found at the lower elevations. Isolated patches of dwarfed aspen and poplar (*Populus balsamifera* ssp. *balsamifera*) are found on the upper edges of south-facing slopes and escarpments (see Plate 62). These dry communities are small in extent but characteristic of the northeast section of Denali Park and are reminiscent of Interior Alaska steppe bluffs. The Park road then ascends into extensive shrub birch (*Betula glandulosa* and *B. nana*) and alpine areas (see Plate 57), briefly crossing the floodplain forests of several braided rivers before descending into the Wonder Lake area (and then radiating out on smaller mining access roads and trails into the scrubs, mixed forests, and woodlands of the Kantishna Hills). Few visitors or Park personnel venture into the expanse of the Yukon-Kuskokwim Bottomlands Section, whose birch scrubs, braided rivers, black spruce muskegs, and other wetlands extend to Lake Minchumina, just beyond the Park boundary.

The dwarf alpine scrub communities of the Alaska Mountains Section are dominated by white mountain avens (*Dryas octopetala*) (see Plate 40) mixed with a variety of ericaceous species. Drier sites have very high lichen diversity (see Plate 59) and moist sites have diverse herbaceous meadows. Lower slopes are often more species-rich, perhaps due to accumulation of nutrients resulting from downward creep. Four-angled cassiope (*Cassiope tetragona*) dominates on cooler exposures, often with crowberry (*Empetrum hermaphroditum*), dwarf willows (*Salix* spp.), and Alaska mountain avens (*Dryas alaskensis*). Disturbance regimes of the alpine area are limited, with seral processes mainly occurring on old moraines, on narrow floodplain gravel bars, and in old kettle pond basins. Permafrost is of limited extent, but cryoturbation and soil creep contribute to plant community dynamics.

Dwarf alpine scrub communities grade into low and medium shrub birch-blueberry (*Vaccinium uliginosum*) communities, which cover large areas of the Park. Like the alpine sites, these communities are subject to cryoturbation and soil creep and are interspersed with freeze-thaw ruptures and gelifluction lobes (see Plate 9). Moist areas have a significant under story of sedge (*Carex* spp.), and scrubby drains are dominated by diamondleaf willow (*Salix pulchra*). Poorly drained terraces and basins are covered by meadows of tussock cottongrass (*Eriophorum brachyantherum* and *E. vaginatum*) (see Plate 10) mixed with low birch and dwarf ericaceous shrub. These are especially evident in the north central area east of the Kantishna Hills and atop isolated hills like Castle Rocks. Fire is an important disturbance regime.

In the Yukon-Kuskokwim Bottomlands Section, open black spruce (*Picea mariana*) woodlands (see Plate 38) and forests are the main feature of the Minchumina Basin, and are often stunted due to permafrost (taiga). Tamarack (*Larix laricina*) is usually present in low numbers, but is more prominent in and around fens. Distinctly different understories of ericaceous scrub (especially Labrador tea, *Ledum palustre* ssp. *decumbens* and *L. groenlandicum*), tussock cottongrass, and lichen are related to subtle differences in drainage. Fire-induced succession is an important and complex process in the basin, and seral communities range from ericaceous/tussock cottongrass scrubs to broadleaf forests (see Plate 36). Fire also plays an important part in disturbance of permafrost in this section. The muskegs are interspersed with sedge/sphagnum collapse bogs (see Plate 55) and ponds associated with the thawing of permafrost. Slow drainages of diamondleaf willow and leatherleaf scrub are common.

Thin bands of well-drained river terraces support forests and woodlands of white spruce and balsam poplar, with associated riverine successional communities of tall alder and willow thickets (see Plate 63). Scrubs of low willow, soapberry (*Shepherdia canadensis*), and occasionally silverberry (*Eleagnus commutata*) develop from the dry or moist herbaceous meadows that line the recently colonized gravel bars. Beaver-influenced communities occur in drainages, especially adjacent to escarpments and footslopes.

Immediately south of the Kantishna River, fens drain a large area of groundwater discharge, which is distinctive enough to be considered a zone by itself. Scrubs and muskeg here are like those in the black spruce zone, but with a higher percentage of sweet gale, shrubby cinquefoil, and often contain iris. Some fen meadows, dominated by tufted bulrush (*Trichophorum cespitosum*), have distinctive and unusual assemblages of plant species (see Plate 54).

In the extreme northwest corner of the preserve, beyond Birch Creek and the Herron River, is a region of lowlands dominated by numerous small lakes, ponds, sloughs, and meandering rivers. Vegetation on higher ground here is a seral mix of paper birch, black, and white spruce forests related to the freeze-thaw dynamic of permafrost development and destruction. Large lakes often have a narrow strand of bluejoint (sometimes several stands that are over a meter high) running parallel to the shoreline (see Plate 64). This part of Denali Park has the lowest elevation north of the Alaska Range (less than 200 meters) and, along with Lake Minchumina, represents the divide between the Kuskokwim and Tanana drainages. Floristically it is distinct, with many elements typical of the interior lowlands that only just reach into the study area. Hydrology and lake/pond succession patterns here are complex (see Plate 61).

Much of the basin is flat, broken only by river drainages and the low relief of relict Pleistocene dunes located at its extreme western edge (see Plate 58). From these lowlands rise the small and isolated Kuskokwim Mountains Section, notably surrounding Lake Chilchukabena. Warm, well-drained hill slopes are covered by closed paper birch forest. Cooler, north-facing slopes support black spruce/Labrador tea woodlands very similar to those of the Yukon-Kuskokwim Bottomlands Section. Poorly drained, flat-topped hills have tussock cottongrass meadows that are also very similar to those of the Bottomland (see Plate 24).

Vegetation of the South Side: South Central Mountains and Cook Inlet Lowlands Subsections

Vegetation of the South Central climate zone is markedly different from the previously described north side sections, as discussed below. Many species that are dominant on the south side are found only in small populations north of the range. Some species are almost completely restricted to the South Central climate and may be used as indicators of it. These plants occur only rarely on the north side, primarily in valleys positioned along the transition between the two climates. The following is a list of plant species found in the South Central climate zone:

Actaea rubra (Ait.) Willd. ssp. *arguta* (Nutt.) Hultén
Alnus crispa (Ait.) Pursh ssp. *sinuata* (Regel) Hultén
 (synonym=*A. sinuata* (Regel) Rydb.)
Arnica latifolia Bong.
Athyrium filix-femina (L.) Roth ssp. *cyclosorum* (Rupr.) C. Christens.
Botrychium lanceolatum (Gmel.) Angstr.
Caltha leptosepala DC.
Carex anthoxanthea J. & K. Presl
Carex mertensii Prescott ex Bong.
Carex nigricans C.A. Mey.
Carex pauciflora Lightf.
Carex echinata Murr. ssp. *phyllomanica* (W. Boott) Reznicek
 (synonym=*C. phyllomanica* W. Boott)
Carex micropoda C.A. Mey.
 (synonym=*C. pyrenaica* Wahlenb. ssp. *micropoda* (C.A. Mey.) Hultén)
Cinna latifolia (Trev. ex Goepp.) Griseb.
Cryptogramma acrostichoides R. Br.
 (synonym=*C. crispa* R. Br. var. *acrostichoides* (R. Br.) Clarke)
Erigeron peregrinus (Banks ex Pursh) Greene
Fritillaria camschatcensis (L.) Ker-Gawl.
Gentiana douglasiana Bong.
Geum macrophyllum Willd. sens. str.
Heuchera glabra Willd. ex Roemer & J.A. Schultes
Juncus drummondii E. Mey.
Juncus mertensianus Bong.
Luetkea pectinata (Pursh) Kuntze
Lupinus nootkatensis Donn ex Sims
Mitella pentandra Hook.
Oplopanax horridus Miq.
 (synonym=*Echinopanax horridum* (Sm.) Decne. & Planch.)
Osmorhiza depauperata Phil.
Phyllodoce aleutica (Spreng.) Heller ssp. *aleutica*
Platanthera dilatata (Pursh) Lindl. ex Beck
Polystichum lonchitis (L.) Roth
Populus balsamifera L. ssp. *trichocarpa* (Torr. & Gray ex Hook.) Brayshaw
Ranunculus occidentalis Nutt. var. *brevistylis* Greene
Rubus pedatus Sm.
Rubus stellatus Sm.
 (synonym=*Rubus arcticus* L. ssp. *stellatus* (Sm.) Boivin)
Salix sitchensis Sanson ex Bong.
Sambucus racemosa L. ssp. *pubens* var. *arborescens* (Michx.) House
Scheuchzeria palustris L. ssp. *americana* (Fern.) Hultén
Senecio triangularis Hook.
Stellaria crispa Cham. & Schlecht.
Stellaria borealis Bigelow ssp. *sitchana* (Steudel) Piper.
 (synonym=*Stellaria sitchana* Steud var. *sitchana*)
Vaccinium cespitosum Michx.
Vaccinium ovalifolium Sm.
Vahlodea atropurpurea (Wahlenb.) Fries ex Hartman
Veratrum viride Ait. ssp. *eschschoitzii* (Gray) Love & Love

A majority of the south side communities within the Denali Park's borders are alpine and subalpine scrubs (see Plate 65) and are found within the South Central Mountains Section. The expansion of the Park's boundary in 1980 added small slivers of the Cook Inlet Section at low elevations (see Plate 66). These include areas along the headwaters of the Yentna, Kahiltna, and Tokositna Rivers. The upper Yentna Valley, comprised of two main forks, is the most extensive and complete South Central riverine system in Denali Park, and contains the largest concentration of South Central lowland habitats. Fire has a much smaller role on the south side. Permafrost was found so infrequently on the south side it could not be mapped at the scale we employed. Only two field stops identified permafrost and associated plant communities more typical of the Interior. One was found on a northeast-facing slope near the terminus of the Dall Glacier, which supports a shrub birch-blueberry community. Another was found in an open black spruce forest on a stream terrace along the Kahiltna River.

The dwarf alpine scrubs of the South Central Mountains Section are characteristically ericaceous. Below the sparsely vegetated talus and scree slopes, Steller cassiope (*Cassiope stelleriana*) (see Plate 41) and crowberry (*Empetrum hermaphroditum*) are joined by partridge foot (*Luetkea pectinata*) to form a thick dwarf vegetation mat. When underlain by a loamy soil rich in volcanic ash, small hummocks form from frost action (see Plate 49), giving those communities a pebbled look from the air. Partridge foot, with forbs and graminoids, often dominate in moist snowbed depressions. Below the ericaceous zone is a belt of medium size Barclay willow (*Salix barclayi*) scrub, occasionally mixed with diamondleaf willow (*Salix planifolia*) (see Plate 42). These willow scrubs form a mosaic with meadows of medium sized forbs, notably northern geranium (*Geranium erianthum*) and Sitka burnet (*Sanguisorba stipulata*).

Immediately below the alpine zone are extensive stands of tall Sitka alder (*Alnus sinuata*) scrub. These dense stands are typically species-poor, and may have a sparse to dense understory of shield fern (*Dryopteris dilatata*) (see Plate 67) and devil's club (*Oplopanax horridus*). They form a mosaic with meadows of bluejoint (*Calamagrostis canadensis*) and tall forbs such as lady fern (*Athyrium filix-femina*), fireweed (*Epilobium angustifolium*), and corn lily (*Veratrum viride*) (see Plate 68). Alpine basin drainages are dominated by short stalked sedge (*Carex podocarpa*)-mixed forb meadows that may have a small but significant percentage of willow. Wet sedge meadows are scattered throughout on poorly drained, gentle slopes with smooth lawns of few-flowered sedge (*Carex pauciflora*) and tufted bulrush (*Trichophorum cespitosum*), broken by shallow flarks (see Plate 69).

In the Cook Inlet Lowlands Section, Sitka alder (*Alnus sinuata*) scrub intergrades with paper birch (*Betula neoalaskana*) or mixed paper birch-white spruce woodlands. Poplar (either balsam poplar or black cottonwood, *Populus balsamifera* ssp. *trichocarpa*) and willows are additional components of similar communities on large alluvial fans (see Plate 70). Terraces along the rivers draining the huge southern glaciers are influenced by flood plain succession. Yellow mountain avens (*Dryas drummondii*) is eventually replaced by mixed willow-soapberry scrubs and tall forests of poplar (either balsam poplar or black cottonwood) and Sitka alder (see Plate 43). Moist areas progress from mixed willow, thinleaf (*Alnus tenuifolia*) and Sitka alder scrubs to tall forests of poplar, Sitka alder, and devil's club. Moraine succession is evident in the upper reaches of the valleys, and beaver-induced patterns of succession are very common on flood plains immediately adjacent to mountain slopes. Hydrology and plant community composition are extensively altered, more so than in valleys on the north side of the Alaska Range.

The poorly drained lowland communities include extensive scrub and herbaceous wetlands, especially wet meadows of water sedge (*Carex aquatilis*) and tufted bulrush-few-flowered sedge, in addition to fens of buckbean (*Menyanthes trifoliata*) and water horsetail (*Equisetum fluviatile*) (see Plate 53). Few-flowered sedge-tufted bulrush meadows have a narrow margin of dwarfed black spruce woodlands.

Transition Areas

Transition zones between the north and south sides of the Alaska Range were found on either side of the McKinley-Foraker massif, in the eastern valleys from the Windy Pass to Broad Pass areas, and to a smaller extent in the narrow valley passes of the southwest. The Windy Pass and Broad Pass transition areas, though north of the hydrographic divide, contained many elements of the south side such as with Barclay willow (*Salix barclayi*) and sometimes Sitka alder (*Alnus sinuata*) scrub at low elevations. High alpine dwarf

scrub in the Upper West Fork of the Yentna resembled alpine communities of the north side with dwarf scrubs of white mountain avens..

Plant species generally restricted to the South Central flora were occasionally found in the upper reaches of other north side valleys. The presence of southern elements was noticeable in Chedotlothna Glacier area with partridge foot, lance-leaved moonwort (*Botrychium lanceolatum*), and Drummond rush (*Juncus drummondii*) but was most apparent in Refuge Valley, whose wildflower displays are legendary. Its reputation is probably due, at least in part, to the presence of many southern species. Large meadows there contained numerous herbaceous species of the south side, as well as thickets of Barclay willow (*Salix barclayi*), snowbeds of partridge foot, and even small populations of Aleutian mountainheath (*Phyllodoce aleutica*). Isolated parts of the Kantishna Hills are reported to contain several South Central plant species (Carl Roland, NPS, personal communication), but we did not encounter any of these along transects.

Many plants common on the north side are also common on the south side. Of the few plants with ranges more restricted to interior communities, several were found south of the hydrographic divide. All were found in the southwest transition zone. The uppermost portion of the West Fork of the Yentna River (Roland 1999), at Shellabarger Pass and Mystic Pass, contained several of these elements: downy ryegrass (*Leymus innovatus*), Baffin fescue (*Festuca baffinensis*), and elegant paintbrush (*Castilleja elegans*). The southwestern area of transition was found to be much smaller than the Broad Pass transition zone, which was not surprising given the topography of the high and narrow passes.

The so-called blue mountainheath (*Phyllodoce caerulea*) was found to be a small but significant constituent of ericaceous communities in two stops at Augustin Peak and one near Simpson Pass. This plant species indicates affinities with the western Alaskan flora in that most distant corner of Denali Park.

Floristics

A total of 662 species of vascular plants were observed at our data stops, with an additional 51 subspecies or varieties and three hybrids. Fifteen additional species were observed outside of data stops. A list of the plants observed, grouped according to life form, is found in [Appendix D](#). Although our geographic coverage of the study area was extensive, not all plants that have been documented were observed on transects. Transect stops were chosen to represent typical and widespread soil types and not small unique plant communities. Transect stop selection normally avoided irregular areas, ecotones, seeps, cliffs, and other areas of limited extent which often harbor species with narrow habitat requirements. These habitats were included only when incidentally found within map units and were not thoroughly examined. The results of recent NPS vascular plant inventories are currently being compiled and will produce a more comprehensive list (Amy Larsen, NPS, personal communication).

Only the major species or genera of non-vascular plants, lichens, and fungi were identified during this study. Over 50 kinds of lichens (some identified only to genus or as "lichen species groups"), approximately 40 bryophytes, and 150 fungi were observed.

A total of 1,243 vascular plant specimens were collected. Additionally, of the tree cores and trunk slices examined, 244 were saved. One hundred and thirty fungi, 63 mosses and liverworts, and 52 lichen collections were made. These are all available. Taxa determinations of rare and difficult to identify vascular plants were made by Carolyn Parker of the University of Alaska Museum/Herbarium. Additional identifications were made by David Murray, Curator Emeritus of the University of Alaska Museum/Herbarium, Donald Farrar of the University of Iowa at Ames, George Argus, Curator Emeritus of the Canadian Museum of Nature at Ottawa, and other specialists. Non-vascular collections have not been reviewed and determinations, especially of fungi, are provisional.

Notable Plants and Plant Communities

During the course of our fieldwork, a number of plants were encountered that were notable either as rarities or as alien plants that had become established in natural plant communities. These plants were tracked within our database and their occurrences are noted in the Landtype description reports. None of these plants are extremely unusual, but many are so little reported on in the state that they are currently tracked by the Alaska Natural Heritage Program (AKNHP). Their Biological and Conservation Database is

dynamic, and additions or deletions from the tracking list are made when new data become available. During the six years of fieldwork for this project several plant species, such as tufted loosestrife (*Lysimachia thyrsiflora*), have been removed from the AKNHP list (2002). Occurrences are still noteworthy for these plants and they have been kept on our list of notable plants. Other plants on our list, while not rare, are notable as large range extensions, or as being either new to Denali Park or little known there. Two hepatics are considered uncommon in our area (Racine et al. 1997 and Vitt, Marsh and Bovey, 1988) and one lichen was considered unusual for Denali Park (Peter Neitlich, NPS, personal communication). They are listed below.

The alien plant taxa were encountered in remote areas with very little or no apparent human disturbance, and the list was maintained separately from the other notable alien plants. An additional list of other notable alien plants includes those plants that were collected during the course of fieldwork, but which were not found in data stops or were from data stops within the corridor. Most of the occurrences of the notable plants were documented with voucher collections during the 1999-2002 field seasons.

Notable rare plants and range extensions based on observations in data plots:

Agrostis alaskana Hultén
Agrostis geminata Trin.
Aphragmus eschscholtzianus Andr. ex DC. (G3 S3)
Arenaria longipedunculata Hultén (G3G4Q S3)
Arnica amplexicaulis Nutt. ssp. *prima* Maguire
Astragalus aboriginum Richards.
Aster junciformis Rydb.
Astragalus sealei Lepage
(synonym=*A. eucosmus* Hornem. ssp. *sealei* (Lepage) Hultén)
Astragalus robbinsii (Oakes) Gray
Bidens tripartita L.
Botrychium alaskense W.H. Wagner & J.R. Grant (G2G3 S2S3)
Botrychium manganense Victorin
(synonym=*B. lunaria* (L.) Sw., in part)
Botrychium virginianum (L.) Sw. (G5T5 S1S2)
Braya glabella Richards. ssp. *glabella*
(synonym=*Braya bartlettiana* Jordal)
Calla palustris L.
Caltha natans Pallas ex Georgi
Calypso bulbosa (L.) Oakes
Calamagrostis stricta (Timm) Koeler ssp. *stricta*
(synonym =*C. neglecta* (Ehrh.) Gaertn., Mey. & Schreb.)
Carex adelostoma Krecz. (G4 S1)
Carex albo-nigra Mack.
Carex chordorrhiza Ehrh. ex L. f.
Carex diandra Schrank
Carex eburnea Boott (G5 S2S3)
Carex echinata Murr. ssp. *phyllomanica* (W. Boott) Reznicek
(synonym=*C. phyllomanica* W. Boott)
Carex eleusinoides Turcz.
Carex enanderi Hultén (G5T3Q S3)
(synonym=*C. lenticularis* Michx. var. *dolia* (M.E. Jones) L.A. Standley)
Carex foenea Willd. (including *C. aenea* Fern.)
Carex heleonastes Ehrh.* (G4 S2)
Carex interior Bailey (G5 S1)
Carex laeviculmis Meinsh.
Carex lasiocarpa Ehrh. ssp. *americana* (Fern.) Hultén
Carex lyngbyei Hornem.
Carex macrochaeta C. A. Mey.

- Carex oederi* Retz. ssp. *viridula* (Michx.) Hultén
Carex cf. *parryana* Dew. (G4 S1)
Carex rossii Boott
Carex sitchensis Prescott
Carex spectabilis Dew.
Carex supina Willd. ssp. *spaniocarpa* (Steud.) Hultén
Carex williamsii Britt.
Ceratophyllum demersum L. (G5 S2)
Cicuta bulbifera L. (G5 S1S2)
Circaea alpina L.
Claytonia tuberosa Pall.
Conocephalum conicum (L.) Dumort.
Coptis trifolia (L.) Salisb.
Cystopteris montana (Lam.) Bernh. ex Desv.
Danthonia intermedia Vasey
Deschampsia beringensis Hultén
Deschampsia breviifolia R. Br.
Diphasiastrum sitchense (Rupr.) Holub
(synonym = *Lycopodium sabinifolium* Willd. var. *sitchense* (Rupr.) Fern.)
Douglasia alaskana (Coville & Standl.) S. Kelso (G2G3 S2S3)
(synonym = *Androsace alaskana* Cov. & Standl.)
Douglasia gormanii Constance (G3 S3)
Draba lactea Adams
Draba lonchocarpa Rydb.
Draba lonchocarpa Rydb. var. *lonchocarpa*
Draba macounii O.E. Schulz (see Cody, 1996)
Draba ruaxes Payson & St. John (G3 S3)
(synonym = *D. exalata* Ekman)
Draba stenopetala Trautv.
Elaeagnus commutata Bernh. ex Rydb.
Eleocharis quinqueflora (F. Hartmann) O. Schwarz (G5 S1)
Elymus trachycaulus (Link) Gould ex Shinners ssp. *novae-angliae* (Scribn.) Melderis
(synonym = *Agropyron pauciflorum* (Schwein) Hitchc. ssp. *novae-angliae* (Scribn.) Melderis)
Epilobium leptocarpum Haussk.
Erigeron eriocephalus J. Vahl
Erigeron glabellus Nutt. ssp. *pubescens* (Hook.) Cronq.
Eriophorum gracile W.D.J. Koch
Eriophorum viridicarinatum (Engelm.) Fern.* (G5 S2)
Festuca baffinensis Polunin
Festuca brevissima Jurtz.
(synonym = *Festuca ovina* L. ssp. *alaskaensis* Holmen, in part)
Gentianopsis detonsa (Rottb.) Ma ssp. *yukonensis* (J. Gillett) J. Gillett
(synonym = *Gentiana barbata* Froel.)
Gentiana douglasiana Bong.
Glyceria borealis (Nash) Batchelder several sites
Glyceria maxima (Hartm.) Holmb. ssp. *grandis* (S. Wats.) Hultén
Glyceria striata (Lam.) Hitchc. ssp. *stricta* (Scribn.) Hultén (G5T5Q S2)
Goodyera repens (L.) R. Br. ex Ait. f. var. *ophioides* Fern.
Hammarbya paludosa (L.) Kuntze (G4 S2S3)
(synonym = *Malaxis paludosa* (L.) Sw.)
Hippuris montana Ledeb.
Huperzia miyoshiana (Makino) Ching
(synonym = *Lycopodium selago* L. ssp. *chinense* (Christ) Hultén)

Isoetes echinospora Durieu
Juncus stygius L. ssp. *americanus* (Buchenau) Hultén
Kobresia sibirica Turcz.
Lemna minor L.
Lemna trisulca L.
Lycopodium dendroideum Michx.
Lysimachia thyrsoflora L.
Minuartia biflora (L.) Schinz & Thellung (G5 S2)
Myriophyllum verticillatum L. (G5 S3)
Najas flexilis (Willd.) Rostk. & Schmidt (G5 S1S2)
Nymphaea tetragona Georgi
Osmorhiza depauperata Phil.
Oxytropis huddelsonii Porsild (G3 S2S3)
Oxytropis mertensiana Turcz.
Pedicularis macrodonta Richards. (G4Q S3)
Phyllodoce aleutica (Spreng.) Heller
Phyllodoce caerulea (L.) Bab.
Pilophorus robustus Th. Fr.
Poa leptocoma Trin. (G5 S2)
Poa macrocalyx Trautv. & Mey.
Podagrostis aequivalvis (Trin.) Scribn. & Merr.
Polygonum amphibium L. ssp. *laevimarginatum* Hultén
Polygonum pennsylvanicum L. ssp. *oneillii* (Brenckle) Hultén
Polystichum braunii (Spenn.) Fee var. *alaskense* (Maxon) Hultén
Polystichum lonchitis (L.) Roth
Potamogeton epihydrus Raf. var. *ramosus* (Peck) House
Ranunculus macounii Britt.
Ranunculus pennsylvanicus L. f.
Ricciocarpos natans L.
Rubus spectabilis Pursh
Salix setchelliana Ball (G4G3 S3)
Salix candida Fluegge ex Willd. (G5 S2S3)
Salix exigua Nutt. ssp. *interior* (Rowlee) Cronquist
 (synonym=*S. interior* Rowlee)
Salix lucida Muhl. ssp. *lasiandra* (Benth.) E. Murray
Scheuchzeria palustris L. ssp. *americana* (Fern.) Hultén
Scirpus validus M. Vahl
Selaginella sibirica (Milde) Hieron.
Solidago lepida DC.
Sparganium minimum (Hartman) Wallr.
Stellaria alaskana Hultén (G3 S3)
Stellaria dicranoides Fenzl (G3 S3)
 (synonym=*Arenaria chamissonis* Maguire)
Stellaria longifolia Muhl.
Subularia aquatica L.
Swida stolonifera (Michx.) Rydb.
 (synonym=*Cornus stolonifera* Michx.)
Thlaspi arcticum A. Pors. (G3 S3)
Tofieldia glutinosa (Michx.) Pers. ssp. *brevistyla* C.L. Hitchc.
Typha latifolia L.
Utricularia minor L.
Veronica scutellata L.
Veronica serpyllifolia L.

Viola glabella Nutt.
Viola selkirkii Pursh ex Goldie (G5? S3)

Notable rare plants and range extensions based on observations outside of data plots:

Anaphalis margaritacea (L.) Benth. & Hook. f.
Carex deflexa Hornem. (G5 S1S2)
Cicuta douglasiana Bong. re north 150 km
Eriophorum angustifolium Honck. ssp. *triste* (T. Fries) Hultén
Gentianella tenella (Rottb.) Boerner
 (synonym=*Gentiana tenella* Rottb.)
Isoetes occidentalis Henderson (G4G5 S1S2)
Juncus bufonius L.
Juncus oreganus S. Wats.
Limosella aquatica L. (G5 S3)
Oxytropis jordalii Porsild
Papaver alboroseum Hultén (G3G4 S3)
Phlox hoodii Richardson (G5 S1S2)
Salix rotundifolia Trautv. ssp. *dodgeana* (Rydb.) Argus
 (synonym=*Salix dodgeana* Rydb.)
Scutellaria galericulata L. var. *pubescens* Benth.
Stuckenia pectinatus (L.) Boerner
 (synonym=*Potamogeton pectinatus* L.)

* occurrences from outside Park boundaries

Plants with codes in parenthesis are tracked by AKNHP. Codes correspond to global (G) and state (S) ranks, where 5 is common and secure, and 1 is rare and of management concern. "T" indicates a sub-specific taxon, "Q" indicates a taxonomic question, and "?" indicate lack of data or unknown.

Notable alien plant species encountered outside of the development corridor and occurring within data plots:

Bidens spp.
Bidens cernua L.
Bidens tripartita L. (possibly alien, also on notable list)
Beckmannia eruciformis auct. non (L.) Host
Poa palustris L.
Poa pratensis L. ssp. *pratensis*
Rumex maritimus L. ssp. *maritimus*

Notable alien plant species encountered outside the development corridor and outside of data plots:

Chenopodium album L.
Taraxacum officinale L.

Alaska Natural Heritage Program Tracked Plants

Thirty-eight AKNHP tracked taxa were documented during the survey. All of them have a state ranking of S3 or S2. Many are globally uncommon, but were to be expected within the study area, since Denali is at the center of their ranges. Examples are Alaska starwort (*Stellaria alaskana*), Alaska douglasia (*Douglasia alaskana*) (see Plate 71) and matted sandwort (*Stellaria dicranoides*). Populations of these plants were well established and individuals were sometimes numerous. Some other notable plants encountered are common elsewhere in North America, but have sporadic occurrences here since this is the northern edge of their range. A few of these plants are quite uncommon, with state rankings of S1. These peripheral species, such as bulbous water hemlock (*Cicuta bulbifera*) and rattlesnake fern (*Botrychium virginianum* ssp. *europaeum*) (see Plate 72) were only encountered occasionally.

Most of the high alpine tracked taxa were encountered on the north side of the range or in the transition zones on either side of the McKinley/Foraker massif. The subalpine and lowland species were clustered in two groups: on the south side of the range from the Eldridge Glacier southwest (especially the Yentna River watershed), and on the north side in the Minchumina Basin.

In the southwest, fowl managrass (*Glyceria striata* ssp. *stricta*) and Selkirk violet (*Viola selkirkii*) were encountered regularly and form the bulk of the south side element occurrences. Like the alpine elements, they appear to be widespread in proper habitat in the southwest portion of Denali Park. In the Minchumina Basin several much more rare species, including silver willow (*Salix candida*), few-flower spikerush (*Eleocharis quinqueflora*), and inland sedge (*Carex interior*), occur in a large but unusual fen community. Several large range extensions were also found in this fen community, which is discussed more fully below.

Range Extensions

Several dozen large range extensions, such as salmonberry (*Rubus spectabilis*) (see Plate 73), goldthread (*Coptis trifoliata*), and pearly everlasting (*Anaphalis margaritacea*), were documented during our fieldwork. The range extensions were often found in the far reaches of the southwest and northwest corners of Denali Park (and often in the same areas with high concentrations of AKNHP tracked taxa). Until recent years these two regions have seen the fewest botanical surveys. Finding range extensions beyond those given in published accounts was to be expected, given the remote nature of these areas. Many smaller range extensions were encountered during the survey but were not included in the notable plant list or on the map. New fieldwork performed by the NPS botanical inventories and long-term monitoring projects have also turned up many of these plants.

Some of the notable plants were encountered frequently enough to be considered common elements within their plant communities and their occurrences help clarify the picture of the floristic subsections of Denali Park. The Yentna watershed contained many notable plants found further south in the Cook Inlet area, such as Sitka willow (*Salix sitchensis*), Aleutian mountainheath (*Phyllodoce aleutica*) (see Plate 74), and lance-leaved grapefern (*Botrychium lanceolatum*). The Minchumina-Kuskokwim lowlands are vast wetlands with many elements typical of the interior wetlands further north. Cattail (*Typha latifolia*), two species of duckweed (*Lemna minor* and *L. trisulca*), and whorled loosestrife (*Lysimachia thyrsoiflora*) were widespread and sometimes locally common. Some of the unusually large range extensions, including Oeder's sedge (*Carex oederi* ssp. *viridula*) and sticky tofieldia (*Tofieldia glutinosa* ssp. *brevistyla*), appear to be specifically associated with the groundwater discharge fens of the Minchumina Basin. Detailed site descriptions for each of the rare or unusual plant occurrences may be obtained by querying the database.

Alien Plants

The list of alien plants observed during our fieldwork is based on the Alaska Exotic Plant Information Clearinghouse Weed List (2002), with additional plants suspected of being alien (for example, golden dock, *Rumex maritimus* ssp. *maritimus*). There is still some confusion about the nativity of certain plants. Hultén (1968) considered American sloughgrass (*Beckmannia eruciformis*) to be alien, but this view is not widely accepted—it may not be native to some parts of the state, but was apparently native where it was found.

Most of these occurrences are well away from human disturbance (although float plane traffic probably occurs at Lake Chilchukabena). However, many of the sites were areas of naturally open ground such as gravel bars, beaver-influenced mud banks, or dry kettle ponds. The occurrence of goosefoot (*Chenopodium album*) was the most surprising, being found on a very remote gravel bar of Birch Creek east of Billberg Lake. The occurrence of threelobe beggarticks (*Bidens tripartita*) is fairly new to the state. Little is known about this plant and so it is included here as possibly alien. It is also included in the Notable Plants list as well.

Rare Plant Communities

Given the scale of the project, our survey focused only on major soil, vegetation, and landform units. Plant communities of rare or unusual types were, for the most part, excluded due to their limited extent within

the Park. After analysis of the data, some Landtypes of extremely limited extent were dropped because of the scale of the maps we have produced. Often, these units contained notable plant species. For example, a wet alpine meadow community was found on an upper tributary of Coffee Creek, east of the Ruth Glacier. It was notable since it was dominated by Enander sedge (*Carex enanderi*) and rough-stem tall cottongrass (*Eriophorum triste*). It was provisionally assigned a Landtype name, but was later dropped from our synthesis because it was of such limited extent that it could not be regarded as its own site, nor even incorporated as an inclusion in another site. A similar exclusion was of a xeric bluff meadow on a south-facing ridge top associated with [M135A_801—Escarpments, Cool](#) near Triple Lakes. This prairie sagewort/purple reedgrass (*Artemisia frigida* / *Calamagrostis purpurascens*) meadow was associated with dwarf broadleaf forest communities, and was home to spiny phlox (*Phlox hoodii*) and Jordall's locoweed (*Oxytropis jordalii*). It may be a recurring element within the xeric conditions of the upper slopes of ridges and escarpments, and although notable was of such limited extent that it was dropped and does not appear as a part of that site description.

Sometimes unusual assemblages were small but regularly occurring, mapable units. An example is a rich gravel bar seep, such as those found on gravel bars of [M135A_203—Gravelly Low Flood Plains, Wet](#). Wet meadows of harpoon sedge/entire-leaved avens (*Carex microglochin* / *Dryas integrifolia*) occurred occasionally in areas of groundwater discharge. One such meadow was where longstem sandwort (*Arenaria longipedunculata*) was found.

One unusual wetland community, however, covered a very large area of approximately 30,375 hectares northeast of the McKinley River. This area of groundwater discharge appears to be a unique feature of the Minchumina Basin. Within the widespread black spruce/ericaceous muskegs of the Kuskokwim lowlands, this community is a mosaic of low shrubby cinquefoil-sweet gale scrubs and wet sedge meadows (see Plate 54). Many rare or unusual plants were found in there, some of them not occurring in any other map unit. They include:

Carex interior Bailey (G5 S1)
Carex oederi Retz. ssp. *viridula* (Michx.) Hultén
Eleocharis quinqueflora (F. Hartmann) O. Schwarz (G5 S1)
Pedicularis macrodonta Richards. (G4Q S3)
Salix candida Fluegge ex Willd. (G5 S2S3)
Tofieldia glutinosa (Michx.) Pers. ssp. *brevistyla* C.L. Hitchc.

Some elements of this community were also found in fens on the south side (inland sedge and bigtooth lousewort were found along the Yentna River), but the presence of most of these plant species is unique. AKNHP does not presently maintain a statewide ranking for plant communities. This plant community mosaic is unusual for Denali Park, and future review of statewide occurrences may identify it as a rare type.

Appendix D—Local Plant List

Plant symbols and scientific names for plants and fungi observed at data collection stops, grouped by life form, are listed below. Plant symbols for most vascular and non-vascular plants are from the National PLANTS Database (USDA 2001) (<http://plants.usda.gov/index.html>). Plant symbols for plants not in the PLANTS database and for fungi begin with ZZ or end in 61, 90, or 99.

Nomenclature for vascular plants follows that used by the University of Alaska Fairbanks (UAF) Museum/Herbarium. Where a plant name differs from that used in Hultén (1968; 1973), the name from Hultén and the symbol from PLANTS are given in parentheses on the next line. Some names from Hultén are not in PLANTS and do not have plant symbols.

Nomenclature for lichens and bryophytes follows that used in the PLANTS database. Nomenclature for fungi is based on Arora (1986) and Schalkwijk-Barendsen (1994). For some entries, synonyms are given in parenthesis on the next line.

Voucher specimens were collected for all entries followed by an asterisk (*). A photo or sketch was taken of all entries followed by a dagger (†).

Trees

BENE4	<i>Betula neoalaskana</i> Sarg.* (BEPAH— <i>Betula papyrifera</i> Marsh ssp. <i>humilis</i> (Regel) Hultén)
LALA	<i>Larix laricina</i> (Du Roi) K. Koch*
PICEA	<i>Picea</i> A. Dietr.
PIGL	<i>Picea glauca</i> (Moench) Voss
PIMA	<i>Picea mariana</i> (P. Mill.) B.S.P.
POBA2	<i>Populus balsamifera</i> L.
POBAB2	<i>Populus balsamifera</i> ssp. <i>balsamifera</i> L.
POBAT	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> (Torr. & Gray ex Hook.) Brayshaw*
POTR5	<i>Populus tremuloides</i> Michx.
SABE2	<i>Salix bebbiana</i> Sarg. (SADER— <i>Salix depressa</i> L. ssp. <i>rostrata</i> (Richards.) Hiitonen)

Shrubs

ALNUS	<i>Alnus</i> P. Mill.
ALSI3	<i>Alnus sinuata</i> (Regel) Rydb. (ALCRS— <i>Alnus crispa</i> (Ait.) Pursh ssp. <i>sinuata</i> (Regel) Hultén)
ALTE2	<i>Alnus tenuifolia</i> Nutt. (ALINT— <i>Alnus incana</i> (L.) Moench ssp. <i>tenuifolia</i> (Nutt.) Breitung)
ALVIC	<i>Alnus viridis</i> ssp. <i>crispa</i> (Ait.) Turrill (no code— <i>Alnus crispa</i> (Ait.) Pursh ssp. <i>crispa</i>)
ANPO	<i>Andromeda polifolia</i> L.
ARCTO3	<i>Arctostaphylos</i> Adans.
ARUV	<i>Arctostaphylos uva-ursi</i> (L.) Spreng.
ARAL13	<i>Arctous alpina</i> (L.) Niedenzu (ARAL2— <i>Arctostaphylos alpina</i> (L.) Spreng.)
ARRU6	<i>Arctous rubra</i> (Rehd. & Wilson) Nakai (ARRU— <i>Arctostaphylos rubra</i> (Rehd. & Wilson) Fern.)
ARFR4	<i>Artemisia frigida</i> Willd.
BETUL	<i>Betula</i> L.
BEGL	<i>Betula glandulosa</i> Michx.
BENA	<i>Betula nana</i> L.
BETULX	hybrid <i>Betula</i> *
CALY4	<i>Cassiope lycopodioides</i> (Pallas) D. Don*
CAST33	<i>Cassiope stelleriana</i> (Pallas) DC.*
CATE11	<i>Cassiope tetragona</i> (L.) D. Don

CHCA2	<i>Chamaedaphne calyculata</i> (L.) Moench
DILA	<i>Diapensia lapponica</i> L.
DRYAS	<i>Dryas</i> L.
DRAL7	<i>Dryas alaskensis</i> Porsild (DROCA2— <i>Dryas octopetala</i> L. ssp. <i>alaskensis</i> (Porsild) Hultén)
DRDR	<i>Dryas drummondii</i> Richards. ex Hook.
DRIN4	<i>Dryas integrifolia</i> Vahl
DROC	<i>Dryas octopetala</i> L.
ELCO	<i>Elaeagnus commutata</i> Bernh. ex Rydb.
EMNI	<i>Empetrum nigrum</i> L. sens lat.
EMNIH	<i>Empetrum nigrum</i> ssp. <i>hermaphroditum</i> (Lange ex Hagerup) Bocher*
EMNIN	<i>Empetrum nigrum</i> ssp. <i>nigrum</i> L.
JUCO6	<i>Juniperus communis</i> L.
LEDUM	<i>Ledum</i> L.
LEGR	<i>Ledum groenlandicum</i> Oeder (LEPAG— <i>Ledum palustre</i> L. ssp. <i>groenlandicum</i> (Oeder) Hultén)
LEPAD	<i>Ledum palustre</i> ssp. <i>decumbens</i> (Ait.) Hultén
LIBO3	<i>Linnaea borealis</i> L.
LOPR	<i>Loiseleuria procumbens</i> (L.) Desv.
LUPE	<i>Luetkea pectinata</i> (Pursh) Kuntze*
MYGA	<i>Myrica gale</i> L.*
OPHO	<i>Oplopanax horridus</i> Miq. (ECHO2— <i>Echinopanax horridus</i> (Sm.) Dcne. & Planch. ex H.A.T. Harms)
OXMI3	<i>Oxycoccus microcarpos</i> Turcz. ex Rupr.
PEFL15	<i>Pentaphylloides floribunda</i> (Pursh) A. Love (POFR4— <i>Potentilla fruticosa</i> auct. non L.)
PHAL4	<i>Phyllodoce aleutica</i> (Spreng.) Heller* † (PLALA99— <i>Phyllodoce aleutica</i> (Spreng.) Heller ssp. <i>aleutica</i>)
PHCA10	<i>Phyllodoce caerulea</i> (L.) Bab.* †
RHLA2	<i>Rhododendron lapponicum</i> (L.) Wahlenb.
RIBES	<i>Ribes</i> L.
RIGL	<i>Ribes glandulosum</i> Grauer*
RIHU	<i>Ribes hudsonianum</i> Richards.
RILA3	<i>Ribes laxiflorum</i> Pursh*
RITR	<i>Ribes triste</i> Pallas
ROAC	<i>Rosa acicularis</i> Lindl.
RUARA3	<i>Rubus arcticus</i> ssp. <i>arcticus</i> L.* †
RUID	<i>Rubus idaeus</i> L.
RUSP	<i>Rubus spectabilis</i> Pursh*
SALIX	<i>Salix</i> L.
SAAL	<i>Salix alaxensis</i> (Anderss.) Coville*
SAALA	<i>Salix alaxensis</i> var. <i>alaxensis</i> (Anderss.) Coville
SAALL	<i>Salix alaxensis</i> var. <i>longistylis</i> (Rydb.) Schneid.
SAAR3	<i>Salix arbusculoides</i> Anderss.
SAAR4	<i>Salix arctica</i> Liebm.
SABA3	<i>Salix barclayi</i> Anderss.*
SABA4	<i>Salix barrattiana</i> Hook.*
SABE2	<i>Salix bebbiana</i> Sarg.* (SADER— <i>Salix depressa</i> L. ssp. <i>rostrata</i> (Richards.) Hiitonen)
SACA4	<i>Salix candida</i> Fluegge ex Willd.* †
SACO2	<i>Salix commutata</i> Bebb*
SAEXI	<i>Salix exigua</i> ssp. <i>interior</i> (Rowlee) Cronq.* (SAIN3— <i>Salix interior</i> Rowlee)

SAFU	<i>Salix fuscescens</i> Anderss.
SAGL	<i>Salix glauca</i> L.*
SAHA	<i>Salix hastata</i> L.*
SALUL	<i>Salix lucida</i> ssp. <i>lasiandra</i> (Benth.) E. Murr.* (SALA5— <i>Salix lasiandra</i> Benth.)
SAMY	<i>Salix myrtillofolia</i> Anderss.
SANI10	<i>Salix niphoclada</i> Rydb.*
SAPH	<i>Salix phlebophylla</i> Anderss.*
SAPX99	<i>Salix phlebophylla</i> X <i>rotundifolia</i> *
SAPO	<i>Salix polaris</i> Wahlenb.
SAPS	<i>Salix pseudomonticola</i> Ball* (SAMO2— <i>Salix monticola</i> Bebb)
SAPS8	<i>Salix pseudomyrsinites</i> Anderss.* (SAMYP4— <i>Salix myrtillofolia</i> Anderss. var. <i>pseudomyrsinites</i> (Anderss.) Ball ex Hultén)
SAPU15	<i>Salix pulchra</i> Cham.*
SARE2	<i>Salix reticulata</i> L.
SARI4	<i>Salix richardsonii</i> Hook.* (SALAR— <i>Salix lanata</i> L. ssp. <i>richardsonii</i> (Hook.) Skvort.)
SARO2	<i>Salix rotundifolia</i> Trautv.*
SASC	<i>Salix scouleriana</i> Barratt ex Hook.*
SASE4	<i>Salix setchelliana</i> Ball*
SASI2	<i>Salix sitchensis</i> Sanson ex Bong.*
SAST2	<i>Salix stolonifera</i> Coville*
SARAA	<i>Sambucus racemosa</i> ssp. <i>pubens</i> var. <i>arborescens</i> (Torr. & Gray) Gray
SHCA	<i>Shepherdia canadensis</i> (L.) Nutt.
SOSC2	<i>Sorbus scopulina</i> Greene*
SPST3	<i>Spiraea stevenii</i> (Schneid.) Rydb. (SPBE— <i>Spiraea beauverdiana</i> auct. non Schneid.)
SWST2	<i>Swida stolonifera</i> (Michx.) Rydb.* † (COST4— <i>Cornus stolonifera</i> Michx.)
VACE	<i>Vaccinium cespitosum</i> Michx.*
VAOV	<i>Vaccinium ovalifolium</i> Sm.*
VAUL	<i>Vaccinium uliginosum</i> L.
VAULM	<i>Vaccinium uliginosum</i> L. ssp. <i>microphyllum</i> Lange*
VAVIM99	<i>Vaccinium vitis-idaea</i> L. ssp. <i>minus</i> (Lodd.) Hultén
VIDE	<i>Viburnum edule</i> (Michx.) Raf.
ZZSHRUB	total unknown-shrubs

Grasses, Sedges, and Rushes

AGROS2	<i>Agrostis</i> L.
AGAL2	<i>Agrostis alaskana</i> Hultén
AGME3	<i>Agrostis mertensii</i> Trin.*
(AGBO2	<i>Agrostis borealis</i> Hartman*)
AGGE2	<i>Agrostis geminata</i> Trin.*
AGSC5	<i>Agrostis scabra</i> Willd.
ALAE	<i>Alopecurus aequalis</i> Sobol.
ARCTA	<i>Arctagrostis</i> Griseb.
ARAR21	<i>Arctagrostis arundinacea</i> (Trin.) Beal* (ARLAA2— <i>Arctagrostis latifolia</i> (R. Br.) Griseb. var. <i>arundinacea</i> (Trin.) Griseb.)
ARLA2	<i>Arctagrostis latifolia</i> (R. Br.) Griseb.*
ARFU2	<i>Arctophila fulva</i> (Trin.) Rupr. ex Anderss.*
BEER2	<i>Beckmannia eruciformis</i> auct. non (L.) Host* (BEERB— <i>Beckmannia eruciformis</i> (L.) Host ssp. <i>baicalensis</i> (Kusnez.) Hultén)

BROMU	Bromus L.
BRCI2	Bromus ciliatus L.*
BRPUV	Bromus pumpellianus Scribn. var. villosissimus Hultén*
BRPUA2	Bromus pumpellianus var. arcticus (Shear ex Scribn. & Merr.) Porsild*
CALAM	Calamagrostis Adans.
CACA4	Calamagrostis canadensis (Michx.) Beauv.*
CALA6	Calamagrostis lapponica (Wahlenb.) Hartman*
CAPU	Calamagrostis purpurascens R. Br.
CAST36	Calamagrostis stricta (Timm) Koel.*
CASTI3	Calamagrostis stricta ssp. inexpansa (Gray) C.W. Greene* (CAIN—Calamagrostis inexpansa Gray)
CASTS5	Calamagrostis stricta ssp. stricta (Timm) Koel.* (CANE—Calamagrostis neglecta (Ehrh.) P.G. Gaertn., B. Mey. & Scherb.)
CAREX	Carex L.
CAAD	Carex adelostoma Krecz.*
CAAL6	Carex albonigra Mackenzie*
CAAN10	Carex anthoxantha J.& K. Presl*
CAAQ	Carex aquatilis Wahlenb.*
CAAR2	Carex arcta Boott*
CAAT7	Carex atrofusca Schkuhr*
CAAT8	Carex atosquama Mackenzie* (CAATA4—Carex atrata L. ssp. atosquama (Mackenzie) Hultén)
CAAU3	Carex aurea Nutt.
CABI5	Carex bigelowii Torr. ex Schwein.*
CABR15	Carex brunnescens (Pers.) Poir.*
CABRP2	Carex brunnescens ssp. pacifica Kalela*
CABU6	Carex buxbaumii Wahlenb.*
CACA11	Carex canescens L.*
CACA12	Carex capillaris L.*
CACA13	Carex capitata L.*
CACH5	Carex chordorrhiza Ehrh. ex L. f.*
CACO10	Carex concinna R. Br.*
CADI4	Carex diandra Schrank*
CADI6	Carex disperma Dewey
CAEB2	Carex eburnea Boott*
CAECP	Carex echinata ssp. phyllomanica (W. Boott) Reznicek* (CAPH6—Carex phyllomanica W. Boott)
CAEL4	Carex eleusinoides Turcz. ex C.A. Mey.*
CAEN2	Carex enanderi Holm*†
CAFO3	Carex foenea Willd.* (CAAE—Carex aenea Fern.)
CAGAB	Carex garberi ssp. bifaria (Fern.) Hultén*
CAGY2	Carex gynocrates Wormsk. ex Drej.*
CAHE4	Carex heleonastes L. f.*
CAIN11	Carex interior Bailey*
CAKE2	Carex kelloggii W. Boott*
CAKR2	Carex krausei Boeckl.*
CALA10	Carex lachenalii Schkuhr*
CALA13	Carex laeiculmis Meinsh.*
CALAA5	Carex lasiocarpa ssp. americana (Fern.) Love & Bernard*
CALE10	Carex leptalea Wahlenb.*
CALI7	Carex limosa L.*
CALI	Carex livida (Wahlenb.) Willd.*

CALO4	<i>Carex loliacea</i> L.*
CALU2	<i>Carex lugens</i> Holm*
CALY3	<i>Carex lyngbyei</i> Hornem.*
CAMA9	<i>Carex macloviana</i> d'Urv. (sensu Cody 1996)*
CAMA11	<i>Carex macrochaeta</i> C.A. Mey.*
CAMA12	<i>Carex magellanica</i> ssp. <i>irrigua</i> (Wahlenb.) Hultén*
CAME9	<i>Carex media</i> R. Br.*
CAME4	<i>Carex membranacea</i> Hook. †
CAME6	<i>Carex mertensii</i> Prescott ex Bong.*
CAMI4	<i>Carex microchaeta</i> Holm
CAMIM	<i>Carex microchaeta</i> ssp. <i>microchaeta</i> Holm*
CAMIN	<i>Carex microchaeta</i> ssp. <i>nesophila</i> (Holm) E. Murr.* (CANE4— <i>Carex nesophila</i> Holm)
CAMI6	<i>Carex microglochin</i> Wahlenb.*
CAMI16	<i>Carex micropoda</i> C.A. Mey.* (CAPYM— <i>Carex pyrenaica</i> Wahlenb. ssp. <i>micropoda</i> (C.A. Mey.) Hultén)
CAMI10	<i>Carex misandra</i> R. Br.*
CANA2	<i>Carex nardina</i> Fries*
CANI2	<i>Carex nigricans</i> C.A. Mey.*
CAOB4	<i>Carex obtusata</i> Lilj.*
CAOEV	<i>Carex oederi</i> ssp. <i>viridula</i> (Michx.) Hultén*
CAPA14	<i>Carex pachystachya</i> Cham. ex Steud.* (CAMAP4— <i>Carex macloviana</i> d'Urv. ssp. <i>pachystachya</i> (Cham. ex Steud.) Hultén)
CAPA18	<i>Carex parryana</i> Dewey*cf
CAPA19	<i>Carex pauciflora</i> Lightf.*
CAPE8	<i>Carex petricosa</i> Dewey*
CAPL6	<i>Carex pluriflora</i> Hultén*
CAPO	<i>Carex podocarpa</i> R. Br.*
CARA5	<i>Carex rariflora</i> (Wahlenb.) Sm.*
CARO5	<i>Carex rossii</i> Boott*
CARO6	<i>Carex rostrata</i> Stokes
CARO7	<i>Carex rotundata</i> Wahlenb.*
CARU3	<i>Carex rupestris</i> All.*
CASAL2	<i>Carex saxatilis</i> ssp. <i>laxa</i> (Trautv.) Kalela*†
CASC10	<i>Carex scirpoidea</i> Michx.
CASI3	<i>Carex sitchensis</i> Prescott ex Bong.*
CASP5	<i>Carex spectabilis</i> Dewey*cf
CAST10	<i>Carex stylosa</i> C.A. Mey.
CASUS4	<i>Carex supina</i> ssp. <i>spaniocarpa</i> (Steud.) Hultén*
CATE5	<i>Carex tenuiflora</i> Wahlenb.*
CAUT	<i>Carex utriculata</i> Boott* (CARO6— <i>Carex rostrata</i> Stokes in part., see Cody 1996)
CAVA2	<i>Carex vaginata</i> Tausch*
CAWI3	<i>Carex williamsii</i> Britt.*
CILA2	<i>Cinna latifolia</i> (Trev. ex Goepp.) Griseb.*
DAIN	<i>Danthonia intermedia</i> Vasey*
DEBE2	<i>Deschampsia beringensis</i> Hultén
DEBR2	<i>Deschampsia brevifolia</i> R. Br.*
DECE	<i>Deschampsia cespitosa</i> (L.) Beauv.*
DECEG2	<i>Deschampsia cespitosa</i> ssp. <i>glauca</i> (Hartman) Hartman*
ELAC	<i>Eleocharis acicularis</i> (L.) Roemer & J.A. Schultes*
ELPA3	<i>Eleocharis palustris</i> (L.) Roemer & J.A. Schultes
ELQU2	<i>Eleocharis quinqueflora</i> (F.X. Hartmann) Schwarz*

ELYMU	<i>Elymus</i> L. (see Cody 1996)
ELALA2	<i>Elymus alaskanus</i> ssp. <i>alaskanus</i> (Scribn. & Merr.) A. Love* (AGBOA2— <i>Agropyron boreale</i> (Turcz.) Drobow ex Polunin ssp. <i>alaskanum</i> (Scribn. & Merr.) Melderis)
ELALB99	<i>Elymus alaskanus</i> ssp. <i>borealis</i> (Turcz.) A. & D Love* (no code— <i>Agropyron boreale</i> (Turcz.) Drobow ssp. <i>boreale</i>)
ELALH	<i>Elymus alaskanus</i> ssp. <i>hyperarcticus</i> (Polunin) A. & D. Love* (AGBOH2— <i>Agropyron boreale</i> (Turcz.) Drobow ex Polunin ssp. <i>hyperarcticum</i> (Polunin) Melderis)
ELMA7	<i>Elymus macrourus</i> (Turcz.) Tzvelev* (AGMA— <i>Agropyron macrourum</i> (Turcz.) Drobow)
ELTR7	<i>Elymus trachycaulus</i> (Link) Gould ex Shinners (see Cody 1996) (AGPA15— <i>Agropyron pauciflorum</i> (Schwein.) Hitchc.)
ELTRA2	<i>Elymus trachycaulus</i> ssp. <i>andinus</i> (Scribn. & J.G. Sm.) A. & D. Love* (AGVIA3— <i>Agropyron violaceum</i> (Hornem.) Lange ssp. <i>andinum</i> (Scribn. & Sm.) Melderis)
ELTRN	<i>Elymus trachycaulus</i> ssp. <i>novae-angliae</i> (Scribn.) Tzvelev* (AGPAN4— <i>Agropyron pauciflorum</i> (Schwein.) Hitchc. ssp. <i>novae-angliae</i> (Scribn.) Melderis)
ELTRV	<i>Elymus trachycaulus</i> ssp. <i>violaceus</i> (Hornem.) A. & D. Love* (no code— <i>Agropyron violaceum</i> (Hornem.) Lange ssp. <i>violaceum</i>)
ERIOP	<i>Eriophorum</i> L.
ERAN6	<i>Eriophorum angustifolium</i> Honckeney*
ERANS2	<i>Eriophorum angustifolium</i> ssp. <i>subarcticum</i> (Vassiljev) Hultén ex Kartesz & Gandhi*
ERBR6	<i>Eriophorum brachyantherum</i> Trautv. & C.A. Mey.*
ERGR8	<i>Eriophorum gracile</i> W.D.J. Koch*
ERRU2	<i>Eriophorum russeolum</i> Fries ex Hartman*
ERSC2	<i>Eriophorum scheuchzeri</i> Hoppe*
ERTR22	<i>Eriophorum triste</i> (T. Fries) Hadac & A. Löve* (ERANT— <i>Eriophorum angustifolium</i> ssp. <i>triste</i> (T. Fries) Hultén)
ERVA4	<i>Eriophorum vaginatum</i> L.*
ERVI9	<i>Eriophorum viridicarinatum</i> (Engelm.) Fern.*
FESTU	<i>Festuca</i> L.
FEAL	<i>Festuca altaica</i> Trin.
FEBA	<i>Festuca baffinensis</i> Polunin*
FEBR	<i>Festuca brachyphylla</i> J.A. Schultes ex J.A. & J.H. Schultes*
FEBR2	<i>Festuca brevissima</i> Jurtzev* (FEOVA— <i>Festuca ovina</i> L. ssp. <i>alaskana</i> Holmen)
FERI3	<i>Festuca richardsonii</i> Hook.* (FERUR3— <i>Festuca rubra</i> L. ssp. <i>richardsonii</i> (Hook.) Hultén)
FERU2	<i>Festuca rubra</i> L.*
FEVI3	<i>Festuca vivipara</i> (L.) Sm.
GLBO	<i>Glyceria borealis</i> (Nash) Batchelder*
GLMAG	<i>Glyceria maxima</i> ssp. <i>grandis</i> (S. Wats.) Hultén*
GLSTS3	<i>Glyceria striata</i> ssp. <i>stricta</i> (Scribn.) Hultén*
HIAL3	<i>Hierochloa alpina</i> (Sw. ex Willd.) Roemer & J.A. Schultes
HIOD	<i>Hierochloa odorata</i> (L.) Beauv.
JUNCU	<i>Juncus</i> L.
JUAL	<i>Juncus alpinus</i> auct. non Vill.*
JUAR2	<i>Juncus arcticus</i> Willd.*
JUARA	<i>Juncus arcticus</i> ssp. <i>alaskanus</i> Hultén*
JUBI2	<i>Juncus biglumis</i> L.*
JUCA6	<i>Juncus castaneus</i> Sm.
JUCAC2	<i>Juncus castaneus</i> ssp. <i>castaneus</i> Sm.
JUCAL	<i>Juncus castaneus</i> ssp. <i>leucochlamys</i> (Zing. ex Krecz.) Hultén

JUDR	<i>Juncus drummondii</i> E. Mey.*
JUFI	<i>Juncus filiformis</i> L.
JUME3	<i>Juncus mertensianus</i> Bong.*
JUSTA	<i>Juncus stygius</i> ssp. <i>americanus</i> (Buch.) Hultén*
JUTR4	<i>Juncus triglumis</i> L.*
JUTRA	<i>Juncus triglumis</i> ssp. <i>albescens</i> (Lange) Hultén*
KOMY	<i>Kobresia myosuroides</i> (Vill.) Fiori*
KOSI	<i>Kobresia sibirica</i> (Turcz. ex Ledeb.) Boeckl.*
KOSI2	<i>Kobresia simpliciuscula</i> (Wahlenb.) Mackenzie*
LEYMU	<i>Leymus</i> Hochst. (ELYMU— <i>Elymus</i> L. p.p.)
LEIN6	<i>Leymus innovatus</i> (Beal) Pilger (ELIN4— <i>Elymus innovatus</i> Beal)
LUZUL	<i>Luzula</i> DC.
LUAR9	<i>Luzula arctica</i> Blytt
LUAR5	<i>Luzula arcuata</i> (Wahlenb.) Sw.*
LUARU	<i>Luzula arcuata</i> ssp. <i>unalaschcensis</i> (Buch.) Hultén*
LUCO5	<i>Luzula confusa</i> Lindeberg*
LUMU2	<i>Luzula multiflora</i> (Ehrh.) Lej.
LUPA4	<i>Luzula parviflora</i> (Ehrh.) Desv.*
LUPI2	<i>Luzula piperi</i> (Coville) M.E. Jones* (LUWAP— <i>Luzula wahlenbergii</i> Rupr. ssp. <i>piperi</i> (Coville) Hultén)
LURU2	<i>Luzula rufescens</i> Fisch. ex E. Mey.
LUSP4	<i>Luzula spicata</i> (L.) DC.*
LUTU2	<i>Luzula tundricola</i> Gorodk.*
LUWA	<i>Luzula wahlenbergii</i> Rupr.* (no code— <i>Luzula wahlenbergii</i> Rupr. ssp. <i>wahlenbergii</i>)
PHCOA	<i>Phleum commutatum</i> var. <i>americanum</i> (Fourn.) Hultén
POA	<i>Poa</i> L.
POAL2	<i>Poa alpina</i> L.*
POAR2	<i>Poa arctica</i> R. Br.*
POARA2	<i>Poa arctica</i> ssp. <i>arctica</i> R. Br.*
POARL4	<i>Poa arctica</i> ssp. <i>lanata</i> (Scribn. & Merr.) Soreng* (POLA— <i>Poa lanata</i> Scribn. & Merr.)
POGL	<i>Poa glauca</i> Vahl*
POLE2	<i>Poa leptocoma</i> Trin.*
POMA2	<i>Poa macrocalyx</i> Trautv. & C.A. Mey.*
POMA4	<i>Poa malacantha</i> Komarov*cf
POPA2	<i>Poa palustris</i> L.*
POPA26	<i>Poa paucispicula</i> Scribn. & Merr.*
POPR	<i>Poa pratensis</i> L.*
POPRP2	<i>Poa pratensis</i> L. ssp. <i>pratensis</i> *
POPRA6	<i>Poa pratensis</i> ssp. <i>alpigena</i> (Fries ex Blytt) Hiitonen* (POAL— <i>Poa alpigena</i> (Fries ex Blytt) Lindm. f.)
POPS	<i>Poa pseudoabbreviata</i> Rosh.* (POBR— <i>Poa brachyanthera</i> Hultén sensu Cody 1996)
POAE	<i>Podagrostis aequalvis</i> (Trin.) Scribn. & Merr.*
SCVA	<i>Scirpus validus</i> Vahl*
TRAL7	<i>Trichophorum alpinum</i> (L.) Pers.*
TRCE3	<i>Trichophorum cespitosum</i> (L.) Hartman*
TRSP2	<i>Trisetum spicatum</i> (L.) Richter*
VAAT2	<i>Vahlodea atropurpurea</i> (Wahlenb.) Fries ex Hartman*
ZZGRAM	total unknown-graminoids

ZZGRASS total unknown-grasses
 ZZSEDGE total unknown-sedges or other Cyperaceae

Forbs and Ferns

ACBO *Achillea borealis* Bong.
 ACSI *Achillea sibirica* Ledeb.
 ACRO3 *Acomastylis rossii* (R. Br.) Greene
 (GERO2—*Geum rossii* (R. Br.) Ser.)
 ACDE2 *Aconitum delphiniifolium* DC.
 ACDEP *Aconitum delphiniifolium* ssp. *paradoxum* (Reichenb.) Hultén
 ACRU2 *Actaea rubra* (Ait.) Willd.
 ACRUA8 *Actaea rubra* ssp. *arguta* (Nutt.) Hultén
 ACRUR2 *Actaea rubra* ssp. *rubra* (Ait.) Willd.
 ADMO *Adoxa moschatellina* L.
 ANCH *Androsace chamaejasme* Wulfen
 ANSE4 *Androsace septentrionalis* L.*
 ANEMO *Anemone* L.
 ANDR *Anemone drummondii* S. Wats.
 ANMU4 *Anemone multiceps* (Greene) Standl.*
 (ANDR—*Anemone drummondii* S. Wats. in part)
 ANNA *Anemone narcissiflora* L.*
 ANPA *Anemone parviflora* Michx.
 ANRI *Anemone richardsonii* Hook.
 ANGEL *Angelica* L.
 ANGE2 *Angelica genuflexa* Nutt.*
 ANLU *Angelica lucida* L.
 ANTEN *Antennaria* Gaertn.
 ANAL4 *Antennaria alpina* (L.) Gaertn.* (see [Cody 1996](#))
 ANFR *Antennaria friesiana* (Trautv.) Ekman*
 ANFRA *Antennaria friesiana* ssp. *alaskana* (Malte) Hultén*
 ANIS2 *Antennaria isolepis* Greene
 ANMO9 *Antennaria monocephala* DC.*
 ANPU *Antennaria pulcherrima* (Hook.) Greene*
 ANRO2 *Antennaria rosea* Greene
 APES *Aphragmus eschscholtzianus* Andr. ex DC.* †
 ARDR *Arabis drummondii* Gray*
 ARKA6 *Arabis kamchatica* (Fisch. ex DC.) Ledeb.
 (ARLYK2—*Arabis lyrata* L. ssp. *kamchatica* (Fisch. ex DC.) Hultén)
 ARCA7 *Arenaria capillaris* Poir.*
 ARLO *Arenaria longipedunculata* Hultén*
 ARNIC *Arnica* L.
 ARAL4 *Arnica alpina* (L.) Olin
 ARAMP *Arnica amplexicaulis* ssp. *prima* (Maguire) Maguire
 ARGRF *Arnica griscomii* ssp. *frigida* (C.A. Mey. ex Iljin) S.J. Wolf*
 (ARFR2—*Arnica frigida* C.A. Mey.)
 ARLA8 *Arnica latifolia* Bong.*
 ARLE2 *Arnica lessingii* (Torr. & Gray) Greene*
 ARTEM *Artemisia* L.
 ARAR9 *Artemisia arctica* Less.
 ARBO4 *Artemisia borealis* Pallas*
 ARGL8 *Artemisia globularia* Cham. ex Bess.*
 ARHY2 *Artemisia hyperborea* Rydb.*
 (ARFU4—*Artemisia furcata* Bieb. in part)

ARTI	<i>Artemisia tilesii</i> Ledeb.
ASJU	<i>Aster junciformis</i> Rydb.* †
ASSI	<i>Aster sibiricus</i> L.
ASTRA	<i>Astragalus</i> L.
ASAB	<i>Astragalus aboriginorum</i> Richards.*
ASADV	<i>Astragalus adsurgens</i> ssp. <i>viciifolius</i> (Hultén) Welsh*
ASAL7	<i>Astragalus alpinus</i> L.*
ASEU2	<i>Astragalus eucosmus</i> B.L. Robins.* (no code— <i>Astragalus eucosmus</i> B.L. Robins. ssp. <i>eucosmus</i>)
ASNU6	<i>Astragalus nutzotinensis</i> Rouss.
ASPO	<i>Astragalus polaris</i> Benth.*
ASRO	<i>Astragalus robbinsii</i> (Oakes) Gray*
ASSE13	<i>Astragalus sealei</i> Lepage* (ASEUS— <i>Astragalus eucosmus</i> B.L. Robins. ssp. <i>sealei</i> (Lepage) Hultén)
ASUM2	<i>Astragalus umbellatus</i> Bunge*
ATFIC	<i>Athyrium filix-femina</i> ssp. <i>cyclosorum</i> (Rupr.) C. Christens.*
BAOR	<i>Barbarea orthoceras</i> Ledeb.
BIDEN	<i>Bidens</i> L.
BICE	<i>Bidens cernua</i> L.*
BITR	<i>Bidens tripartita</i> L.* (Hitchcock, C.L. and A. Cronquist 1955)
BIPL99	<i>Bistorta plumosa</i> (Small) E. Greene (POBI5— <i>Polygonum bistorta</i> L.)
BIVI2	<i>Bistorta vivipara</i> (L.) S.F. Gray (POVI3— <i>Polygonum viviparum</i> L.)
BORO	<i>Boschniakia rossica</i> (Cham. & Schlecht.) Fedtsch.
BOAL99	<i>Botrychium alaskense</i> W.H. Wagner & J.R. Grant* (Wagner & Grant, 2002)
BOLA	<i>Botrychium lanceolatum</i> (Gmel.) Angstr.*
BOLU	<i>Botrychium lunaria</i> (L.) Sw.* †
BOMI	<i>Botrychium minganense</i> Victorin*† (no code— <i>Botrychium lunaria</i> (L.) Sw. f. <i>minganense</i> (Victorin) Clute)
BOPI	<i>Botrychium pinnatum</i> St. John* (no code— <i>Botrychium boreale</i> (Fries) Milde ex Hultén)
BOVIE	<i>Botrychium virginianum</i> ssp. <i>europaeum</i> (Angstr.) Jav.* †
BORI2	<i>Boykinia richardsonii</i> (Hook.) Rothrock
BRGL	<i>Braya glabella</i> Richards.* (BRBA— <i>Braya bartlettiana</i> Jordal)
BUTRA2	<i>Bupleurum triradiatum</i> ssp. <i>arcticum</i> (Regel) Hultén
CAPA	<i>Calla palustris</i> L.*
CALLI6	<i>Callitriche</i> L.
CAHE2	<i>Callitriche hermaphroditica</i> L.* †
CAPA52	<i>Callitriche palustris</i> L.* (CAVE2— <i>Callitriche verna</i> L. emend Kutz.)
CALTH	<i>Caltha</i> L.
CALE4	<i>Caltha leptosepala</i> DC.*
CANA	<i>Caltha natans</i> Pallas ex Georgi*
CAPAA4	<i>Caltha palustris</i> ssp. <i>arctica</i> (R. Br.) Hultén*
CABU	<i>Calypso bulbosa</i> (L.) Oakes*
CAMPA	<i>Campanula</i> L.
CALA7	<i>Campanula lasiocarpa</i> Cham.*
CAUN2	<i>Campanula uniflora</i> L.*
CARDA	<i>Cardamine</i> L.
CABE	<i>Cardamine bellidifolia</i> L.
CAPRA3	<i>Cardamine pratensis</i> ssp. <i>angustifolia</i> (Hook.) O.E. Schulz

CAPU5	<i>Cardamine purpurea</i> Cham. & Schlecht.
CAUM3	<i>Cardamine umbellata</i> Greene*
CASTI2	<i>Castilleja Mutis ex L. f.</i>
CACA20	<i>Castilleja caudata</i> (Pennell) Rebr.*
CAEL6	<i>Castilleja elegans</i> Malte*
CARA7	<i>Castilleja raupii</i> Pennell
CEBE2	<i>Cerastium beeringianum</i> Cham. & Schlecht.*
CEBEB99	<i>Cerastium beeringianum</i> var. <i>beeringianum</i>
CEBEG99	<i>Cerastium beeringianum</i> var. <i>grandiflorum</i> (Fenzl) Hultén*
CEDE4	<i>Ceratophyllum demersum</i> L.* †
CHTE3	<i>Chrysosplenium tetrandrum</i> (Lund ex Malmgr.) Th. Fries
CHWR2	<i>Chrysosplenium wrightii</i> Franch. & Savigny
CIBU	<i>Cicuta bulbifera</i> L.* †
CIVI5	<i>Cicuta virosa</i> L.* (CIMA— <i>Cicuta mackenzieana</i> Raup)
CIAL	<i>Circaea alpina</i> L.*
CLAYT	<i>Claytonia</i> L.
CLSA2	<i>Claytonia sarmentosa</i> C.A. Mey.*
CLSC	<i>Claytonia scammaniana</i> Hultén*
CLTU	<i>Claytonia tuberosa</i> Pallas ex J.A. Schultes*
CNCN	<i>Cnidium cnidiifolium</i> (Turcz.) Schischkin
COVI6	<i>Coeloglossum viride</i> (L.) Hartman*†
COPA28	<i>Comarum palustre</i> L. (POPA14— <i>Potentilla palustris</i> (L.) Scop.)
COTR2	<i>Coptis trifolia</i> (L.) Salisb.* †
COTR3	<i>Corallorrhiza trifida</i> Chatelain
COCA13	<i>Cornus canadensis</i> L.
COCXS99	<i>Cornus canadensis</i> L. x <i>C. suecica</i> L.*
COSU4	<i>Cornus suecica</i> L.*
COPA11	<i>Corydalis pauciflora</i> (Steph.) Pers. †
CREL	<i>Crepis elegans</i> Hook.
CRNA	<i>Crepis nana</i> Richards.*
CRNAL	<i>Crepis nana</i> var. <i>lyratifolia</i> (Turcz.) Hultén*
CRYPT3	<i>Cryptogramma</i> R. Br.*
CRSI7	<i>Cryptogramma sitchensis</i> (Rupr.) T. Moore* (CRCRS— <i>Cryptogramma crispa</i> (L.) R. Br. ex Hook. var. <i>sitchensis</i> (Rupr.) C. Christens.)
CYGU	<i>Cypripedium guttatum</i> Sw.
CYPA5	<i>Cypripedium passerinum</i> Richards.
CYFR2	<i>Cystopteris fragilis</i> (L.) Bernh.*
CYMO3	<i>Cystopteris montana</i> (Lam.) Bernh. ex Desv.*
DELPH	<i>Delphinium</i> L.
DEBR	<i>Delphinium brachycentrum</i> Ledeb.
DEGL3	<i>Delphinium glaucum</i> S. Wats.
DIAL5	<i>Diphasiastrum alpinum</i> (L.) Holub (LYAL3— <i>Lycopodium alpinum</i> L.)
DICO7	<i>Diphasiastrum complanatum</i> (L.) Holub (LYCO3— <i>Lycopodium complanatum</i> L.)
DISI6	<i>Diphasiastrum sitchense</i> (Rupr.) Holub* (LYSAS3— <i>Lycopodium sabinifolium</i> Willd. var. <i>sitchense</i> (Rupr.) Fern.)
DOFR	<i>Dodecatheon frigidum</i> Cham. & Schlecht.*
DOAL2	<i>Douglasia alaskana</i> (Coville & Standl. ex Hultén) S. Kelso*† (ANAL2— <i>Androsace alaskana</i> Coville & Standl. ex Hultén)
DOGO	<i>Douglasia gormanii</i> Constance*

DRABA	<i>Draba</i> L.*
DRAL2	<i>Draba alpina</i> L.*
DRAU	<i>Draba aurea</i> Vahl ex Hornem.*
DRBO	<i>Draba borealis</i> DC.*
DRCA4	<i>Draba cana</i> Rydb.* (DRLA2— <i>Draba lanceolata</i> Royle)
DRFL	<i>Draba fladnizensis</i> Wulfen*
DRGL	<i>Draba glabella</i> Pursh* (DRHI— <i>Draba hirta</i> auct. non L.)
DRJU2	<i>Draba juvenilis</i> Komarov* (DRLO2— <i>Draba longipes</i> Raup)
DRLA	<i>Draba lactea</i> M.F. Adams*cf
DRLO	<i>Draba lonchocarpa</i> Rydb.*
DRLOL	<i>Draba lonchocarpa</i> var. <i>lonchocarpa</i> Rydb.*
DRMA7	<i>Draba macounii</i> O.E. Schulz* (See Cody 1996)
DRNI	<i>Draba nivalis</i> Lilj.*
DRRU	<i>Draba ruaxes</i> Payson & St. John* (DREX4— <i>Draba exalata</i> Ekman)
DRST2	<i>Draba stenoloba</i> Ledeb.*
DRST3	<i>Draba stenopetala</i> Trautv.*
DRAN	<i>Drosera anglica</i> Huds.*
DRRO	<i>Drosera rotundifolia</i> L.
DRDI2	<i>Dryopteris dilatata</i> auct. non (Hoffmann) Gray*
DRFR	<i>Dryopteris fragrans</i> (L.) Schott
EPILO	<i>Epilobium</i> L.
EPAN4	<i>Epilobium anagallidifolium</i> Lam.
EPAN2	<i>Epilobium angustifolium</i> L.
EPCIA99	<i>Epilobium ciliatum</i> Raf. ssp. <i>adenocaulon</i> (Hausskn.) Hoch & Raven* (no code— <i>Epilobium adenocaulon</i> (Hausskn.)
EPCIG	<i>Epilobium ciliatum</i> ssp. <i>glandulosum</i> (Lehm.) Hoch & Raven* (EPGL4— <i>Epilobium glandulosum</i> Lehm.)
EPDA	<i>Epilobium davuricum</i> Fisch. ex Hornem.*
EPHO	<i>Epilobium hornemannii</i> Reichenb.*
EPLA3	<i>Epilobium lactiflorum</i> Hausskn.*
EPLA	<i>Epilobium latifolium</i> L.
EPLA	<i>Epilobium leptocarpum</i> Hausskn.*
EPPA	<i>Epilobium palustre</i> L.*
EQUIS	<i>Equisetum</i> L.
EQAR	<i>Equisetum arvense</i> L.
EQFL	<i>Equisetum fluviatile</i> L.
EQHY	<i>Equisetum hyemale</i> L.
EQPA	<i>Equisetum palustre</i> L.
EQPR	<i>Equisetum pratense</i> Ehrh.
EQSC	<i>Equisetum scirpoides</i> Michx.
EQSY	<i>Equisetum sylvaticum</i> L.
EQVA	<i>Equisetum variegatum</i> Schleich. ex F. Weber & D.M.H. Mohr
EQVAA2	<i>Equisetum variegatum</i> ssp. <i>alaskanum</i> (A.A. Eat.) Hultén*
ERIGE2	<i>Erigeron</i> L.
ERAC2	<i>Erigeron acris</i> L.*
ERER8	<i>Erigeron eriocephalus</i> J. Vahl*
ERGLP3	<i>Erigeron glabellus</i> Nutt. ssp. <i>pubescens</i> (Hook.) Cronq.* †
ERHU	<i>Erigeron humilis</i> Graham*
ERLO	<i>Erigeron lonchophyllus</i> Hook.*

ERPA99	<i>Erigeron pallens</i> Cronq.* (ERPU3— <i>Erigeron purpuratus</i> Greene in part)
ERPE3	<i>Erigeron peregrinus</i> (Banks ex Pursh) Greene*
ERPU3	<i>Erigeron purpuratus</i> Greene*
ERAR10	<i>Eritrichium aretioides</i> (Cham.) A. DC.*
ERSP9	<i>Eritrichium splendens</i> Kearney*
ERIN7	<i>Erysimum inconspicuum</i> (S. Wats.) MacM.*
ERPA10	<i>Erysimum pallasii</i> (Pursh) Fern.*
EUDI9	<i>Euphrasia disjuncta</i> Fern. & Wieg.*
EUED	<i>Eutrema edwardsii</i> R. Br.*
FRCA5	<i>Fritillaria camschatcensis</i> (L.) Ker-Gawl.*
GALIU	<i>Galium</i> L.
GABO2	<i>Galium boreale</i> L.
GATR2	<i>Galium trifidum</i> L.*
GATR3	<i>Galium triflorum</i> Michx.*
GAAF	<i>Gastrolychnis affinis</i> (J. Vahl ex Fries) Tolm. & Kozh.* (MEAF4— <i>Melandrium affine</i> (J. Vahl ex Fries) J. Vahl)
GAAP3	<i>Gastrolychnis apetala</i> (L.) Tolm. & Kozh.* (MEAPA2— <i>Melandrium apetalum</i> (L.) Fenzl ssp. <i>arcticum</i> (Fries) Hultén)
GENTI	<i>Gentiana</i> L. sens lat.
GENTI2	<i>Gentianella</i> Moench
GEAL2	<i>Gentiana algida</i> Pallas
GEDO	<i>Gentiana douglasiana</i> Bong.*
GEGL	<i>Gentiana glauca</i> Pallas
GEPR3	<i>Gentiana prostrata</i> Haenke
GEPR5	<i>Gentianella propinqua</i> (Richards.) J. Gillett (GEPR7— <i>Gentiana propinqua</i> Richards.)
GEDEY	<i>Gentianopsis detonsa</i> ssp. <i>yukonensis</i> (J. Gillett) J. Gillett* (GEDEY2— <i>Gentianella detonsa</i> (Rottb.) G. Don ssp. <i>yukonensis</i> J. Gillett)
GELI2	<i>Geocaulon lividum</i> (Richards.) Fern.
GEER2	<i>Geranium erianthum</i> DC.
GEMA4	<i>Geum macrophyllum</i> Willd.
GEPE7	<i>Geum perincisum</i> Rydb.* (GEMAP2— <i>Geum macrophyllum</i> Willd. ssp. <i>perincisum</i> (Rydb.) Hultén)
GOREO2	<i>Goodyera repens</i> var. <i>ophioides</i> Fern.*
GYDR	<i>Gymnocarpium dryopteris</i> (L.) Newman*
HAPA11	<i>Hammarbya paludosa</i> (L.) Kuntze*†
HEDYS	<i>Hedysarum</i> L.
HEAL	<i>Hedysarum alpinum</i> L.
HEHE2	<i>Hedysarum hedysaroides</i> auct. non (L.) Schinz & Thellung*
HEMA	<i>Hedysarum mackenziei</i> Richards.
HELA4	<i>Heracleum lanatum</i> Michx.
HEGL5	<i>Heuchera glabra</i> Willd. ex Roemer & J.A. Schultes
HITR2	<i>Hieracium triste</i> Willd. ex Spreng.
HIMO2	<i>Hippuris montana</i> Ledeb.* †
HIVU2	<i>Hippuris vulgaris</i> L.
HUHA	<i>Huperzia haleakalae</i> (Brack.) Holub* (LYSE— <i>Lycopodium selago</i> L.)
HUMI	<i>Huperzia miyoshiana</i> (Makino) Ching* (LYSEC— <i>Lycopodium selago</i> L. ssp. <i>chinense</i> (Christ) Hultén)
IMNO	<i>Impatiens noli-tangere</i> L.*
IRSE	<i>Iris setosa</i> Pallas ex Link
ISEC	<i>Isoetes echinospora</i> Durieu*

KOIS	<i>Koenigia islandica</i> L.*
LAGL2	<i>Lagotis glauca</i> Gaertn.
LEMI3	<i>Lemna minor</i> L.*
LETR	<i>Lemna trisulca</i> L.*
LEPY	<i>Leptarrhena pyrolifolia</i> (D. Don) R. Br. ex Ser.*
LIBO4	<i>Listera borealis</i> Morong*
LICO6	<i>Listera cordata</i> (L.) R. Br. ex Ait. f.
LLSE	<i>Lloydia serotina</i> (L.) Reichenb.
LORO	<i>Lomatogonium rotatum</i> (L.) Fries ex Fern.
LUAR2	<i>Lupinus arcticus</i> S. Wats.
LUNO	<i>Lupinus nootkatensis</i> Donn ex Sims*
LYCOP2	<i>Lycopodium</i> L. sens lat.
LYAN2	<i>Lycopodium annotinum</i> L.
LYCL	<i>Lycopodium clavatum</i> L.
LYDE	<i>Lycopodium dendroideum</i> Michx.* (LYOBD— <i>Lycopodium obscurum</i> L. var. <i>dendroideum</i> (Michx.) D.C. Eat.)
LYTH2	<i>Lysimachia thyrsoflora</i> L.*
MAST	<i>Matteuccia struthiopteris</i> (L.) Todaro*
METR3	<i>Menyanthes trifoliata</i> L.
MEPA	<i>Mertensia paniculata</i> (Ait.) G. Don
MIGU	<i>Mimulus guttatus</i> DC.
MINUA	<i>Minuartia</i> L.
MIAR3	<i>Minuartia arctica</i> (Stev. ex Ser.) Graebn.*
MIBI9	<i>Minuartia biflora</i> (L.) Schinz & Thellung*
MIEL2	<i>Minuartia elegans</i> (Cham. & Schlecht.) Schischkin* (MIROE— <i>Minuartia rossii</i> (R. Br.) Graebn. var. <i>elegans</i> (Cham. & Schlecht.) Hultén)
MIMA4	<i>Minuartia macrocarpa</i> (Pursh) Ostenf.
MIOB2	<i>Minuartia obtusiloba</i> (Rydb.) House*
MIRO4	<i>Minuartia rossii</i> (R. Br. ex Richards.) Graebn.*
MIRU3	<i>Minuartia rubella</i> (Wahlenb.) Hiern*
MIPE	<i>Mitella pentandra</i> Hook.*
MOLA6	<i>Moehringia lateriflora</i> (L.) Fenzl
MOUN2	<i>Moneses uniflora</i> (L.) Gray
MYALA2	<i>Myosotis alpestris</i> ssp. <i>asiatica</i> Vesterg.
MYSI	<i>Myriophyllum sibiricum</i> Komarov
(MYSP2	<i>Myriophyllum spicatum</i> L.)
MYVE3	<i>Myriophyllum verticillatum</i> L.*
NAFL	<i>Najas flexilis</i> (Willd.) Rostk. & Schmidt*† (FNA 1993-2002)
NUPO2	<i>Nuphar polysepala</i> Engelm.
NYTE	<i>Nymphaea tetragona</i> Georgi*†
ORSE	<i>Orthilia secunda</i> (L.) House (PYSE— <i>Pyrola secunda</i> L.)
OSDE	<i>Osmorhiza depauperata</i> Phil.*
OXDI3	<i>Oxyria digyna</i> (L.) Hill
OXYTR	<i>Oxytropis</i> DC.
OXBO	<i>Oxytropis borealis</i> DC.
OXCA4	<i>Oxytropis campestris</i> (L.) DC.
OXDE2	<i>Oxytropis deflexa</i> (Pallas) DC.
OXHU	<i>Oxytropis huddelsonii</i> Porsild*
OXJO2	<i>Oxytropis jordalii</i> Porsild* (OXCAJ2— <i>Oxytropis campestris</i> (L.) DC. ssp. <i>jordalii</i> (Porsild) Hultén)
OXMA2	<i>Oxytropis maydelliana</i> Trautv.
OXME2	<i>Oxytropis mertensiana</i> Turcz.*

OXNI	<i>Oxytropis nigrescens</i> (Pallas) Fisch. ex DC.
OXSC	<i>Oxytropis scammaniana</i> Hultén
OXVI2	<i>Oxytropis viscida</i> Nutt.*
PAPAV	Papaver L.
PALA9	<i>Papaver lapponicum</i> (Tolm.) Nordh.*
PAMA5	<i>Papaver macounii</i> Greene*
PAMC	<i>Papaver mcconnellii</i> Hultén*
PARA11	<i>Papaver radicum</i> auct. non Rottb.* (see FNA 1993-2002)
PAKO3	<i>Parnassia kotzebuei</i> Cham. ex Spreng.
PAPA8	<i>Parnassia palustris</i> L.
PANU5	<i>Parrya nudicaulis</i> (L.) Boiss.
PANUI	<i>Parrya nudicaulis</i> ssp. interior Hultén
PEDIC	<i>Pedicularis</i> L.
PECA2	<i>Pedicularis capitata</i> M.F. Adams
PELA	<i>Pedicularis labradorica</i> Wirsing
PELA14	<i>Pedicularis lanata</i> Cham. & Schlecht.* (PEKA7— <i>Pedicularis kanei</i> Dur.)
PELA3	<i>Pedicularis langsдорffii</i> Fisch. ex Stev.
PEMA	<i>Pedicularis macrodonta</i> Richards.* †
PEOE	<i>Pedicularis oederi</i> Vahl ex Hornem.
PESU	<i>Pedicularis sudetica</i> Willd. sens lat.*
PEVE	<i>Pedicularis verticillata</i> L.*
PETAS	<i>Petasites</i> P. Mill.
PEFR5	<i>Petasites frigidus</i> (L.) Fries
PEHY5	<i>Petasites hyperboreus</i> Rydb.*
PESA5	<i>Petasites sagittatus</i> (Banks ex Pursh) Gray*
PHHO	<i>Phlox hoodii</i> Richards.* †
PIVI	<i>Pinguicula villosa</i> L.
PIVU	<i>Pinguicula vulgaris</i> L.*
PLATA2	<i>Platanthera</i> L.C. Rich.
PLDI3	<i>Platanthera dilatata</i> (Pursh) Lindl. ex Beck*
PLHY2	<i>Platanthera hyperborea</i> (L.) Lindl.*
PLOB	<i>Platanthera obtusata</i> (Banks ex Pursh) Lindl.
PLST4	<i>Platanthera stricta</i> Lindl.* (PLSA6— <i>Platanthera saccata</i> (Greene) Hultén)
POMA18	<i>Podistera macounii</i> (Coul. & Rose) Mathias & Constance (LIMUA— <i>Ligusticum mutellinoides</i> (Crantz) Willar ssp. alpinum auct. non (Ledeb.) Thellung)
POAC	<i>Polemonium acutiflorum</i> Willd. ex Roemer & J.A. Schultes
POBO2	<i>Polemonium boreale</i> M.F. Adams
POPU3	<i>Polemonium pulcherrimum</i> Hook.*
POLYG4	<i>Polygonum</i> L. sens lat.
POAL5	<i>Polygonum alaskanum</i> W. Wight ex Hultén
POAML	<i>Polygonum amphibium</i> ssp. laevimarginatum Hultén*
POPEO2	<i>Polygonum pensylvanicum</i> ssp. oneillii (Brenckle) Hultén*
POBRA3	<i>Polystichum braunii</i> var. alaskense (Maxon) Hultén*
POLO4	<i>Polystichum lonchitis</i> (L.) Roth*
POTAM	<i>Potamogeton</i> L.
POALT3	<i>Potamogeton alpinus</i> ssp. tenuifolius (Raf.) Hultén*
POEP2	<i>Potamogeton epihydrus</i> Raf.*
POGR8	<i>Potamogeton gramineus</i> L.*
POPU7	<i>Potamogeton pusillus</i> L.* (POBE9— <i>Potamogeton berchtoldii</i> Fieber)

POR12	<i>Potamogeton richardsonii</i> (Benn.) Rydb.* (POPER5— <i>Potamogeton perfoliatus</i> L. ssp. <i>richardsonii</i> (Benn.) Hultén)
POZO	<i>Potamogeton zosteriformis</i> Fern.* (POZOZ— <i>Potamogeton zosterifolius</i> Schumacher ssp. <i>zosteriformis</i> (Fern.) Hultén)
POBI8	<i>Potentilla biflora</i> Willd. ex Schlecht.
POHO2	<i>Potentilla hookeriana</i> Lehm.*
POHY4	<i>Potentilla hyparctica</i> Malte
PONI2	<i>Potentilla nivea</i> L.*
PONO3	<i>Potentilla norvegica</i> L.
POUN2	<i>Potentilla uniflora</i> Ledeb.*
PRCUS	<i>Primula cuneifolia</i> ssp. <i>saxifragifolia</i> (Lehm.) W.W. Sm. & G. Forrest*
PREG	<i>Primula egaliksensis</i> Wormsk. ex Hornem.*
PREX2	<i>Primula eximia</i> Greene* (PRTSA— <i>Primula tschuktschorum</i> Kjellm. var. <i>arctica</i> (Koidzumi) Fern.)
PUPAM	<i>Pulsatilla patens</i> ssp. <i>multifida</i> (Pritz.) Zamels
PYROL	<i>Pyrola</i> L. sens. lat.
PYAS	<i>Pyrola asarifolia</i> Michx.
PYCH	<i>Pyrola chlorantha</i> Sw.*
PYGR	<i>Pyrola grandiflora</i> Radius
PYMI	<i>Pyrola minor</i> L.*
RANUN	<i>Ranunculus</i> L.
RAES	<i>Ranunculus eschscholtzii</i> Schlecht.*
RAGEG	<i>Ranunculus gelidus</i> ssp. <i>grayi</i> (Britt.) Hultén*
RAGM	<i>Ranunculus gmelinii</i> DC.
RAGMG99	<i>Ranunculus gmelinii</i> ssp. <i>gmelinii</i> DC.
RAGMP2	<i>Ranunculus gmelinii</i> ssp. <i>purshii</i> (Richards.) Hultén*
RAHY2	<i>Ranunculus hyperboreus</i> Rottb.
RALA	<i>Ranunculus lapponicus</i> L.*
RAMA2	<i>Ranunculus macounii</i> Britt.*
RANI	<i>Ranunculus nivalis</i> L.*
RAOCB	<i>Ranunculus occidentalis</i> var. <i>brevistylis</i> Greene*
RAPE2	<i>Ranunculus pensylvanicus</i> L. f.*
RAPY	<i>Ranunculus pygmaeus</i> Wahlenb.
RARE80	<i>Ranunculus reptans</i> L.*
RASCM3	<i>Ranunculus sceleratus</i> ssp. <i>multifidus</i> (Nutt.) Hultén*
RATR	<i>Ranunculus trichophyllus</i> Chaix
RHMIB	<i>Rhinanthus minor</i> ssp. <i>borealis</i> (Sterneck) A. Love
RHIN11	<i>Rhodiola integrifolia</i> Raf. (SEROI3— <i>Sedum rosea</i> (L.) Scop. ssp. <i>integrifolium</i> (Raf.) Hultén)
RORIP	<i>Rorippa</i> Scop.
ROBA	<i>Rorippa barbareifolia</i> (DC.) Kitagawa (ROHIBRorippa <i>hispida</i> (Desv.) Britt. var. <i>barbareifolia</i> (DC.) Hultén)
ROPA2	<i>Rorippa palustris</i> (L.) Bess.
ROPAH	<i>Rorippa palustris</i> ssp. <i>hispida</i> (Desv.) Jonsell* (no code— <i>Rorippa hispida</i> (Desv.) Britt. var. <i>hispida</i>)
RUAR	<i>Rubus arcticus</i> L.*
RUCH	<i>Rubus chamaemorus</i> L.
RUPE	<i>Rubus pedatus</i> Sm.*
RUST6	<i>Rubus stellatus</i> Sm.* (RUARS— <i>Rubus arcticus</i> L. ssp. <i>stellatus</i> (Sm.) Boivin)
RUMEX	<i>Rumex</i> L.
RUACA2	<i>Rumex acetosa</i> ssp. <i>alpestris</i> (Jacq.) A. Love*
RUAR6	<i>Rumex arcticus</i> Trautv.*

RUFE3	<i>Rumex fenestratus</i> Greene
RUMAM99	<i>Rumex maritimus</i> L. ssp. <i>maritimus</i> *
SAGIN	<i>Sagina</i> L.
SANI7	<i>Sagina nivalis</i> (Lindblom) Fr. (SAIN9— <i>Sagina intermedia</i> Fenzl*)
SASA	<i>Sagina saginoides</i> (L.) Karst.*
SANGU2	<i>Sanguisorba</i> L.
SAOF3	<i>Sanguisorba officinalis</i> L.
SAST11	<i>Sanguisorba stipulata</i> Raf.
SAAN3	<i>Saussurea angustifolia</i> (Willd.) DC.
SAVIY	<i>Saussurea viscida</i> var. <i>yukonensis</i> (Porsild) Hultén
SAXIF	<i>Saxifraga</i> L.
SABR6	<i>Saxifraga bronchialis</i> L.
SABRC	<i>Saxifraga bronchialis</i> ssp. <i>cherlerioides</i> (D. Don) Hultén
SABRF	<i>Saxifraga bronchialis</i> ssp. <i>funstonii</i> (Small) Hultén
SACA24	<i>Saxifraga calycina</i> Sternb.* (SADAG— <i>Saxifraga davurica</i> Willd. ssp. <i>grandipetala</i> (Engl. & Irmsch.) Hultén)
SACE2	<i>Saxifraga cernua</i> L.
SACE4	<i>Saxifraga cespitosa</i> L.*
SAES	<i>Saxifraga eschscholtzii</i> Sternb.
SAFL6	<i>Saxifraga flagellaris</i> Willd. ex Sternb.
SAFO4	<i>Saxifraga foliolosa</i> R. Br.*
SAHI5	<i>Saxifraga hieraciifolia</i> Waldst. & Kit. ex Willd.
SAHI3	<i>Saxifraga hirculus</i> L.
SALYH	<i>Saxifraga lyallii</i> ssp. <i>hultenii</i> (Calder & Savile) Calder & Taylor
SANE3	<i>Saxifraga nelsoniana</i> D. Don* (SAPU6— <i>Saxifraga punctata</i> L. in part)
SANI6	<i>Saxifraga nivalis</i> L.*
SAOP	<i>Saxifraga oppositifolia</i> L.
SARE8	<i>Saxifraga reflexa</i> Hook.
SARI8	<i>Saxifraga rivularis</i> L.*
SASE7	<i>Saxifraga serpyllifolia</i> Pursh
SATR5	<i>Saxifraga tricuspida</i> Rottb.
SCPAA3	<i>Scheuchzeria palustris</i> ssp. <i>americana</i> (Fern.) Hultén*
SCGAP	<i>Scutellaria galericulata</i> var. <i>pubescens</i> Benth.* †
SESE	<i>Selaginella selaginoides</i> (L.) Beauv. ex Mart. & Schrank*
SESI	<i>Selaginella sibirica</i> (Milde) Hieron.*
SENEC	<i>Senecio</i> L. sens. lat.
SEAT2	<i>Senecio atropurpureus</i> (Ledeb.) Fedtsch.*
SEATF	<i>Senecio atropurpureus</i> ssp. <i>frigidus</i> (Richards.) Hultén*
SECO2	<i>Senecio congestus</i> (R. Br.) DC.*
SEKJ	<i>Senecio kjellmanii</i> Porsild* (SEATT— <i>Senecio atropurpureus</i> (Ledeb.) Fedtsch. ssp. <i>tomentosus</i> (Kjellm.) Hultén)
SELU	<i>Senecio lugens</i> Richards.
SEOG	<i>Senecio ogtorukensis</i> Packer* (SECO14— <i>Senecio conterminus</i> Greenm. in part)
SEPA4	<i>Senecio pauciflorus</i> Pursh*
SERE5	<i>Senecio resedifolius</i> Less.
SETR	<i>Senecio triangularis</i> Hook.*
SETU	<i>Senecio tundricola</i> Tolm. (SEFU— <i>Senecio fuscatus</i> Hayek)
SEYU	<i>Senecio yukonensis</i> Porsild
SIPR	<i>Sibbaldia procumbens</i> L.

SIAC	<i>Silene acaulis</i> (L.) Jacq.
SIRE3	<i>Silene repens</i> Patrin ex Pers.*
SIWI	<i>Silene williamsii</i> Britt.* (SIMEW— <i>Silene menziesii</i> Hook. ssp. <i>williamsii</i> (Britt.) Hultén)
SMELO	<i>Smelowskia</i> C.A. Mey.
SMBO	<i>Smelowskia borealis</i> (Greene) Drury & Rollins*
SOLID	<i>Solidago</i> L.
SOLE8	<i>Solidago lepida</i> DC.*
SOMU	<i>Solidago multiradiata</i> Ait.*
SPARG	<i>Sparganium</i> L.
SPAN2	<i>Sparganium angustifolium</i> Michx.
SPHY	<i>Sparganium hyperboreum</i> Laestad.*
SPMI	<i>Sparganium minimum</i> (Hartman) Wallr.
SPRO	<i>Spiranthes romanzoffiana</i> Cham.
STELL	<i>Stellaria</i> L.
STAL3	<i>Stellaria alaskana</i> Hultén*
STBOB	<i>Stellaria borealis</i> ssp. <i>borealis</i> Bigelow* (STCAI— <i>Stellaria calycantha</i> (Ledeb.) Bong. ssp. <i>interior</i> Hultén, <i>Stellaria calycantha</i> (Ledeb.) Bong. var. <i>isophylla</i> (Fern.) Fern.)
STCAI2	<i>Stellaria borealis</i> ssp. <i>sitchana</i> (Steud.) Piper* (STSI3— <i>Stellaria sitchana</i> Steud.)
STBOS	<i>Stellaria calycantha</i> (Ledeb.) Bong.*
STCA	<i>Stellaria crassifolia</i> Ehrh.*
STCR	<i>Stellaria crispa</i> Cham. & Schlecht.*
STCR2	<i>Stellaria dicranoides</i> (Cham. & Schlecht.) Fenzl (ARCH8— <i>Arenaria chamissonis</i> Maguire)
STDI4	<i>Stellaria edwardsii</i> R. Br.*
STED	<i>Stellaria laeta</i> Richards.
STLA3	<i>Stellaria longifolia</i> Muhl. ex Willd.*
STLO	<i>Stellaria longipes</i> Goldie*
STLO2	<i>Stellaria monantha</i> Hultén*
STMO2	<i>Streptopus amplexifolius</i> (L.) DC.*
STAM2	<i>Stuckenia filiformis</i> (Pers) Boerner* (POFI2— <i>Potamogeton filiformis</i> Pers.)
STFI6	<i>Subularia aquatica</i> L.*
SUAQ	<i>Swertia perennis</i> L.*
SWPE	<i>Synthyris borealis</i> Pennell
SYBO	<i>Taraxacum</i> G.H. Weber ex Wiggers
TARAX	<i>Taraxacum ceratophorum</i> (Ledeb.) DC.*
TACE	<i>Taraxacum kamschaticum</i> Dahlst.*
TAKA	<i>Taraxacum lacerum</i> Greene*
TALA	<i>Thalictrum alpinum</i> L.*
THAL	<i>Thalictrum sparsiflorum</i> Turcz. ex Fisch. & C.A. Mey.
THSP	<i>Thelypteris phegopteris</i> (L.) Slosson
THPH	<i>Thlaspi arcticum</i> Porsild*†
THAR4	<i>Tofieldia</i> Huds.
TOFIE	<i>Tofieldia coccinea</i> Richards.
TOCO	<i>Tofieldia glutinosa</i> ssp. <i>brevistyla</i> C.L. Hitchc.*
TOGLB	<i>Tofieldia pusilla</i> (Michx.) Pers.*
TOPU	<i>Trientalis europaea</i> L.
TREU	<i>Triglochin maritimum</i> L.*
TRMA4	<i>Triglochin palustre</i> L.*
TRPA6	<i>Typha latifolia</i> L.*
TYLA	

URDIG	<i>Urtica dioica</i> ssp. <i>gracilis</i> (Ait.) Seland.* (URGR3— <i>Urtica gracilis</i> Ait.,
URLY2	<i>Urtica lyallii</i> S. Wats.)
UTIN2	<i>Utricularia intermedia</i> Hayne
UTMI	<i>Utricularia minor</i> L.*
UTVUM	<i>Utricularia vulgaris</i> ssp. <i>macrorhiza</i> (Le Conte) Clausen
VACA3	<i>Valeriana capitata</i> Pallas ex Link
VEVIE2	<i>Veratrum viride</i> ssp. <i>eschscholtzii</i> (Gray) A.& D. Love*
VERON	<i>Veronica</i> L.
VEAM2	<i>Veronica americana</i> Schwein. ex Benth.*
VESC2	<i>Veronica scutellata</i> L.*
VESE	<i>Veronica serpyllifolia</i> L.*
VEWO2	<i>Veronica wormskjoldii</i> Roemer & J.A. Schultes*
VEWOA	<i>Veronica wormskjoldii</i> ssp. <i>alterniflora</i> (Fern.) Pennell
VIOLA	<i>Viola</i> L.
VIBI2	<i>Viola biflora</i> L.*
VIEPR	<i>Viola epipsila</i> ssp. <i>repens</i> Becker
VIGL	<i>Viola glabella</i> Nutt.*
VILA6	<i>Viola langsdorfii</i> Fisch. ex Gingins
VISE2	<i>Viola selkirkii</i> Pursh ex Goldie*†
WIPH	<i>Wilhelmsia physodes</i> (Fisch. ex Ser.) McNeill*
WOGL	<i>Woodsia glabella</i> R. Br. ex Richards.*
WOIL	<i>Woodsia ilvensis</i> (L.) R. Br.*
ZIEL2	<i>Zigadenus elegans</i> Pursh
ZZFERN	total unknown-ferns
ZZFORB	total unknown-forbs

Lichens

ALECT3	<i>Alectoria</i> Ach.
ALOC60	<i>Alectoria ochroleuca</i> (Hoffm.) Massal.
AMPU9	<i>Amandinea punctata</i> (Hoffm.) Coppins & Scheid.* (BUPU3— <i>Buellia punctata</i> (Hoffm.) Massal.)
ASAH12	<i>Asahinea</i> Culb. & C. Culb.*
BRYOR2	<i>Bryoria</i> Brodo & D. Hawksw.
CETRA2	<i>Cetraria</i> Ach. sens. lat.
CEIS61	<i>Cetraria islandica</i> group (includes CEER6 <i>C. ericetorum</i> Opiz, CEIS60 <i>C. islandica</i> (L.) Ach., and CELA60 <i>C. laevigata</i> Rass.)
CLADI3	<i>Cladina</i> (Nyl.) Nyl.
CLAR60	<i>Cladina arbuscula</i> (Wallr.) Hale & Culb.
CLMI61	<i>Cladina mitis</i> group (includes CLAR60 <i>C. arbuscula</i> (Wallr.) Hale & Culb. and CLMI60 <i>C. mitis</i> (Sandst.) Hustich)
CLRA61	<i>Cladina rangiferina</i> group * (includes CLRA60 <i>C. rangiferina</i> (L.) Nyl., CLST5 <i>C. stygia</i> (Fr.) Ahti, and CLWA5 <i>Cladonia wainioi</i> Savicz)
CLST60	<i>Cladina stellaris</i> (Opiz) Brodo
CLADO3	<i>Cladonia</i> P. Browne
CLBO9	<i>Cladonia botrytes</i> (K. Hagen) Willd.*
CLCA9	<i>Cladonia cariosa</i> (Ach.) Sprengel*
CLCEV60	<i>Cladonia cervicornis</i> ssp. <i>verticillata</i> (Hoffm.) Ahti*
CLCO19	<i>Cladonia cornuta</i> (L.) Hoffm.*

CLDE61	Cladonia deformis group (includes CLDE60 <i>C. deformis</i> (L.) Hoffm. and CLSU64 <i>C. sulphurina</i> (Michaux) Fr.)
CLGR13	<i>Cladonia gracilis</i> (L.) Willd
CLGRV	<i>Cladonia gracilis</i> ssp. <i>vulnerata</i> Ahti
CLMU60	<i>Cladonia multiformis</i> G. Merr.*
CLPY61	<i>Cladonia pyxidata</i> group* (includes CLPO60 <i>C. pocillum</i> (Ach.) Grognot and CLPY60 <i>C. pyxidata</i> (L.) Hoffm.)
CLSQ61	<i>Cladonia squamosa</i> group (includes CLECI <i>C. ecmocyna</i> Leighton ssp. <i>intermedia</i> (Robbins) Ahti, CLSQ60 <i>C. squamosa</i> Hoffm., and CLSU62 <i>C. subsquamosa</i> Krempelh.)
CLUN61	<i>Cladonia uncialis</i> group* (includes CLKA3 <i>C. kanewskii</i> Oksner, CLNI4 <i>C. nipponica</i> Asah. and CLUN60 <i>C. uncialis</i> (L.) F. H. Wigg.)
COELO5	<i>Coelocaulon</i> Link
DACTY4	<i>Dactylina</i> Nyl.
DAAR61	<i>Dactylina arctica</i> group (includes DAAR60 <i>D. arctica</i> (Richardson) Nyl. and DABE60 <i>D. beringica</i> C. D. Bird & J. W. Thomson)
DARA60	<i>Dactylina ramulosa</i> (Hook.) Tuck.*
EVME60	<i>Evernia mesomorpha</i> Nyl.*
FLCU	<i>Flavocetraria cucullata</i> (Bellardi) Karnefelt & Thell (CECU60— <i>Cetraria cucullata</i> (Bellardi) Ach.)
FLNI	<i>Flavocetraria nivalis</i> (L.) Karnefelt & Thell (CENI62— <i>Cetraria nivalis</i> (L.) Ach.)
HYPOG2	<i>Hypogymnia</i> (Nyl.) Nyl.
ICER	<i>Icmadophila ericetorum</i> (L.) Zahlbr.*
LEPTO14	<i>Leptogium</i> (Ach.) Gray*
LOBAR2	<i>Lobaria</i> Schreber*
LOLI60	<i>Lobaria linita</i> (Ach.) Rabenh.
MARI60	<i>Masonhalea richardsonii</i> (Hook.) Karnefelt
NEPHR3	<i>Nephroma</i> Ach.
NEAR60	<i>Nephroma arcticum</i> (L.) Torss.
NEEX2	<i>Nephroma expallidum</i> (Nyl.) Nyl.
NEPA60	<i>Nephroma parile</i> (Ach.) Ach.
NERE60	<i>Nephroma resupinatum</i> (L.) Ach.
PAPE60	<i>Pannaria pezizoides</i> (Weber) Trevisan
PARME2	<i>Parmelia</i> Ach.*
PELT12	<i>Peltigera</i> Willd.*
PEAP61	<i>Peltigera aphthosa</i> group (includes PEAP60 <i>P. aphthosa</i> (L.) Willd., PEBR21 <i>P. britannica</i> (Gyelnik) Holt.-Hartw. & Tonsb. and PELE61 <i>P. leucophlebia</i> (Nyl.) Gyelnik)
PECA60	<i>Peltigera canina</i> (L.) Willd.
PEDI60	<i>Peltigera didactyla</i> (With.) J. R. Laundon
PEPO60	<i>Peltigera polydactylon</i> (Necker) Hoffm.
PEVE60	<i>Peltigera venosa</i> (L.) Hoffm.*
PEDA3	<i>Pertusaria dactylina</i> (Ach.) Nyl.
PIRO60	<i>Pilophorus robustus</i> Th. Fr.*
PSPU60	<i>Pseudephebe pubescens</i> (L.) Choisy
PSHY60	<i>Psoroma hypnorum</i> (Vahl) Gray
RADI60	<i>Ramalina dilacerata</i> (Hoffm.) Hoffm.
SOCR60	<i>Solorina crocea</i> (L.) Ach.
SOSA60	<i>Solorina saccata</i> (L.) Ach.*
SPHAE7	<i>Sphaerophorus</i> Pers.*

STERE2	Stereocaulon Hoffm.*
THSU61	Thamnozia subuliformis group (includes THSU60 <i>T. subuliformis</i> (Ehrh.) W. Culb. and THVE60 <i>T. vermicularis</i> (Sw.) Ach. ex Schaerer)
UMBIL2	Umbilicaria Hoffm.*
USNEA2	Usnea Dill. ex Adans.
VUPI	<i>Vulpicida pinastri</i> (Scop.) J.-E. Mattsson & M. J. Lai (CEPI4— <i>Cetraria pinastri</i> (Scop.) Gray)
VUTI	<i>Vulpicida tilesii</i> (Ach.) J.-E. Mattsson & M. J. Lai (CETI60— <i>Cetraria tilesii</i> Ach.)
ZZARBO	unknown-arboreal lichens
ZZCRUST	unknown-crustose and soil crust lichens
ZZLICHEN	unknown-foliose and fruticose lichens
LICHEN	total lichens
L2ALL	total crustose and soil crust lichens

Bryophytes

ABAB70	<i>Abietinella abietina</i> (Hedw.) Fleisch. (THAB70— <i>Thuidium abietinum</i> (Hedw.) Schimp. in B.S.G.)
AULAC2	<i>Aulacomnium</i> Schwaegr.
AUPA70	<i>Aulacomnium palustre</i> (Hedw.) Schwaegr.*
AUTU70	<i>Aulacomnium turgidum</i> (Wahlenb.) Schwaegr.*
BALY99	<i>Barbilophozia lycopodioides</i> (Wallr.) Loeske*
BRACH10	<i>Brachythecium</i> Schimp. in B.S.G.
BRAR71	<i>Bryum argenteum</i> Hedw.*
CALLI10	<i>Calliergon</i> (Sull.) Kindb.*
CLDE70	<i>Climacium dendroides</i> (Hedw.) Web. & Mohr
COCO99	<i>Conocephalum conicum</i> (L.) Lindb.*
DICRA8	<i>Dicranum</i> Hedw.
DREPA3	<i>Drepanocladus</i> (C. Mull.) G. Roth*
DRRE99	<i>Drepanocladus revolvens</i> (Sw.) Warnst.*
HYSP70	<i>Hylocomium splendens</i> (Hedw.) Schimp. in B.S.G.
HYPNU2	<i>Hypnum</i> Hedw.
MAPO99	<i>Marchantia polymorpha</i> L.
MNIUM2	<i>Mnium</i> Hedw.
PASQ70	<i>Paludella squarrosa</i> (Hedw.) Brid.*
PLAGI7	<i>Plagiomnium</i> T. Kop.*
PLSC70	<i>Pleurozium schreberi</i> (Brid.) Mitt.
POUR3	<i>Pogonatum urnigerum</i> (Hedw.) P. Beauv.
POLYT5	<i>Polytrichum</i> Hedw.*
POCO38	<i>Polytrichum commune</i> Hedw.
POJU70	<i>Polytrichum juniperinum</i> Hedw.
POPI10	<i>Polytrichum piliferum</i> Hedw.*
POST70	<i>Polytrichum strictum</i> Brid.
PRQU99	<i>Preissia quadrata</i> (Scop.) Nees*
PTPU99	<i>Ptilidium pulcherrimum</i> (G.Web.) Hampe*
PTCR70	<i>Ptilium crista-castrensis</i> (Hedw.) De Not.
RACOM	<i>Racomitrium</i> Brid.
RACA11	<i>Racomitrium canescens</i> (Hedw.) Brid.
RALA70	<i>Racomitrium lanuginosum</i> (Hedw.) Brid.
RHIZO2	<i>Rhizomnium</i> (Broth.) T. Kop.
RHYTI2	<i>Rhytidiadelphus</i> (Lindb. ex Limpr.) Warnst.
RHTR70	<i>Rhytidiadelphus triquetrus</i> (Hedw.) Warnst.

RHRU70	Rhytidium rugosum (Hedw.) Kindb.*
RINA99	Ricciocarpus natans (L.) Corda*
SCAP99	Scapania sp.*
SPHAG2	Sphagnum L.*
SPSQ70	Sphagnum squarrosum Crome
SPLAC	Splachnum Hedw.
SPLU7	Splachnum luteum Hedw. †
TALI2	Tayloria lingulata (Dicks.) Lindb.*
THUID	Thuidium Schimp. in B.S.G.
THRE7	Thuidium recognitum (Hedw.) Lindb.
TONI70	Tomentypnum nitens (Hedw.) Loeske*
TORTU	Tortula Hedw.
MOSS	total bryophytes-mosses and liverworts
ZZLIV	unknown-liverworts
ZZMOSS	unknown-mosses

Fungi

AGARI90	Agaricus sp.* †
AGSY90	Agaricus sylvicola (Vittadini) Fries* †
ALOV90	Albatrellus ovinus (Fr.) Kotl. & Pouz.* †
ALAU90	Aleuria aurantia (Persoon ex Fries) Fuckel
ALDI90	Alpova diplophoeus sp.*
AMANI90	Amanita sp.
AMBA90	Amanita battarrae Boudier†
AMMU90	Amanita muscaria (Fr.) S.F.G. †
ARME90	Armillariella mellea (Vahl ex Fr.) Kar.
AUAU90	Auricularia auricula (Hook.) Under.
BICI90	Bisporella citrina (Batsch & Fries) Korf & Carpenter
BOLET90	Boletus sp.
BOED90	Boletus edulis Builliard ex Fries
BOSU90	Boletus subtomentosus Fries
BOBE90	Bondarzewia berkeleyi (Fr.) Sing.*
BRMA90	Brefeldia maxima (Fr.) Rost.
CALVA90	Calvatia sp.
CAUM90	Cantharellula umbonata (Gmel. Ex Fr.) Sing. †
CATU90	Cantharellus tubaeformis Fr.*
CEUN90	Cerrena unicolor (Fr.) Murr.*
CHEIL90	Cheilymenia sp.
CHAE90	Chlorociboria aeruginascens (Nyl.) Kan.* †
CHRY90	Chrysomyxa sp.
CHLE90	Chrysomyxa ledicola Lagerh.
CHPY90	Chrysomyxa pyrolaeformis
CLAVA90	Clavariadelphus sp.* †
CLSA90	Clavariadelphus sachalinensis (Imai) Corner* †
CLTR90	Clavariadelphus truncatus (Quel.) Donk †
CLITO90	Clitocybe sp.*
CLAV90	Clitocybe avellaneialba Murr.
CLPR90	Clitopilus prunulus (Scop. Ex Fries) Kum. †
COLLY90	Collybia sp.
COPE90	Coltricia perennis (Fries) Murr.
COPRI90	Coprinus sp.
COAT90	Coprinus atramentarius (Bull. ex Fr.) Fr.
COCO90	Coprinus commatus (Mull. Ex Fr.) S.F.G.

COLA90	<i>Coprinus lagopus</i> (Fr.) Fr. †
CORTI90	<i>Cortinarius</i> sp.* †
COAL90	<i>Cortinarius alboviolaceus</i> (Fries) Kummer
COAR90	<i>Cortinarius armillatus</i> (Fries) Fries †
COSE90	<i>Cortinarius semisanguineus</i> (Fr.) Gill.*
COTR90	<i>Cortinarius traganus</i> (Weinm. ex Fr.) Fr. †
COVI90	<i>Cortinarius violaceus</i> (Fr.) S.F.G. †
CREPI90	<i>Crepidotus</i> sp.
CRAP90	<i>Crepidotus applanatus</i> (Pers. Ex Pers.) Kum.
CRCI90	<i>Crepidotus cinnabarinus</i> Peck
CRMO90	<i>Crepidotus mollis</i> (Fr.) Stde.
CUCI90	<i>Cudonia circinnans</i> sp.*
CYAM90	<i>Cystoderma amianthinum</i> (Scopoli ex Fr.) Fayod* †
DAPA90	<i>Dacrymyces palmatus</i> (Schw.) Bres.
DACO90	<i>Daedaleopsis confragosa</i> (Fries) Schroet.* †
ENFU90	<i>Encoelia furfuracea</i> (Roth ex Pers.) Kar.*
EXIDI90	<i>Exidia</i> sp.
EXGL90	<i>Exidia glandulosa</i> Bull. ex Fr.
FLFE90	<i>Flammulina fennae</i> Bas
FOFO90	<i>Fomes fomentarius</i> (L. ex Fries) Fries †
FOPI90	<i>Fomitopsis pinicola</i> (Fries) Kar.
FUPA90	<i>Fuscoboletinus paluster</i> (Peck) Pomerlau & Smith* †
GAPA90	<i>Galerina paludosa</i> (Fr.) Kuhner
GAAP90	<i>Ganoderma applanatum</i> (Persoon ex Wallroth) Patouillard
GLSE90	<i>Gleophyllum sepiarum</i> (von Wulfen ex Fries) Karsten*†
GOMPH91	<i>Gomphidius</i> sp.
GOSU90	<i>Gomphidius subroseus</i> Kauff. †
GOCL90	<i>Gomphus clavatus</i> (Fries) S.F. Gray†
GYIN90	<i>Gyromytra infula</i> (Schaeffer ex Fries) Quelet
HANI90	<i>Hapalopilus nidulans</i> (Fr.) Kar.*
HELVE90	<i>Helvella</i> sp. †
HEAC90	<i>Helvella acetabulum</i> (L. ex Fr.) Quéf.
HELA90	<i>Helvella lacunosa</i> Afz. ex Fr.*
HERA90	<i>Hericium ramosum</i> (Merat) Letellier
HUHE90	<i>Humaria hemisphaerica</i> (Wigg ex Fr.) Fkl.
HYDNE90	<i>Hydnellum</i> sp.*
HYAU92	<i>Hydnellum aurantiacum</i> (Batsch ex Fr.) Kar. †
HYPE90	<i>Hydnellum peckii</i> Bank.*
HYZO90	<i>Hydnellum zonatum</i> (Batsch) P. Karst* †
HYDNU90	<i>Hydnum</i> sp.
HYIM90	<i>Hydnum imbricatum</i> Fr. † (SAIM90— <i>Sarcodon imbricatus</i> (L. ex Fr.) Karsten)
HYRE90	<i>Hydnum repandum</i> L. ex Fries
HYAU91	<i>Hygrocybe autoconica</i> (Clements) Singer*
HYCO91	<i>Hygrocybe conica</i> (Fr.) Kummer
HYAU90	<i>Hygrophoropsis aurantiaca</i> (Wulf. Ex Fries) Maire*†
HYGRO90	<i>Hygrophorus</i> sp. †
HYCE91	<i>Hygrocybe ceracea</i> (Fr.) Kummer (HYCE90— <i>Hygrophorus ceracea</i>)
HYMI91	<i>Hygrocybe miniata</i> (Fr.) Kummer (HYMI90— <i>Hygrophorus miniatus</i> Fr.)
HYOL90	<i>Hygrophorus olivaceoalbus</i> (Fr.) Fr.* †
HYPI90	<i>Hygrophorus piceae</i> Kuhner & Romagnesi †

HYPY90	<i>Hygrophorus purpurascens</i> (Fr.) Fr. †
HYPOM90	<i>Hypomyces</i> sp.
HYCH90	<i>Hypomyces chrysospermus</i> Tulasne
HYFU90	<i>Hypoxilon fuscum</i> †
INOCY90	<i>Inocybe</i> sp.* †
INFA90	<i>Inocybe fastigiata</i> (Schaeffer ex Fr.) Quél.
INO90	<i>Inonotus obliquus</i> (Fr.) Pil.* †
IRLA90	<i>Irpex lacteus</i> (Fr.) Fr.
LACCA90	<i>Laccaria</i> sp.
LALA90	<i>Laccaria laccata</i> (Scop ex Fr.) Cke. †
LACTA90	<i>Lactarius</i> sp. †
LADE91	<i>Lactarius deceptivus</i> Peck
LADE90	<i>Lactarius deliciosus</i> (Fries) S.F. Gray †
LARE90	<i>Lactarius resimus</i> Fr.
LARU90	<i>Lactarius rufus</i> (Fr.) Fr. †
LASC90	<i>Lactarius scrobiculatus</i> (Fr.) Fr. †
LASO90	<i>Lactarius sordidus</i> Pk. †
LATO90	<i>Lactarius torminosus</i> (Schaeffer ex Fr.) S.F.Gray
LABI90	<i>Laxitextum bicolor</i> (Persoon ex Fries) Lentz †
LECCI90	<i>Leccinum</i> sp. †
LEAU90	<i>Leccinum aurantiacum</i> (Bull. ex St. Amans) S.F.G. †
LEHOA90	<i>Leccinum holopus</i> var. <i>americanum</i> Smith, Thiers & Watling
LEIN90	<i>Leccinum insigne</i> Smith, Thiers & Watling
LENTI90	<i>Lentinellus</i> sp.
LEBE90	<i>Lenzites betulina</i> (Fr.) Fr.*
LEFR90	<i>Leocarpus fragilis</i> (Dicks.) Rost.
LEPIO90	<i>Lepiota</i> sp.
LYEP90	<i>Lycogala epidendron</i> (L.) Fries
LYCOP90	<i>Lycoperdon</i> sp. †
LYEC90	<i>Lycoperdon echinatum</i> Pers. †
LYPE90	<i>Lycoperdon perlatum</i> Persoon
LYPY90	<i>Lycoperdon pyriforme</i> Schaeffer ex Persoon †
MARAS90	<i>Marasmius</i> sp.
MEAL90	<i>Melanoleuca alboflavida</i> (Peck) Murrill †
MECH90	<i>Melastiza chateri</i> (W.G. Smith) Boudier
MEVE90	<i>Metatrachia vesparium</i> (Batsch.) Nan.-Brem.
MIRU90	<i>Microglossum rufum</i> (Schw.) Under.*
MIPA90	<i>Mitrlula paludosa</i> Fr.*
MUMU90	<i>Multiclavula mucida</i> (Fr.) Pet.
MYCEN90	<i>Mycena</i> sp.
MYHA90	<i>Mycena haematopus</i> (Pers. ex Fr.) Kum.
MYLE90	<i>Mycena leiana</i> (Berk.) Sacc.
NADI90	<i>Naematoloma dispersum</i> (Fr.) Kar.
NECI90	<i>Nectria cinnabarina</i> (Tode ex Fr.) Fr.* †
NEIR90	<i>Neolecta irregularis</i> (Pk.) Korf & Rog.* †
OTON90	<i>Otidea onotica</i> (Pers.) Fkl.*
PASE90	<i>Panellus serotinus</i> (Persoon ex Fries) Kuhner
PANUS90	<i>Panus</i> sp.
PARU90	<i>Panus rudis</i> Fr.*
PAIN90	<i>Paxillus involutus</i> (Bat. ex Fr.) Fr.
PAVE90	<i>Paxillus vernalis</i> Watling †
PEAU90	<i>Peniophora aurantiaca</i> Bres.* †
PERU90	<i>Peniophora rufa</i> (Fries) Boid.

PEZIZ90	<i>Peziza</i> sp.
PEAM90	<i>Peziza ammophila</i> sp.
PEBA90	<i>Peziza badio-confusa</i> Korf
PELL90	<i>Phellinus</i> sp.*
PHPI90	<i>Phellinus pini</i> sp.*
PHTO90	<i>Phellodon tomentosus</i> (Fries) Banker*
PHRA90	<i>Phlebia radiata</i> Fr.*
PHOL90	<i>Pholiota</i> sp. †
PHTE90	<i>Pholiota terrestris</i> Overholts*
PHNI90	<i>Phyllotopsis nidulans</i> (Persoon ex Fries) Singer*
PIBE90	<i>Piptoporus betulinus</i> (Bulliard ex Fries) Karsten* †
PLOS90	<i>Pleurotus ostreatus</i> Fries †
PLCR90	<i>Plicaturopsis crispa</i> (Persoon ex Fries) Reid †
PLUTE90	<i>Pluteus</i> sp.*
PLCE90	<i>Pluteus cervinus</i> (Fries) Kummer
PLPA90	<i>Pluteus patricius</i> (Schulzer) Boudier
POLYP90	<i>Polyporus</i> sp.
POAR90	<i>Polyporus arcularius</i> Batsch ex Fries
POBR90	<i>Polyporus brumalis</i> Fries
POVA90	<i>Polyporus varius</i> Persoon ex Fries* (POEL90— <i>Polyporus elegans</i> sp.)
PSLO90	<i>Psathyrella longistriata</i> (Murr.) A.H.S †
PYCI90	<i>Pycnoporus cinnabarinus</i> (Fr.) Kar.*
RAMAR90	<i>Ramaria</i> sp.*
ROCA90	<i>Rozites caperata</i> (Fr.) Kar. †
RUSSU90	<i>Russula</i> sp. †
RUBO90	<i>Russula borealis</i> Kauffman
RUDE90	<i>Russula decolorans</i> (Fr.) Fr.
RULU90	<i>Russula lutea</i> (Huds.) Fr.
SCSC90	<i>Scutellinia scutellata</i> (L. ex St. Amans) Lambotte
SPFL90	<i>Spathularia flavida</i> Persoon ex Fries*†
SPHE90	<i>Sphaeronaemella helvellae</i> (Karsten) Karsten
STSP90	<i>Stemonitis splendens</i> Rost. †
STERE90	<i>Stereum</i> sp.*
STCO90	<i>Stereum complicatum</i> (Fries) Fries
STROP90	<i>Stropharia</i> sp.
STSE90	<i>Stropharia semiglobata</i> (Batsch ex Fr.) Quel. †
SUILL90	<i>Suillus</i> sp.
SUCA90	<i>Suillus cavipes</i> (Opatowski) Smith & Thiers †
SUGR90	<i>Suillus grevillei</i> (Klotzch) Singer †
TEPA90	<i>Tectella patellaris</i> (Fries) Murr. †
THCA90	<i>Thelephora caryophyllea</i> Fries*
THTE90	<i>Thelephora terrestris</i> Fr.*
TRVE90	<i>Trametes versicolor</i> (Fr.) Pil.*
TREME90	<i>Tremella</i> sp.* †
TRFO90	<i>Tremella foliacea</i> Persoon ex Fries
TRME90	<i>Tremella mesenterica</i> Ret. ex Fries †
TRAB90	<i>Trichaptum abietinus</i>
TRABAB90	<i>Trichaptum abietinus</i> var. <i>abietinus</i> *
TRBI90	<i>Trichaptum bififormis</i> (Fr. in Kl.) Ryv.* †
TRICH90	<i>Tricholoma</i> sp.
TRZE90	<i>Tricholoma zelleri</i> (Stuntz & Smith) Ovebro & Tylutki †
TYCH90	<i>Tyromyces chioneus</i> (Fries) Kar.

XEFR90	Xeromphalina fraxinophila A.H. Smith †
ZZFCRUST	unknown-crust fungi
ZZFUNGUS	unknown- fungi
ZZGILL	unknown-gilled fungi
ZZSHELF	unknown-shelf fungi
ZZSLIME	unknown-slime molds

Plants and fungi observed outside soil survey data stops:

ANMA	Anaphalis margaritacea (L.) Benth. & Hook. f.*
CADE7	Carex deflexa Hornem.*
CHAL7	Chenopodium album L.*
CIDO	Cicuta douglasii (DC.) Coult. & Rose*
DRCI	Draba cinerea M.F. Adams*
GETE4	Gentianella tenella (Rottb.) Boerner* (GETE8—Gentiana tenella Rottb.)
ISOC	Isoetes occidentalis Henderson*
JUBU	Juncus bufonius L.*
JUOR4	Juncus oreganus S. Wats.*
LIAQ	Limosella aquatica L.*
PAAL5	Papaver alboroseum Hultén*
SAROR	Salix rotundifolia Trautv. ssp. dodgeana (Rydb.) Argus*
SEPA5	Senecio pauperculus Michx.*
STPE12	Stuckenia pectinatus (L.) Boerner* (POPE6—Potamogeton pectinatus L.)
STHO90	Stropharia hornemanii (Fr. Ex Fr.) Lund. & Nannf. †
TAOF	Taraxacum officinale G.H. Weber ex Wiggers*

Glossary

AC soil. A soil having only an A and a C horizon. Commonly present in soils formed in recent alluvium or on steep rocky slopes.

Acidification (process). A subprocess of Braunification in which excess basic metal cations are removed from the soil profile by leaching or plant use. Acidification is normally accompanied by a lowering in soil reaction (pH).

Active layer. The top layer of ground subject to annual thawing and freezing in areas underlain by permafrost.

Aerobic. A condition in which molecular oxygen is present in the soils.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates down-slope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and areal extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpine. Land and related resources occurring above the upper elevation limit of trees (treeline).

Anaerobic. A condition in which molecular oxygen is absent from the soil.

Aspect. 1) The direction in which a slope faces. 2) The general physical appearance of a vegetation cover type.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as centimeters of water per centimeters of soil.

The capacity in a 150- centimeters profile or to a limiting layer is expressed as:

Very low.....	0 to 8 centimeters
Low.....	8 to 15 centimeters
Moderate.....	15 to 23 centimeters
High.....	23 to 30 centimeters
Very high.....	More than 30 centimeters

Basal area. For trees, the area of the cross section of a single tree or of all trees in a stand, usually measured at breast height (see breast height), expressed in ft²/acre or m²/ha. For herbs and shrubs, the area or proportion of the ground surface covered by the stem or stems of plants at about ground level, expressed in ft²/acre, m²/ha., or percent.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Biome. A continental scale ecosystem characterized by similarities in plant life-form and environment, e.g., boreal, subalpine and alpine.

Bog. A peat-forming ecosystem influenced solely by water, which falls directly on to it as rain or snow. Bog vegetation is predominately herbs, shrubs, and stunted trees. *Sphagnum* spp. usually dominates the moss layer.

Boreal. The biome of North America that stretches from Alaska and the Rocky Mountains eastward to the Atlantic Ocean. To the north it is bounded by the treeline and in the south it is bounded by aspen parklands, a transition zone to the prairie grasslands. The boreal biome is dominated by forest vegetation types.

Braunification (process). Release of iron from primary mineral in soil by hydration or oxidation giving the soil a yellowish, brownish, or reddish brown color.

Breast height. A standard height for measurement of tree diameter and age; 1.5 meters above the average ground level.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canopy. The cover of leaves and branches formed by the tops or crowns of plants as viewed from above.

Canopy cover. The proportion of the ground area covered by the vertical projections of the canopy, expressed as a percent.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey soil. Silty clay, sandy clay, or clay soil texture.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 7.6 to 25 centimeters in diameter.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluviation (processes). Processes associated with transportation and/or deposition by mass movement (direct gravitational action) and local, unconcentrated runoff on sideslopes and/or at the base of slopes.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of

mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose—Noncoherent when dry or moist; does not hold together in a mass.

Friable—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft—When dry, breaks into powder or individual grains under very slight pressure.

Cemented—hard; little affected by moistening

Cover type. A unit of vegetation essentially similar in composition and development throughout its extent. Synonyms: community type, vegetation type.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cryic. Soil temperature regime where the mean annual soil temperature is between 0 and 8 °C.

Cryoturbation (frost churning). The churning of soil materials by frost action, resulting in disrupted or broken horizons, incorporation of material from other horizons, organic matter accumulation on the permafrost table, and oriented rock fragments.

Deep soil. A soil that is 100 to 150 centimeters deep over bedrock or to other material that restricts the penetration of plant roots.

Depth, soil. Generally, the thickness of soil over bedrock. Very deep soils are more than 150 centimeters deep over bedrock; deep soils, 100 to 150 centimeters; moderately deep, 51 to 102 centimeters; shallow, 25 to 51 centimeters; and very shallow, less than 25 centimeters.

Diffusion. Movement from a zone of high concentration to one of lower concentration.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained—Water is removed so slowly that the soil is saturated periodically during the

growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Effervescence. A bubbling reaction upon addition of dilute hydrochloric acid.

Enrichment (process). A fluvial subprocess including the accumulation of bases such as calcium carbonate in the soil. The process includes fluvial deposits of base rich materials and concentration in surface soil layers due to evaporation.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Ericaceous. Refers primarily to the Heath family, Ericaceae—for example, Labrador-tea (*Ledum* spp.), but usually includes the Crowberry family, Empetraceae.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains—synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature—for example, fire that exposes the surface.

Escarpment. A relatively continuous and steep

slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Esker. A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier, and that were left behind when the ice melted. Eskers range in size from less than a kilometer to more than 160 kilometers in length and from 3 to 30 meters in height.

Evapotranspiration. The combined loss of water from a given area and during a specific period of time by evaporation from the soil surface and by transpiration from plants

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, or clay.

Flark. A Swedish term referring to limited, usually elongated, wet areas of exposed peat having an algal film and sometimes a sparse cover of sedges.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Flood plain splay. A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee and deposits its material on the flood plain or fan.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Fluvial (process). Processes including erosion, transportation, deposition, and enrichment of alluvium by water.

Footslope. The geomorphic component that forms the inner, gently inclined surface at the base of a hill slope. The surface profile is dominantly concave. In terms of gradational processes, a footslope is a transition zone between an upslope site of erosion (backslope) and a downslope site of deposition (toeslope).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A unit of forest vegetation essentially

similar in composition and development throughout its extent.

Frost boil. A small mound of fresh soil material formed by frost action. A type of non-sorted circle commonly found in fine-grained sediment underlain by permafrost.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Geomorphic processes. Natural processes that form the landscape and surficial sediments i.e. colluvial processes, deposition, and erosion.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gravel. Rounded or angular fragments of rock as much as 2 millimeters to 7.6 centimeters in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 7.6 centimeters in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in

construction.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

Herb. Grasses, sedges, forbs, and any other non-woody herbaceous plants.

Hill. A natural elevation of the land surface, rising as much as 305 meters above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:

O horizon—An organic layer of fresh and decaying plant residue.

A horizon—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can

penetrate this horizon only along fracture planes.

R layer—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hummock. A rounded or conical mound or other small elevation. Also, a slight rise of ground above a level surface.

Humus. The well decomposed, more or less stable, part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. Group A soils have a high infiltration rate when thoroughly wet and have a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. Group D soils, at the other extreme, have a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Hydromorphism (process). Soil processes associated with saturated conditions including accumulation of organic material and formation of redoximorphic features (gray and red soil mottles caused by saturation or alternating saturated and unsaturated conditions in soils).

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in centimeters per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for a designed purpose is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in centimeters per hour, is expressed as follows:

Very low	Less than 1
Low.....	1 to 1.02
Moderately low.....	1.02 to 1.91
Moderate.....	1.91 to 3.18
Moderately high.....	3.18 to 4.45
High.....	4.45 to 6.35
Very high	More than 6.35

Interior (Alaska). Physiographic area lying north of the summit of the Alaska Range and south of the Brooks Range summit with a dominantly continental climate.

Interstitial (ice crystals). Ice formation in voids between soil particles.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Leaching. The removal of soluble material from soil or other material by percolating water.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Maritime-continental (climate). A blend of these two climate types where either the maritime or continental climate may dominate the local weather for extended periods of time.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Microhigh. An area that is 5 to 30 centimeters higher than the adjacent microlow.

Microlow. An area that is 5 to 30 centimeters lower than the adjacent microhigh.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minor components. A component of limited extent that may not be present.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately deep soil. A soil that is 51 to 102 centimeters deep over bedrock or to other material that restricts the penetration of plant roots.

Morphology, soil. The physical makeup of the soil,

including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common, and many*; size—*fine, medium, and coarse*; and contrast—*faint, distinct, and prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters; *medium*, from 5 to 15 millimeters; and *coarse*, more than 15 millimeters.

Mountain. A natural elevation of the land surface, rising more 305 meters above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes greater than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil; and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. An extensive area of glaciofluvial material that was deposited by meltwater streams.

Overstory. The trees in a forest that form the upper canopy layer or layers.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a

cutoff across a narrow meander neck.

Oxidation. Combination with oxygen; addition of oxygen or other atom or group; removal of hydrogen or other atom or group.

Palsa. (plural palsen) An elliptical dome-like permafrost mound containing alternating layers of ice lenses and peat or mineral soil, commonly 3 to 10 meters high and 2 to 25 meters long, occurring in subarctic bogs and often surrounded by water.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from 1 square meter to 10 square meters, depending on the variability of the soil.

Pergelic. Soil temperature regime where the mean annual soil temperature is zero °C or lower.

Permafrost. Ground, soil, or rock that remains at or below 0° C. for at least two years. It is defined on the basis of temperature and is not necessarily frozen.

Permafrost status or distribution. The percentage of a map unit consisting of soils with permafrost. *Continuous*-more than 80 percent of the composition of a map unit consists of soils with permafrost.

Discontinuous-20 to 80 percent of a map unit consists of soils with permafrost.

Sporadic-more than 5 percent but less than 20 percent of a map unit consists of soils with permafrost.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of centimeters per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow..... Less than 0.2 cm
Slow..... 0.2 to 0.5 cm
Moderately slow..... 0.5 to 1.5 cm
Moderate..... 1.5 to 5.1 cm
Moderately rapid..... 5.1 to 15.2 cm
Rapid..... 15.2 to 51.0 cm
Very rapid..... More than 51.0 cm

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See reaction, soil.)

Physiochemical. Related to physical and chemical soil properties.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Podzolization (process). Includes the removal and translocation of iron and aluminum from surface layers into underlying soil materials. Surface soils typically have a gray leached surface mineral layer a few centimeters thick underlain by a dark red layer of accumulated iron, aluminum and organic compounds.

Ponding. Standing water on soils in closed depressions. Only percolation or evapotranspiration can remove the water.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential natural community. The assemblage of plants that most nearly achieves a long-term steady state of productivity, structure, and composition on a site. Synonyms: potential plant community, climax plant community, and plant association.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid.....	Below 3.5
Extremely acid.....	3.5 to 4.5
Very strongly acid.....	4.6 to 5.0
Strongly acid.....	5.1 to 5.5
Moderately acid.....	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral.....	6.6 to 7.3
Slightly alkaline.....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline.....	8.5 to 9.0
Very strongly alkaline.....	9.1 and higher

Redox concentrations. Bodies of apparent accumulation of iron-manganese oxides.

Redox depletions. Bodies of low chroma (≤ 1)

having values of 4 or more where iron-manganese oxides alone have been stripped out or where both iron-manganese oxides and clay have been stripped out.

- Redoximorphic features.** Patches of contrasting colors and low chroma colors formed by the processes of reduction, translocation, and oxidation of iron and manganese oxides.
- Regeneration.** The new growth of a natural plant community, developing from seed.
- Relief.** The elevations or inequalities of a land surface, considered collectively.
- Rhizosphere.** A thin zone of soil adjacent to a root or pore.
- Riparian association.** A cover type representing the latest successional stage attainable on a specific hydrologically influenced riparian zone site.
- Riparian or Riparian zone.** Land in close proximity to a water course, lake, or spring and influenced by surface and ground water during all or part of the year.
- Riverine.** Associated with a river system; active river channel, and land adjacent to the river that is inundated when stream discharge exceeds channel capacity.
- Riverwash.** Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.
- Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.
- Rock outcrop.** Exposures of bare bedrock other than lava flows and rock-lined pits.
- Root zone.** The part of the soil that can be penetrated by plant roots.
- Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.
- RV.** (Representative Value). Used in the map unit descriptions to designate a representative value of the composition of each major component within a map unit. This value is expressed as a percentage.
- Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

- Sandy soil.** Sand or loamy sand.
- Sapric soil material (muck).** The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.
- Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.
- Scrub type.** A unit of scrub vegetation essentially similar in composition and development throughout its extent.
- Shallow soil.** A soil that is 25 to 51 centimeters deep over bedrock or to other material that restricts the penetration of plant roots.
- Shoulder slope.** The uppermost inclined surface at the top of a hillside. It is the transition zone from the backslope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.
- Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.
- Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.
- Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.
- Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 6 meters in 30 meters of horizontal distance. In this survey the following slope classes are recognized:

Nearly level.....	0 to 2 percent
Gently sloping.....	2 to 4 percent
Moderately sloping.....	4 to 8 percent
Strongly sloping.....	8 to 15 percent
Moderately steep.....	15 to 25 percent
Steep.....	25 to 45 percent
Very steep.....	More than 45 percent

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect

of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil group. A collection of soils that form under the influence of similar soil and geomorphic processes and share similar chemical and physical properties.

Soil process. A physical or chemical change in soil brought about by exterior influences.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand.....	2.0 to 1.0
Coarse sand.....	1.0 to 0.5
Medium sand.....	0.5 to 0.25
Fine sand.....	0.25 to 0.10
Very fine sand.....	0.10 to 0.05
Silt.....	0.05 to 0.002
Clay.....	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

South Central (Alaska). Physiographic area lying between the summit of the Alaska Range and the Cook Inlet with a transitional maritime-continental climate.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 25 to 61 centimeters in diameter if rounded or 15 to 38 centimeters in length if flat.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected

remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subalpine. The biome found between the boreal and alpine biomes and consists of alder scrub.

Subarctic continental. The climate of interior Alaska dominated by long cold winters and short warm summers.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any soil horizon (A, E, AB, or EB) below the surface layer.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 10 to 25 centimeters. Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taiga. A Russian term meaning "land of little sticks," and applied to the dwarf or stunted open conifer woodlands and forests that are typically underlain by permafrost.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and

clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thermal conductivity. A measure of heat transfer through soil.

Thermokarst. Subsidence of the ground surface due to melting of ice masses.

Till plain. An extensive, nearly level to gently rolling or moderately sloping area that is underlain by or consists of till, and that has a slope of 0 to 8 percent.

Toeslope. The outermost inclined surface at the base of a hill. Toeslopes are commonly gentle and linear in profile.

Tussock. A pedestal or rounded mound or other small elevation consisting of sedge and sedge detritus.

Understory. Any plants in a forest or scrub community that grow below and are partially shaded by the tree or shrub overstory.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Variation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Very deep soil. A soil that is more than 152 centimeters deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 25 centimeters deep over bedrock or to other material that restricts the penetration of plant roots.

Xeric (xerophytic). A group of plants adapted to surviving periods of prolonged moisture deficiency.

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