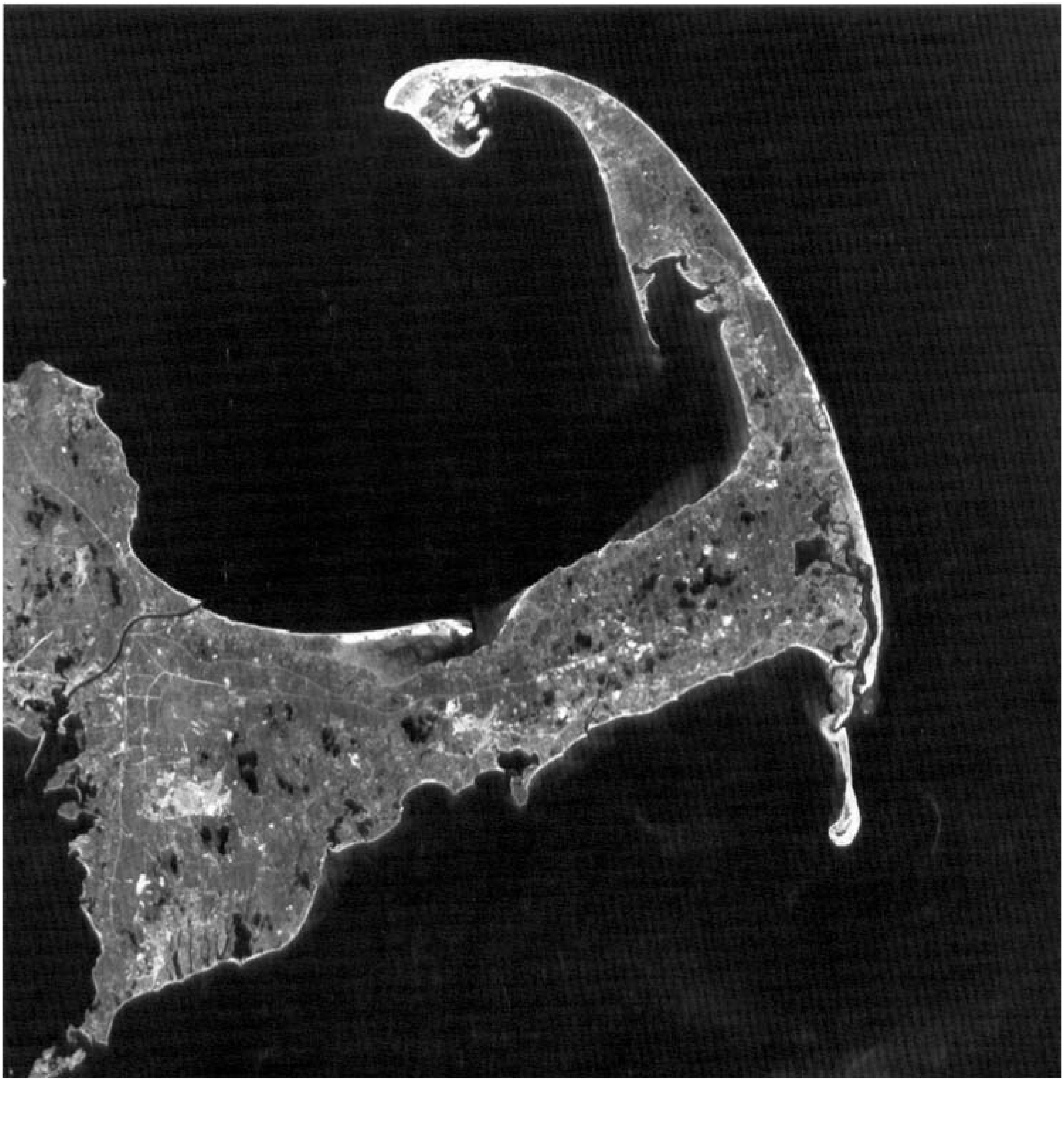
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Massachusetts
Agricultural Experiment
Station

Soil Survey of Barnstable County, Massachusetts



How To Use This Soil Survey

General Soil Map

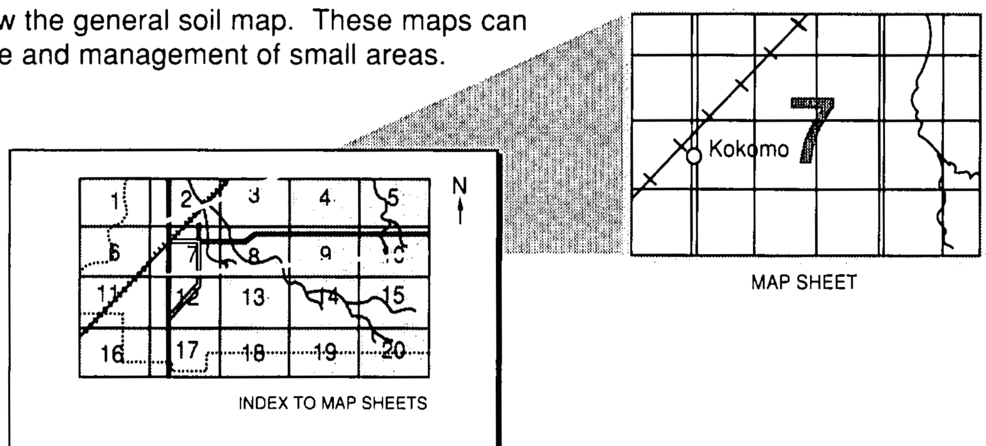
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

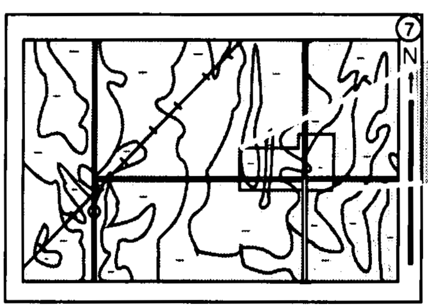
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

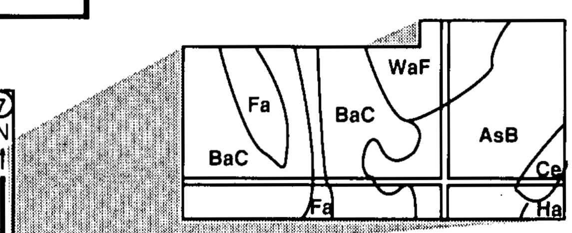
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1983. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983. This survey was made cooperatively by the Soil Conservation Service and the Massachusetts Agricultural Experiment Station. It is part of the technical assistance furnished to the Cape Cod Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Landsat Image of Barnstable County, Massachusetts.

Contents

Issued March 1993

Index to Map Units

Summary of Tables

Preface

This soil survey contains information that can be used in land-planning programs in Barnstable County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Soil Survey of Barnstable County, Massachusetts

By Peter C. Fletcher, Soil Conservation Service

Fieldwork by Peter C. Fletcher, Rino J. Roffinoli, Richard J. Scanu, and Bruce Thompson, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with Massachusetts Agricultural Experiment Station

General Nature of the County

BARNSTABLE COUNTY is a long, narrow section of land that extends eastward from the southeastern part of the mainland to the Atlantic Ocean (fig. 1).

The county is approximately 255,360 acres in size. It can be divided into two major physiographic areas. One of these is a strongly rolling and hilly area, and the other consists of several broad, coalescing plains.

The strongly rolling and hilly physiographic area has the shape of an inverted V, the apex of which is in the northwestern corner of the county. Two narrow belts of hilly terrain extend outward, one southwest to Woods Hole and the other southeast parallel to Cape Cod Bay and extending to Brewster. The maximum elevations in the county, approximately 280 feet above sea level, are in the northwestern part of this hilly area. Elevations decrease unevenly to about 100 feet to the south and east.

The physiographic area that consists of several broad, coalescing plains generally is nearly level to undulating, but it includes some steep-sided depressions, hills, and valleys. One extensive area of plains lies south and east of the hilly area and grades southward to Nantucket Sound. A second area of plains extends northward through nearly the entire length of the northern part of the county and grades westward from the Atlantic Ocean to Cape Cod Bay.

The county has some less extensive but unique physiographic areas, including areas of beaches and sand dunes and areas of tidal marshes (fig. 2). Most of the shoreline is fringed by coastal beaches and sand dunes. The more extensive areas include most of

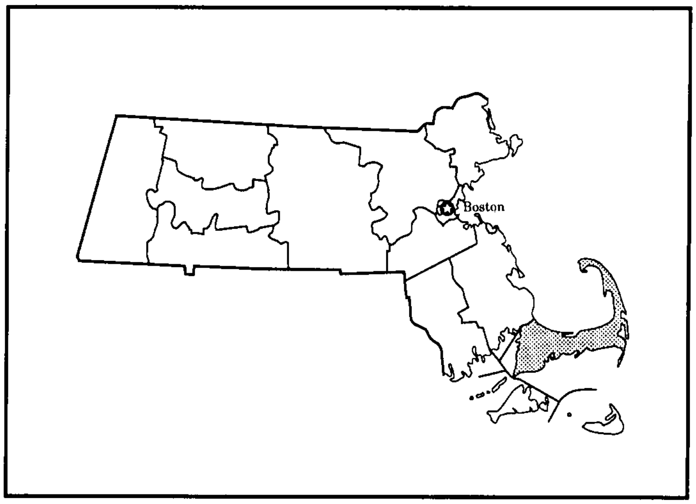


Figure 1.—Location of Barnstable County in Massachusetts.

Provincetown, Sandy Neck, Monomoy Island, and Nauset Beach. Areas of tidal marshes are inland from beaches and sand dunes and border the edges of salt-water inlets and tidal streams. The Great Marshes in the town of Barnstable are the most extensive of the tidal marshes in the county. They are more than 2,800 acres in size.

Many good harbors and coves suitable for docking small fishing boats and pleasure craft are along the coast. Most of the harbors and bays are too shallow for larger oceangoing vessels.

More than 200 small ponds and lakes are in the county. Their size ranges from a few acres to more than

Figure 2.—Severely eroded sea cliffs above nearly level areas of Beaches.

1,000 acres. There are no major rivers in the county. There are many small perennial streams, most of which flow from inland lakes to the ocean.

The first soil survey of Barnstable County was published in 1920 *(5)*. The current survey updates the first survey. It provides additional information and has larger maps, which show the soils in greater detail.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina

Winters in Barnstable County are cold, and summers are warm. Both the start and the end of the warm period are somewhat delayed because of the moderating influence of the Atlantic Ocean. In winter the ground is frequently but not continuously covered with snow. The total annual precipitation is usually adequate for the crops suited to local temperatures.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Hyannis for the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 31 degrees F and the average daily minimum temperature is 23 degrees. The lowest temperature on record, which occurred at Hyannis on January 31, 1961, is -8 degrees. In summer, the average temperature is 68 degrees and the average daily maximum temperature is 77 degrees. The highest recorded temperature, which occurred on July 5, 1955, is 97 degrees.

Growing degree days, shown in table 1, are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, about 21 inches, or nearly 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 5.09 inches at Hyannis on August 12, 1955. Thunderstorms occur on about 20 days each year.

Average seasonal snowfall is about 24 inches. The greatest snow depth at any one time during the period of record was 24 inches. On the average, 4 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in mid afternoon is about 70 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the northwest. Average wind speed is highest, 22 miles per hour, in winter.

Winter storms moving northeastward along the coast frequently bring rain and thawing followed by more snow and cold weather. In summer sea breezes frequently moderate the temperature, particularly in areas near the coast.

History and Development

During the 18th century and part of the 19th century, fishing, whaling, and coastal resource trades dominated the economy of Barnstable County. The discovery of oil in the mid-19th century caused the whaling industry to decline. As transportation and communications improved, the importance of the tourist industry gradually increased and Cape Cod and the county became famous as summer resorts. The county's main economic interests are centered on tourism.

Many descendants of the early and late English settlers make up part of the cape's year-round population. The overall population consists of seasonal visitors and tourists as well as the growing number of permanent residents. According to census figures, the population of Barnstable County in 1860 was 35,990. A gradual but steady decline continued through 1920, when the population was only 26,670. At the same time, a seasonal or second-home boom and a thriving tourist industry developed. As a result, a large part of the county was owned by nonresidents. A second boom in land sales and development began in the 1960's, and explosive increases continued during the period 1970-80. The number of permanent residents increased from 96,656 to 147,925 during this period, while the seasonal population rose from 171,300 to 222,628 *(16)*.

During the period 1951-80, the extent of urban land uses increased by more than 300 percent, from 19,000 to 61,500 acres, in order to accommodate the rapid population growth and the growth of the tourist and recreation industries. The acreage used for agriculture and open land decreased dramatically, from 42,250 to 21,609 acres, during the same period. Also, the acreage of forest land decreased from 174,000 to 142,000 acres *(6)*.

Retail and service industries make up approximately 70 percent of the county's economic base. Construction, manufacturing, utilities, finance, fishing, and agriculture make up the rest.

Although agriculture makes up a small part of the county's economy, it has been important to cape residents and remains a large part of the cape's heritage. Prior to the 18th century, the Wamponoag Indians grew corn and wheat, harvested shellfish, and managed the woodland. The early English colonists found many large tracts of high-quality woodland, freshwater ponds, streams, salt marshes, and areas of fertile soils. These resources helped to provide these early settlers with timber, shellfish, grass, and food crops. The land continued to produce steady yields of corn and other grain, potatoes, fruits, and hay. Areas of pasture supported large numbers of cattle and sheep. By the mid-19th century, a large acreage of forest had been cleared for farming. Cedar and maple swamps were transformed into cranberry bogs. At that time, 30 percent of the county was used for agriculture and farming reached its peak.

By the end of the 19th century, much of the land had become depleted and the Civil War and Industrial Revolution had reduced interest in farming and the need for agricultural labor. Cranberries became the dominant crop. Strawberries, asparagus, white (Cape Cod) turnips, and onions were other successful crops.

During the early 20th century, produce was either shipped from the cape by rail or sold at roadside stands. Strawberries, asparagus, and turnips grew well in the areas of sandy loam and under the mild climate of the cape. Hay, forage, corn, and potatoes were the other principal farm crops. Agricultural census figures indicate that the county had 675 farms in 1920. Approximately 18 percent of the acreage was used for agricultural purposes.

Present trends for agriculture in Cape Cod are towards small, diversified farms with a retail marketing system consisting of roadside stands or pick-your-own enterprises. In 1984, there were approximately 175 agricultural enterprises on about 5,000 acres of land. Much of the land once used for agriculture has been abandoned and has reverted to forest land or has been subdivided for residential uses.

The cropland remaining today is interspersed with residential and commercial areas. This arrangement offers direct opportunities as well as limitations for the future of agriculture in Barnstable County. Population increases have expanded a market for fresh agricultural products, but the development associated with these increases reduces the acreage available for agricultural uses.

Geology

Robert N. Oldale, geologist, U.S. Geological Survey, helped prepare this section.

The landscape of Barnstable County owes its origin to the last continental glacier and to the rise in sea level that followed glaciation. The moving ice scraped, ground, and picked up the bedrock of southern New England and deposited it as the glacial and postglacial sediments of Cape Cod. The rock debris, called drift, was carried south by the ice and deposited along the ice front. The result was the glacial landforms of Cape Cod. Later, as the sea drowned the glacial cape, the drift along the shoreline was eroded and redeposited as beaches and spits. Windblown sand was deposited as dunes.

The exact age of the glacial deposits is not known. The deposits do not date back to more than 18,000 to 20,000 years ago, when the continental glacier reached its maximum advance and extended as far southward as Nantucket and Martha's Vineyard *(7)*. They are older than the glacial deposits near Boston, which, according to radiocarbon dating, are about 14,000 years old *(4)*.

The glacier in southeastern Massachusetts was formed into lobes by basins in the underlying bedrock *(13)*. The lobes occupied the present sites of Buzzard's Bay, Cape Cod Bay, and the Great South Channel to the east of Cape Cod. Generally, the two western lobes contributed drift to the inner part of Cape Cod and the South Channel lobe contributed drift to the outer part. Retreat of the lobes was sequential from west to east. Generally, the oldest deposits were laid down by the Buzzard's Bay lobe and the youngest deposits were laid down by the South Channel lobe *(9)*.

A generalized geologic map of Barnstable County was compiled from detailed 7.5-minute geologic maps made by the U.S. Geological Survey at a scale of 1:31,680 or 1:24,000 *(8, 11)*. The map shows the distribution of geologic units (fig. 3).

Rock debris carried southward by the continental glacier was deposited along the ice front. In areas where the debris was laid down directly by the ice, deposits are unsorted and unstratified. Unstratified drift, or till, is made up of rock material of all sizes, ranging from boulders tens of feet in size to tiny particles of clay. Till is commonly associated with moraines and areas of knob and kettle topography.

In most places the debris was sorted by meltwater streams and deposited as stratified drift. In the ice-contact zone the depositional environment was chaotic. It was characterized by rapid changes in stream volume and stream course. In this zone the stratified drift is coarsest, mostly gravel and sand, and includes till and boulders deposited by the ice. Away from the ice-contact zone, the stratified drift becomes increasingly more sorted and finer grained. These outwash deposits are mostly sand and gravelly sand. On Cape Cod most of the meltwater streams flowed into preglacial lakes where very fine sand, silt, and clay were deposited *(9)*.

Glacial deposits make up the distinctive landforms that are the basis for geologic mapping on Cape Cod. The most prominent landforms are the Buzzard's Bay and Sandwich Moraines. These landforms were formed by readvances of the Buzzard's Bay and Cape Cod Bay lobes against ice-contact margins of the Mashpee Pitted Plain and the Barnstable Outwash Plain. Advancing ice displaced the deposits underlying the outwash plains by thrusting and folding *(10)*. The moraine surface is characterized by ridges, knobs, and kettles and by ridges that run approximately parallel to the trend of the moraine.

Outwash plains are the most common glacial landform. On the inner part of Cape Cod, the outwash plains slope southward. They were formed by streams that drained the Cape Cod Bay lobe. On the outer part of the cape, the outwash plains slope westward. They were formed by meltwater that drained the South Channel lobe.

All outwash plains on Cape Cod are incomplete formations in that their downstream ends have been washed away by marine erosion. Except for the Harwich Outwash Plain and possibly the Eastham Outwash Plain, the ice-contact heads have been destroyed by overriding waves or by marine erosion. The ice-contact head of the Harwich Outwash Plain has been preserved, however, because it was protected from marine erosion by glacial deposits between it and Cape Cod Bay.

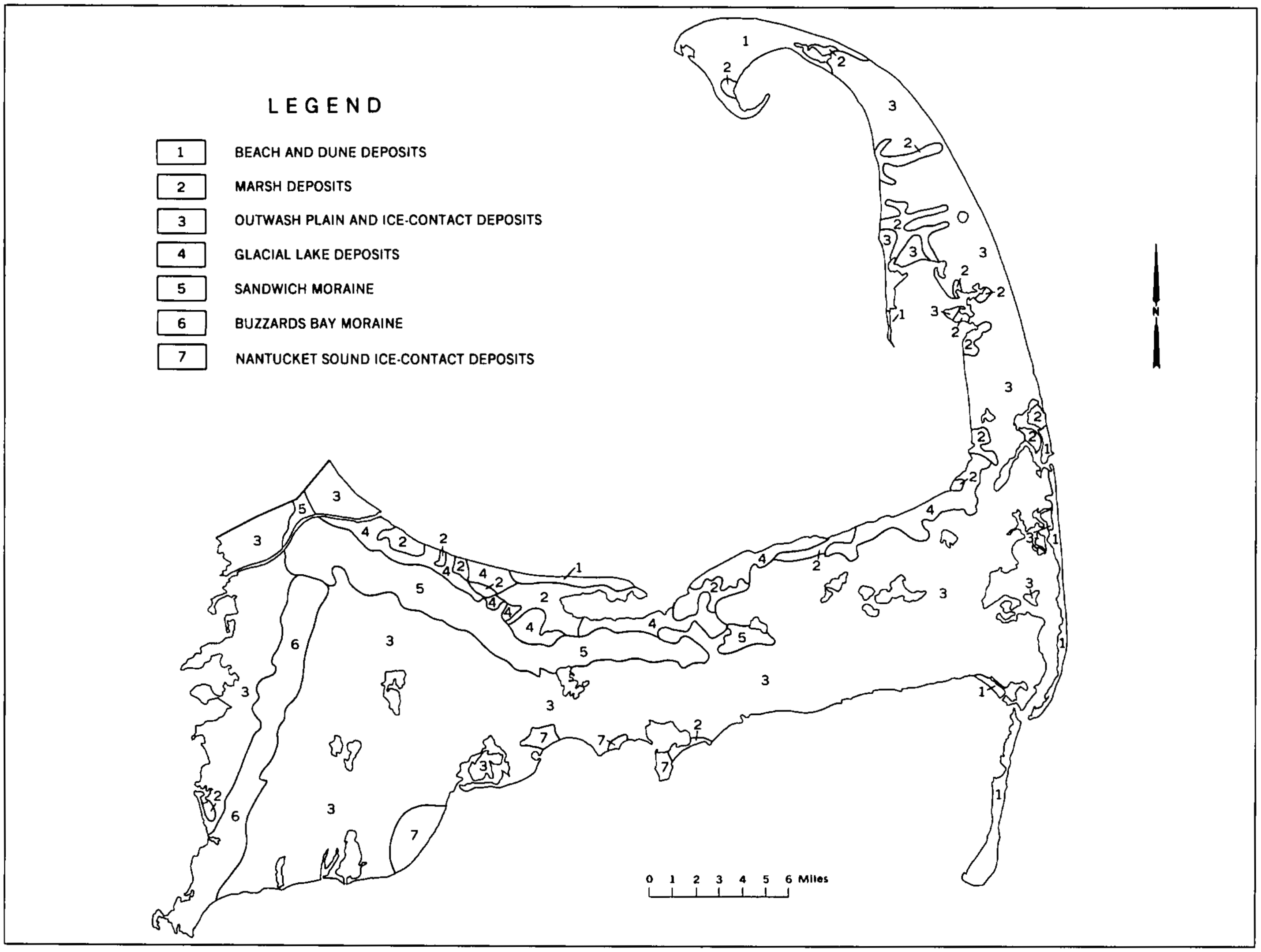


Figure 3.—Geologic map of Barnstable County.

The surface of the outwash plains in Barnstable County is interrupted by kettle holes that were originally the sites of ice blocks buried by outwash deposits. In some areas the kettle holes are deep enough to expose the water table and are ponded. The outwash plains are cut by valleys that are dry in all but their lower reaches, which are drowned by the sea. The valleys were cut by streams under a cold, nearly glacial climate after outwash deposition ceased and before the buried ice blocks melted. Permanently frozen ground may have influenced the formation of these valleys, but there is no undeniable evidence of permafrost.

Knob-and-kettle topography or large isolated kames formed when stratified drift filled holes in the ice. In places the stratified drift surface formed areas that did not have a broad, stream-graded surface. These areas are mapped as ice-contact deposits.

A thin ubiquitous layer of windblown silt and sand caps the glacial deposits. Generally only a few feet thick, the material was deposited when the drift surface was covered with little vegetation. The windblown deposits were mixed with the underlying drift by frost action and contain wind-polished stones called ventifacts.

The oldest postglacial deposits on Cape Cod are freshwater sediments laid down in depressions on the glacial surface. These sediments include reworked glacial drift, mostly sand, silt, clay, and organic material.

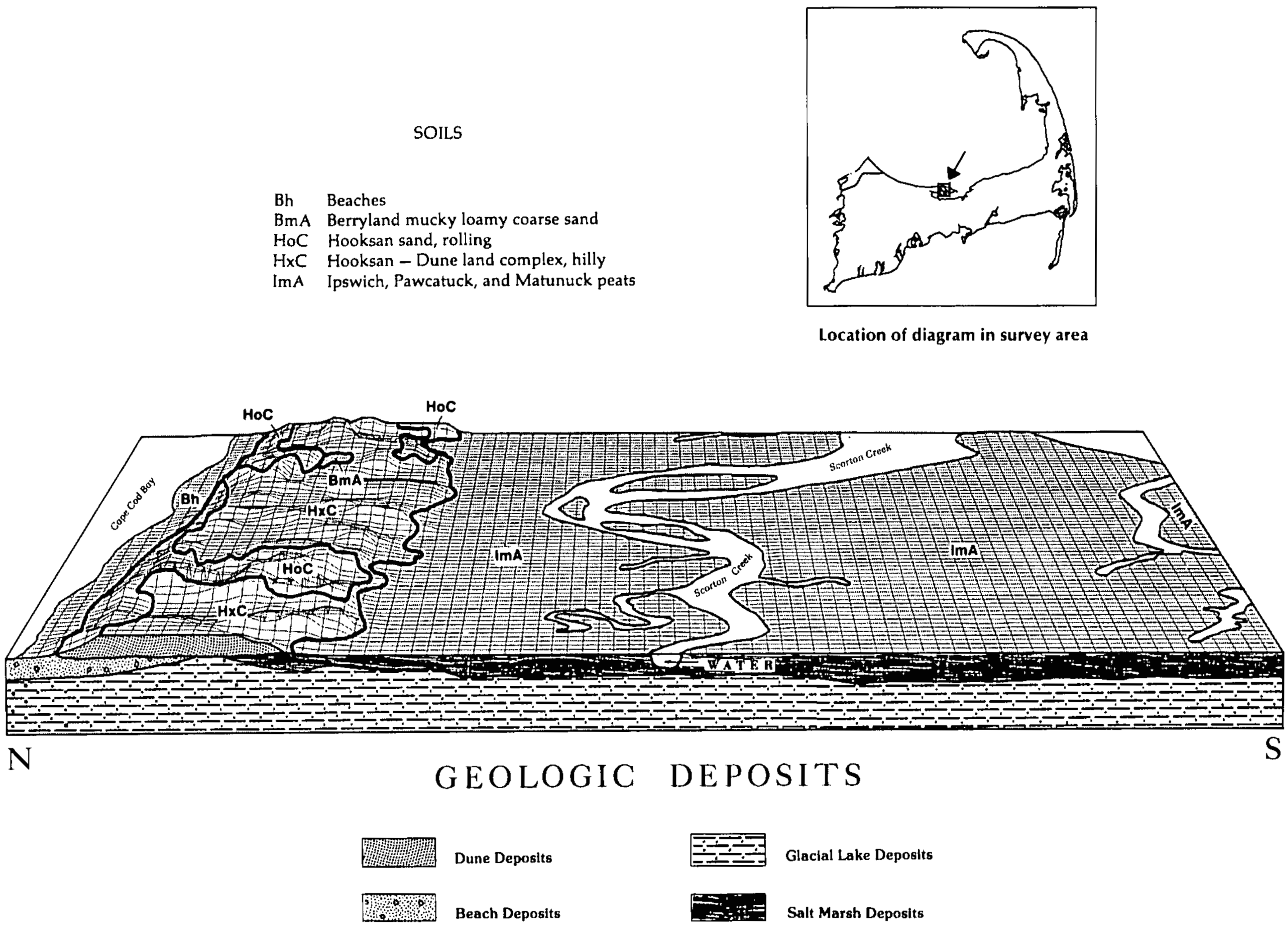


Figure 4.—Relationship of soils, landscapes, and parent material in some map units in Barnstable County.

Organic material from freshwater clay is 13,200 years old *(9)*. Freshwater peat deposits probably started to form about the same time as the basal peat from Martha's Vineyard, which contained tundra vegetation and is 12,700 years old *(3)*. Peat deposits form marshes and swamps in kettle holes and broad areas of collapsed drift.

Marine sedimentation, including saltwater peat and beach deposits, began about 6,000 years ago, when the postglacial marine transgression reached the glacial cape *(17)*. Saltwater peat from the Great Marshes in Barnstable County is 5,480 years old *(12)*. It formed marshes in areas of collapsed drift and behind spits along the shore. The beach deposits, mostly sand, were derived from the glacial deposits of wave erosion. This material was transported along the shore by currents and redeposited above and below sea level. Beach deposits formed spits and narrow strands at the base of sea cliffs.

Dune deposits probably started to form about the same time as the saltwater marsh and beach deposits. Dune deposits are made up of sand winnowed from the beaches. Winds carried the sand inland and to the top of sea cliffs, where it was redeposited as extensive dune fields atop spits and dunes (fig. 4).

The geology of Cape Cod remains dynamic as the postglacial landforms continue to evolve. Wave erosion maintains the sea cliffs cut in the drift. Spits, beaches, and dunes expand and are reshaped by major storms. In response to rises in sea level, plants grow in the marshes and the size of the marshes increases. Eventually, the glacial cape may be worn away and replaced by barrier islands and shoals.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; and the kinds of crops and native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material has few or no roots or other living organisms and has been changed very little by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. 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 soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns 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 noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils 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 onsite investigation is needed to plan for intensive uses in small areas.

Field Determination of Soil Texture

Throughout the course of the soil survey, soil scientists determined soil textural class mainly by feeling the soil with their fingers. Texture determination is sometimes supplemented by examinations of the soil under a hand magnifying lens. Determining soil texture in the field requires skill and experience, but a trained soil scientist can develop relatively precise accuracy, especially when frequent checks are made against laboratory results.

Dependable definitions of texture based on feeling the soil are developed by each soil scientist through mechanical analysis and through concepts of how textures feel within each genetic soil group. During the progress of the soil survey, soil horizons of questionable texture were sampled for mechanical analysis. The results of this analysis were used as guidelines.

Specific definitions cannot be applied to all soils. The following suggested definitions of the basic soil textural classes, however, have been developed in terms of field experience and feel.

Sand is loose and single grain. The individual grains can readily be seen and felt. If squeezed in the hand when dry, the sand will fall apart when the pressure is released. If squeezed when moist, it forms a cast but will crumble when touched.

Sandy loam contains much sand but has enough silt and clay to make it somewhat coherent. Individual sand grains can readily be seen and felt. If squeezed when dry, sandy loam forms a cast that readily falls apart. If squeezed when moist, the cast can bear careful handling without breaking.

Loam has a relatively even mixture of different grades of sand, silt, and clay. It is mellow and has a somewhat gritty feel when dry, but it is fairly smooth and slightly plastic when moist. If squeezed when dry, it forms a cast that can bear careful handling. If squeezed when moist, the cast can be handled quite freely without breaking.

Silt loam has a moderate amount of fine grades of sand and only a small amount of clay. More than half of the particles are silt sized. When dry, silt loam may appear cloddy, but the lumps can be readily broken. When pulverized, it feels soft and floury. When the soil is wet, it readily runs together and water puddles on the surface. When dry or moist, the soil forms a cast that can be freely handled without breaking. When moistened and squeezed between the thumb and finger, the soil does not "ribbon" but has a broken appearance.

Clay loam is fine textured and generally breaks into clods or lumps that are hard when dry. When the moist soil is pinched between the thumb and finger, it forms a thin "ribbon," which breaks readily and can barely sustain its own weight. The moist soil is plastic and forms a cast that can bear much handling. When kneaded in the hand, it does not crumble readily but tends to work into a heavy, compact mass.

Clay is fine textured. It generally forms very hard lumps or clods when dry and is quite plastic and usually sticky when wet. When the moist soil is pinched between the thumb and finger, it forms a long, flexible "ribbon." Some fine clays are very high in content of colloids, are friable, and are not plastic in all moisture conditions.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape (fig. 5). Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The generai soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Hooksan-Beaches-Dune land

Beaches, Dune land, and nearly level to steep, excessively drained, sandy soils formed in windblown deposits; along coastal shorelines

This map unit is on beaches and sand dunes. It makes up about 7 percent of the county. It is about 55 percent Hooksan soils, 25 percent Beaches, 15 percent Dune land, and 5 percent soils of minor extent.

Nearly level to steep areas of Hooksan soils generally extend inland from the areas of Beaches. In a typical area of these soils, beachgrass is growing on a surface layer of pale brown, loose sand about 20 inches thick. The substratum to a depth of 65 inches or more is pale brown and light yellowish brown, loose sand.

Nearly level, long and narrow areas of Beaches generally fringe the coastal shorelines. Their size and shape are subject to dramatic changes because of the erosion and deposition of sand caused by wave action. A typical area of Beaches is not vegetated. It consists of very deep coarse sand. Some areas have a gravelly or cobbly surface.

Nearly level to very steep areas of Dune land generally extend inland from areas of Beaches and are adjacent to the Hooksan soils. A typical area of Dune land is not vegetated. It consists of light brownish gray, loose sand to a depth of 65 inches or more.

Minor in this map unit are the poorly drained Pipestone soils and the very poorly drained Berryland, Ipswich, Matunuck, and Pawcatuck soils. Berryland and Pipestone soils formed in areas of sand with a freshwater table at or near the surface. They are in depressions in areas of Dune land and Hooksan soils. Ipswich, Matunuck, and Pawcatuck soils are inundated daily by tides. Ipswich and Pawcatuck soils formed in organic deposits, and Matunuck soils formed in sandy deposits.

This map unit is used primarily for limited recreation or wildlife habitat. The Hooksan soils support sparse, fragile vegetation. If disturbed, they are subject to severe wind erosion. Vegetating road cuts and trails is difficult. Beaches are well suited to sunbathing and swimming. Dune land is subject to severe wind erosion.

2. Ipswich-Pawcatuck-Matunuck

Nearly level, very deep, very poorly drained peats formed in marine organic and sandy deposits; in areas sheltered from ocean waves along coastal shorelines and adjacent to bodies of brackish water

This map unit is in tidal marshes. It makes up about 6 percent of the county. It is about 60 percent Ipswich soils, 25 percent Pawcatuck soils, 10 percent Matunuck soils, and 5 percent soils of minor extent.

The nearly level Ipswich, Pawcatuck, and Matunuck soils border areas of salt water and brackish water that are protected by beaches and sand dunes from the direct force of ocean waves. These soils are in tidal areas that are subject to daily inundation and are vegetated with saltgrasses.

Typically, Ipswich soils have a surface layer of dark grayish brown peat about 7 inches thick. The substratum to a depth of 65 inches or more is mucky peat. It is dark grayish brown in the upper part and very dark grayish brown in the lower part.

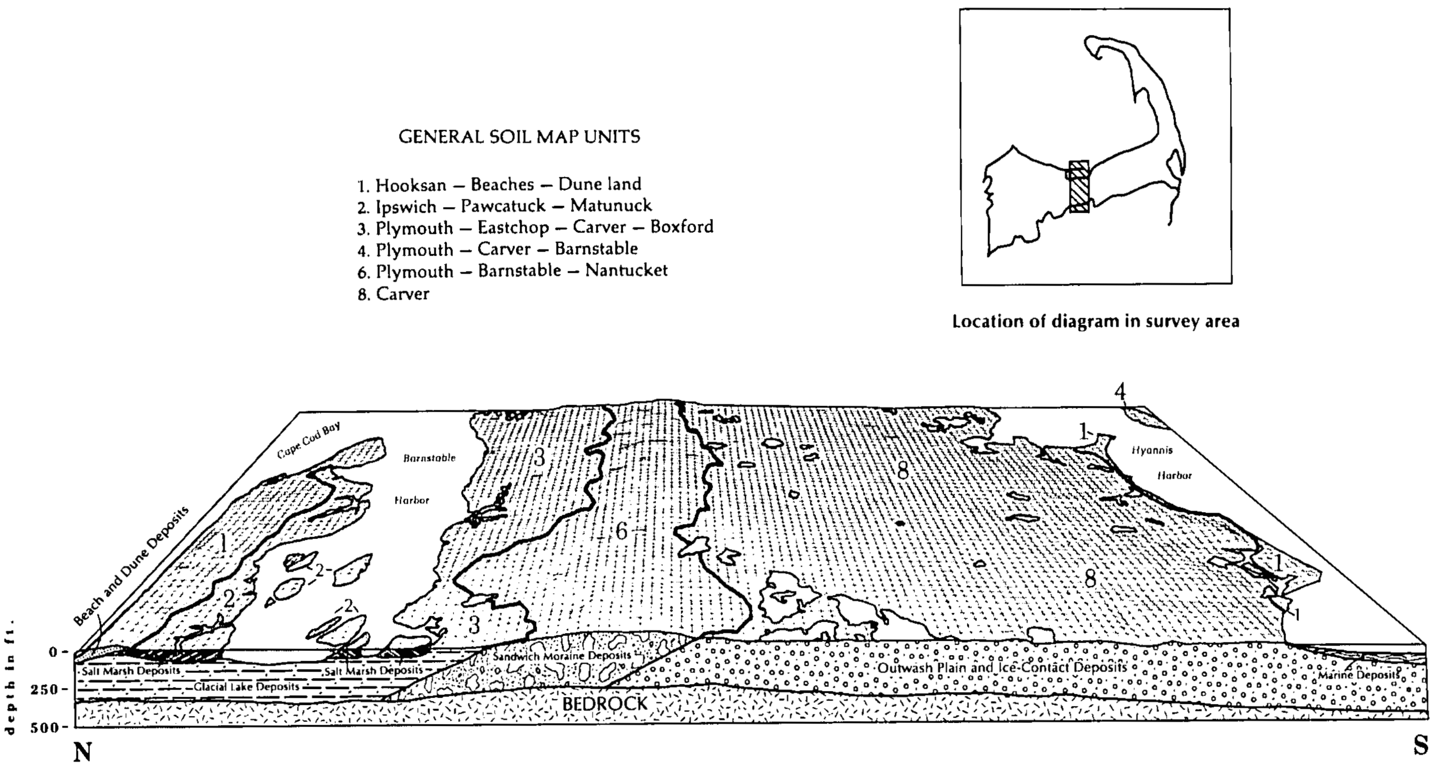


Figure 5.—Relationship of soils, landscapes, and parent material between Sandy Neck to the north and Hyannis Harbor to the south. The diagram represents an area approximately 4 by 8 miles.

Typically, Pawcatuck soils have a surface layer of very dark grayish brown peat about 13 inches thick. Below this is a layer of very dark gray and dark grayish brown peat about 9 inches thick. The substratum extends to a depth of 65 inches or more. It is grayish brown coarse sand in the upper part and dark gray loamy coarse sand in the lower part.

Typically, Matunuck soils have a surface layer of dark grayish brown peat about 13 inches thick. The substratum extends to a depth of 65 inches or more. It is grayish brown and dark gray coarse sand in the upper part and very dark gray coarse sandy loam in the lower part.

Minor in this map unit are the excessively drained Hooksan soils and the very poorly drained Freetown, Maybid Variant, and Swansea soils. Freetown, Maybid Variant, and Swansea soils are in areas where a freshwater table is at or near the surface. Freetown and Swansea soils formed in organic deposits. Maybid Variant soils formed in freshened tidal marsh deposits in areas where natural tidal flooding has been restricted and the environment has changed from brackish to fresh water. Hooksan soils formed in sandy deposits. They are not subject to tidal inundation. Also of minor extent are Beaches, which are nearly level, sandy areas that support no vegetation.

This map unit is best suited to wildlife habitat. It is not suitable for other uses because of tidal inundation and a high organic matter content.

3. Plymouth-Eastchop-Carver-Boxford

Nearly level to steep, very deep, excessively drained and moderately well drained, sandy and clayey soils formed in glacial lake sediments and glacial till; in areas of glacial lake deposits

This map unit occurs as a discontinuous band that parallels the shore of Cape Cod Bay in the northern part of the county. It makes up about 4 percent of the county. It is about 25 percent Plymouth soils, 20 percent Eastchop soils, 15 percent Carver soils, 10 percent Boxford soils, and 30 percent soils of minor extent.

The nearly level to steep Plymouth soils are in scattered areas throughout the unit. Typically, the surface layer is dark brown, very friable sandy loam about 7 inches thick. The subsoil is about 22 inches thick. It is strong brown gravelly loamy coarse sand grading to light yellowish brown gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray gravelly coarse sand in the upper part and pale brown coarse sand in the lower part.

The nearly level to strongly sloping Eastchop soils are mainly in the western and central parts of this map unit. Typically, the surface is covered with an organic layer. This layer is 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partially decomposed and well decomposed organic material. The surface layer is about 6 inches thick. The upper 1 inch is very dark gray, very friable fine sand, and the lower 5 inches is yellowish brown, very friable loamy fine sand. The subsoil is about 19 inches thick. The upper 4 inches is yellowish brown, very friable loamy fine sand; the next 9 inches is yellowish brown, very friable loamy fine sand; and the lower 6 inches is olive yellow, loose fine sand. The substratum to a depth of 65 inches or more is loose very fine sand. The upper 16 inches is light yellowish brown, and the lower part is light olive brown.

The nearly level to steep Carver soils typically are covered with a thin layer of undecomposed and decomposed pine needles, leaves, and twigs. The surface layer is light brownish gray loamy coarse sand about 3 inches thick. The subsoil is about 16 inches thick. It grades from dark brown loamy coarse sand in the upper part to brownish yellow coarse sand in the lower part. The substratum to a depth of 65 inches or more is light yellowish brown coarse sand.

The nearly level and gently sloping Boxford soils typically are covered with about 1 inch of loose, undecomposed leaves and twigs. The surface layer is dark grayish brown silt loam about 9 inches thick. The subsoil is about 17 inches thick. It is brown silt loam in the upper part and grades to grayish brown, mottled silty clay loam in the lower part. The substratum to a depth of 65 inches or more is grayish brown, mottled silty clay loam.

Minor in this map unit are the well drained Nantucket soils, the moderately well drained Belgrade soils, and the very poorly drained Maybid, Freetown, and Swansea soils. Nantucket soils formed in loamy material that is firm in the substratum. Belgrade soils have a high content of very fine sand and silt in the subsoil and substratum. Maybid, Freetown, and Swansea soils have a seasonal high water table at or near the surface for most of the year. Maybid soils formed in clayey material, and Freetown and Swansea soils formed in organic material.

Most areas of this map unit are used as woodland. Many areas have been developed for homesites, and a few areas are farmed. Because of a very low available water capacity, the Carver, Eastchop, and Plymouth soils are droughty and are poorly suited to crops and pasture. The sides of excavations in areas of Carver, Eastchop, and Plymouth soils are unstable and can cave in. The pollution of ground water is a hazard if the Carver, Eastchop, or Plymouth soils are used as sites for septic tank absorption fields or for sanitary landfills. The moderately slowly permeable or very slowly permeable substratum in the Boxford soils does not readily absorb the effluent from septic systems. The seasonal high water table in the Boxford soils is a limitation on sites for dwellings with or without basements.

4. Plymouth-Carver-Barnstable

Nearly level to steep, well drained and excessively drained, sandy and loamy soils formed in sandy, loose glacial till and glacial outwash; on ground moraines and outwash plains

This map unit is in the western part of the county. It makes up about 4 percent of the county. It is about 30 percent Plymouth soils, 25 percent Carver soils, 20 percent Barnstable soils, and 25 percent soils of minor extent.

The nearly level to steep Plymouth soils are in broad areas throughout this unit. The moderately steep and steep areas of these soils are less extensive and are on ridges and hills. Typically, the surface layer is dark brown, very friable sandy loam about 7 inches thick. The subsoil is about 22 inches thick. It is strong brown gravelly loamy coarse sand grading to light yellowish brown gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray gravelly coarse sand in the upper part and pale brown coarse sand in the lower part.

The nearly level to steep Carver soils are in broad areas throughout this unit. Typically, the nearly level and gently sloping areas have a surface that is covered with a thin layer of undecomposed and decomposed pine needles, leaves, and twigs. The surface layer is light brownish gray loamy coarse sand about 3 inches thick. The subsoil is about 16 inches thick. It is dark brown loamy coarse sand grading to brownish yellow coarse sand. The substratum to a depth of 65 inches or more is light yellowish brown coarse sand. Typically, the strongly sloping to steep areas of these soils are less extensive and are on ridges and hills. They have a surface layer of coarse sand.

The nearly level to steep Barnstable soils are in broad areas throughout this unit. The moderately steep areas of these soils are less extensive and are on ridges and hills. Typically, the surface layer is dark yellowish brown, very friable sandy loam about 7 inches thick. The subsoil is about 16 inches thick. It is yellowish brown sandy loam grading with increasing depth to light olive brown sandy loam. The substratum to a depth of 65 inches or more is light yellowish brown coarse sand.

Minor in this map unit are the excessively drained Eastchop soils, the well drained Merrimac soils, and the very poorly drained Freetown and Pawcatuck soils. Eastchop soils are dominantly fine sand throughout. Merrimac soils formed in loamy material over sandy outwash. They do not have surface or subsurface stones and boulders. Freetown soils have a seasonal high water table. They formed in freshwater organic deposits. Pawcatuck soils are inundated by tides. They formed in marine organic deposits.

Most areas of this map unit are used as woodland. Many areas have been developed for homesites, and a few areas are farmed. Most areas of the unit are poorly suited to cultivated crops and pasture because of a very low available water capacity or surface stones. No major limitations affect the use of these soils as building sites. The sides of excavations can cave in because of the loose nature of the substratum. The pollution of ground water is a hazard if the soils are used as sites for septic tank absorption fields or sanitary landfills.

5. Enfield-Merrimac-Carver

Nearly level to steep, very deep, well drained and excessively drained, loamy and sandy soils formed in glacial outwash and loamy eolian material; on outwash plains

This map unit is in the western part of the county. It makes up about 20 percent of the county. It is about 25 percent Enfield soils, 25 percent Merrimac soils, 25 percent Carver soils, and 25 percent soils of minor extent (fig. 6).

The nearly level to strongly sloping Enfield soils are in broad areas throughout this unit. The strongly sloping areas are on the sides of swales and valleys on outwash plains. Typically, the surface is covered with a thin layer of undecomposed and decomposed leaves and twigs. The surface layer is brown silt loam about 1 inch thick. The subsoil is about 30 inches thick. It is reddish brown silt loam in the upper part and grades to yellowish brown very fine sandy loam in the lower part. The substratum extends to a depth of 65 inches or more. It is yellowish brown to brownish yellow, stratified sand and gravel.

The nearly level to moderately steep Merrimac soils are in broad areas throughout this unit. Where strongly sloping, these soils are on the side slopes of swales and valleys on outwash plains and on ridges and hills in areas of ice-contact deposits. Typically, the surface is covered with a thin layer of undecomposed pine needles, leaves, and twigs. The surface layer is sandy loam about 3 inches thick. It is black in the upper part and light brownish gray in the lower part. The subsoil is sandy loam about 21 inches thick. It is strong brown in the upper part and yellowish brown and brownish yellow in the lower part. The substratum to a depth of 65 inches or more is light brownish gray coarse sand.

The nearly level to steep Carver soils are in broad areas throughout this unit. Where strongly sloping to steep, these soils are on the side slopes of swales and valleys on outwash plains and on ridges and hills in areas of ice-contact deposits. Typically, the surface is covered with a thin layer of undecomposed and decomposed pine needles, leaves, and twigs. The surface layer is light brownish gray loamy coarse sand about 3 inches thick. The subsoil is about 16 inches thick. It is dark brown loamy coarse sand grading to brownish yellow loamy coarse sand. The substratum to a depth of 65 inches or more is light yellowish brown coarse sand.

Minor in this map unit are the excessively drained Hinckley and Eastchop soils, the moderately well drained Deerfield soils, the poorly drained Pipestone soils, and the very poorly drained Berryland, Freetown, and Swansea soils. Hinckley soils have a high content of gravel. Eastchop soils are in landscape positions similar to those of the major soils. Berryland, Deerfield, Freetown, Pipestone, and Swansea soils have a seasonal high water table within 3 feet of the surface. They are in swales, depressions, and low areas adjacent to bodies of water. Berryland, Deerfield, and Pipestone soils formed in sandy outwash, and Eastchop soils formed in sandy glaciofluvial and glaciolacustrine sediments. Freetown and Swansea soils formed in organic deposits.

Most areas of this map unit are used as woodland. Many areas have been developed for homesites, and some areas are farmed. This unit is well suited to cropland and pasture. No major hazards or limitations affect the use of these soils as building sites. The sides of excavations can cave in because of the loose nature of the substratum. The pollution of ground water is a hazard if the soils are used as sites for septic tank absorption fields or sanitary landfills.

6. Plymouth-Barnstable-Nantucket

Nearly level to steep, very deep, excessively drained and well drained, sandy and loamy soils formed in reworked glacial outwash and glacial till; on moraines and outwash plains

This map unit occurs as two long, narrow areas that originate in the northwestern part of the county. One

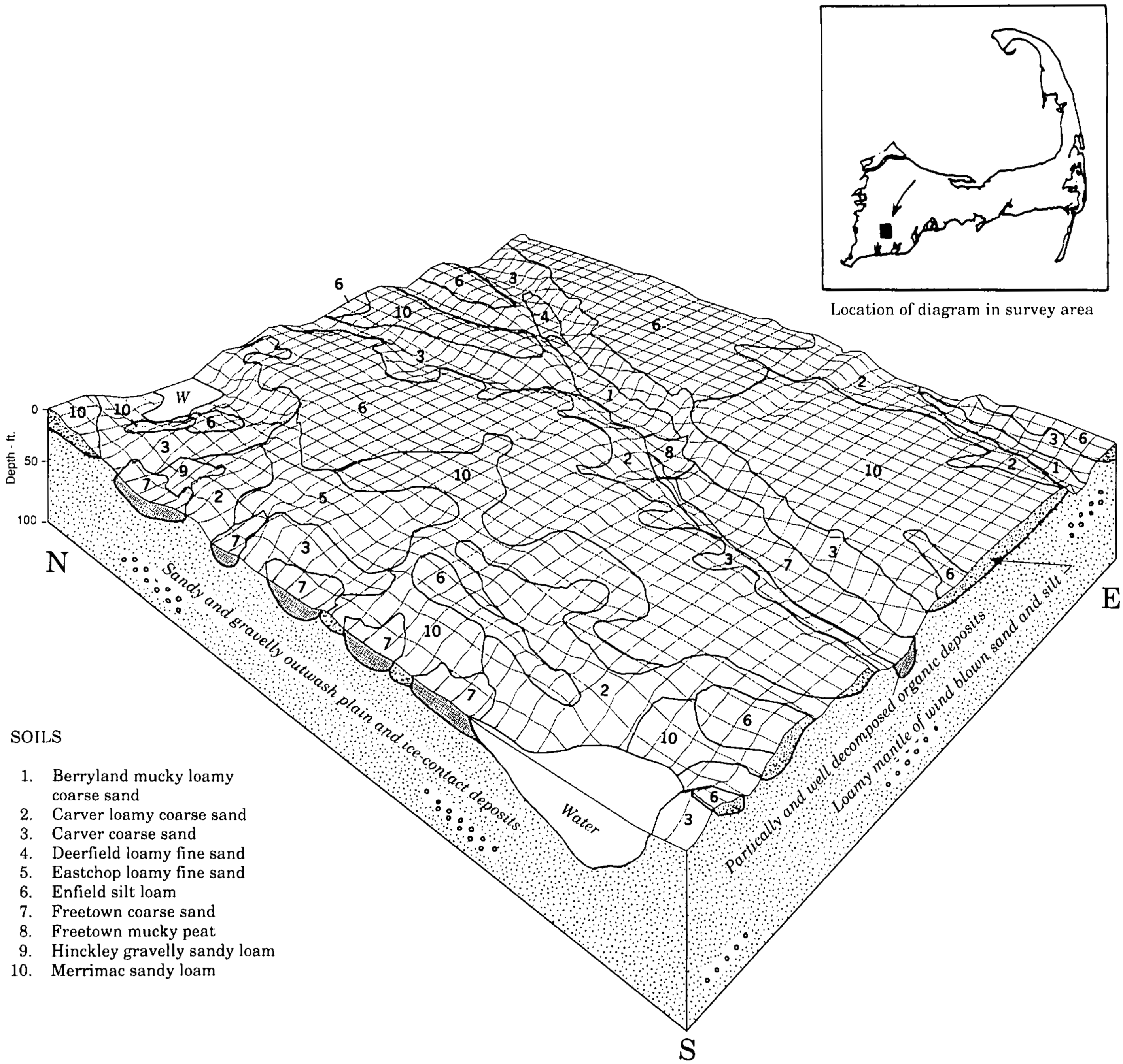


Figure 6.—Relationship of soils, landscapes, and parent material in the Enfield-Merrimac-Carver general soil map unit.

area extends to the southwest corner of the county, and the other extends westward as a discontinuous ridge. This unit makes up about 14 percent of the county. It is about 45 percent Plymouth soils, 25 percent Barnstable soils, 5 percent Nantucket soils, and 25 percent soils of minor extent.

The nearly level to steep Plymouth soils are in scattered areas throughout the unit. They are mapped in complexes with Barnstable soils and in some areas with Nantucket soils. Typically, the surface is covered with a thin layer of undecomposed and decomposed pine needles, leaves, and twigs. The surface layer is about 3 inches thick. It is black loamy coarse sand in the upper part and gray coarse sand in the lower part. The subsoil is about 26 inches thick. It is dark brown gravelly loamy coarse sand grading to light yellowish brown gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray gravelly coarse sand in the upper part and pale brown coarse sand in the lower part.

The nearly level to steep Barnstable soils are in scattered areas throughout the unit. They are mapped in complexes with Plymouth soils and in some areas with Nantucket soils. Typically, the surface is covered with a thin layer of undecomposed and decomposed pine needles, leaves, and twigs. The surface layer is dark gray sandy loam about 1 inch thick. The subsoil is about 22 inches thick. It is dark brown sandy loam grading with increasing depth to light olive brown sandy loam. The substratum to a depth of 65 inches or more is light yellowish brown coarse sand.

The nearly level to steep Nantucket soils are in scattered areas throughout this unit. They are mapped in complexes with Barnstable and Plymouth soils. Typically, the surface is covered with an organic layer. This layer is 1.5 inches of undecomposed leaves and twigs and 0.5 inch of partially decomposed and well decomposed organic material. The surface layer is about 5 inches thick. The upper 1 inch is very dark grayish brown, very friable sandy loam. The lower 4 inches is dark yellowish brown, friable sandy loam. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches is light olive brown, firm loam. Below a depth of 65 inches, the soils vary in texture and may have layers of loose gravel and sand.

Minor in this map unit are the excessively drained Carver and Hinckley soils and the very poorly drained Freetown and Swansea soils. Carver soils are dominantly sand and have a small number of coarse fragments. Hinckley soils have a high content of gravel. Freetown and Swansea soils formed in organic material. They have a seasonal high water table at or near the surface during most of the year.

Most areas of this map unit are used as woodland. Some areas have been developed for homesites, and a few areas are farmed. Because of a low available water capacity, the Plymouth soils are droughty and are poorly suited to crops and pasture. The steep slopes in this map unit are management concerns in areas used as building sites. The sides of excavations in areas of the Plymouth and Barnstable soils are unstable and can cave in. The pollution of ground water is a hazard if the Plymouth or Barnstable soils are used as sites for septic tank absorption fields or sanitary landfills. The slowly permeable substratum in the Nantucket soils does not readily absorb the effluent from septic systems.

7. Carver-Hinesburg-Nantucket

Nearly level to steep, very deep, excessively drained and well drained, sandy and loamy soils formed in glacial outwash, glacial lake sediments, and glacial till; on outwash plains and in areas of glacial lake deposits

This map unit is in the eastern part of the county. It makes up about 3 percent of the county. It is about 40 percent Carver soils, 25 percent Hinesburg soils, 5 percent Nantucket soils, and 30 percent soils of minor extent.

The nearly level to steep Carver soils are in broad areas throughout this unit. Where strongly sloping to steep, these soils are on the side slopes of swales and valleys on outwash plains and on ridges and hills in areas of ice-contact deposits. Typically, the surface is covered with a thin layer of undecomposed and decomposed pine needles, leaves, and twigs. The surface layer is light brownish gray loamy coarse sand about 3 inches thick. The subsoil is loamy coarse sand about 16 inches thick. It grades from dark brown to brownish yellow. The substratum to a depth of 65 inches or more is light yellowish brown coarse sand. Typically, the strongly sloping to steep areas of these soils have a surface layer of coarse sand.

The nearly level to moderately steep Hinesburg soils are in areas throughout this unit. Where strongly sloping to steep, these soils are on hills and ridges in areas of ice-contact deposits. Typically, the surface layer is dark brown sandy loam about 10 inches thick. The subsoil is about 22 inches thick. It is yellowish brown loamy coarse sand in the upper part and light olive brown loamy sand in the lower part. The substratum extends to a depth of 65 inches or more. It may be mottled. It is light brownish gray fine sandy loam in the upper part and light olive brown sandy clay loam in the lower part.

The gently sloping and strongly sloping Nantucket soils are of limited extent. They are in scattered areas throughout this unit. Typically, the surface is covered with an organic layer. This layer is 1.5 inches of undecomposed leaves and twigs and 0.5 inch of partially decomposed and well decomposed organic material. The surface layer is about 5 inches thick. The upper 1 inch is very dark grayish brown, very friable sandy loam, and the lower 4 inches is dark yellowish brown, friable sandy loam. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches or more is light olive brown, firm loam.

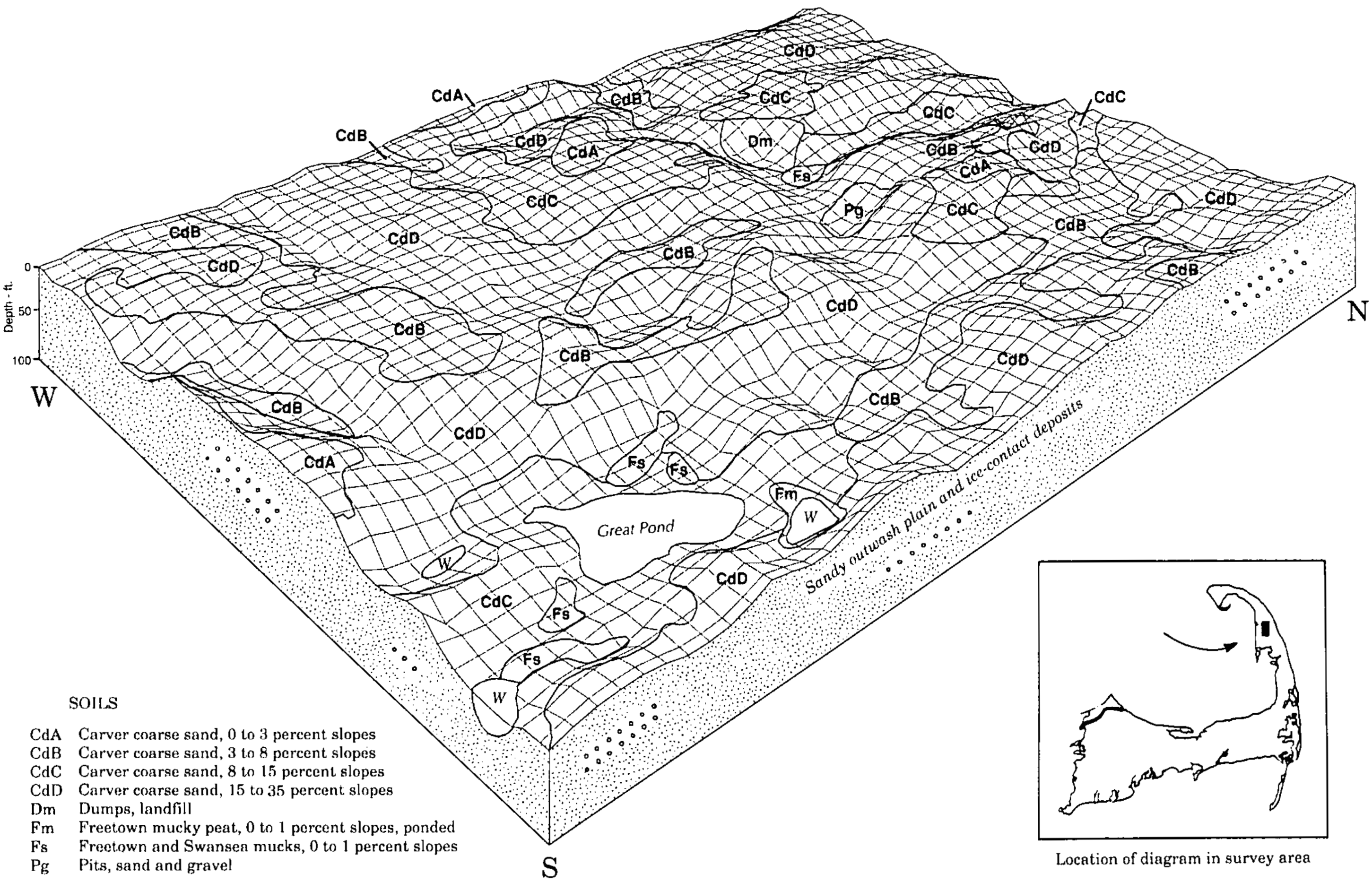


Figure 7.—The relationship of soils, landscapes, and parent material in the Carver general soil map unit.

Minor in this map unit are the excessively drained Plymouth soils and the very poorly drained Freetown and Swansea soils. Plymouth soils are dominantly sand and have a moderate number of coarse fragments. Freetown and Swansea soils formed in organic material. They have a seasonal high water table at or near the surface during most of the year.

Most areas of this map unit are used as woodland. Many areas have been developed for homesites, and a few areas are farmed. Because of a very low available water capacity, the Carver soils are droughty and are poorly suited to crops and pasture. The steep slopes in this map unit are management concerns in areas used as building sites. The sides of excavations in areas of the Carver soils are unstable and can cave in. The pollution of ground water is a hazard if the Carver soils are used as sites for septic tank absorption fields or sanitary landfills. Moderately slow or slow permeability in the substratum of the Hinesburg and Nantucket soils restricts the absorption of the effluent from septic systems.

8. Carver

Nearly level to steep, very deep, excessively drained, sandy soils formed in glacial outwash and ice-contact deposits; on outwash plains and kames

This map unit is in the central and western parts of the county. It makes up about 42 percent of the county. It is about 80 percent Carver soils and 20 percent soils of minor extent (fig. 7).

The nearly level to steep Carver soils are in broad areas throughout this unit. Where strongly sloping to steep, these soils are on the side slopes of swales and valleys on outwash plains and on ridges and hills in areas of ice-contact deposits. Typically, the surface is covered with a thin layer of undecomposed and decomposed pine needles, leaves, and twigs. The surface layer is brown coarse sand about 7 inches thick. The subsoil is about 33 inches thick. It is strong brown coarse sand in the upper part and grades to brownish yellow coarse sand in the lower part. The substratum to a depth of 65 inches or more is light yellowish brown coarse sand.

Minor in this map unit are the excessively drained Eastchop and Hinckley soils, the poorly drained Pipestone soils, and the very poorly drained Berryland, Freetown, and Swansea soils. Eastchop soils are dominantly fine sand and have a small amount of gravel. Hinckley soils have a large amount of gravel. Berryland, Freetown, Pipestone, and Swansea soils have a seasonal high water table within 1.5 feet of the surface. They are in swales and depressions and in low areas adjacent to streams, ponds, and lakes. Berryland and Pipestone soils formed in sandy outwash. Freetown and Swansea soils formed in organic deposits. Also of minor extent are areas of Pits and Dumps.

Most areas of this map unit are used as woodland. Some areas have been developed for homesites. This unit is poorly suited to cultivated crops and pasture because of a very low available water capacity. No major limitations affect the use of these soils as building sites. The sides of excavations can cave in because of the loose nature of the substratum. The pollution of ground water is a hazard if the Carver soils are used as sites for septic tank absorption fields or sanitary landfills.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Carver coarse sand, 3 to 8 percent slopes, is a phase of the Carver series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Barnstable-Plymouth-Nantucket complex, rolling, very bouldery, is an example.

An *undifferentiated group* is made up of two or more soils 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 in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Freetown and Swansea mucks, 0 to 1 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, sand and gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Soil Descriptions

AmA—Amostown sandy loam, 0 to 5 percent slopes. This very deep, nearly level and gently sloping, moderately well drained soil is in depressions and swales in areas of glacial lake deposits. It makes up approximately 0.1 percent (285 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is friable sandy loam about 7 inches thick. The upper 2 inches is very dark grayish brown, and the lower 5 inches is dark brown. The subsoil is friable sandy loam about 26 inches thick. The upper 6 inches is yellowish brown, the next 14 inches is light olive brown, and the lower 6 inches is light olive brown and mottled. The substratum to a depth of 65 inches or more is stratified light olive brown, yellowish brown, and grayish brown, mottled very fine sandy loam and silt loam. It is friable or firm.

Included with this soil in mapping are small areas of Belgrade, Boxford, Deerfield, and Walpole soils. Also included are many areas where the soil is underlain by sandy or gravelly material below a depth of 65 inches. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Amostown soil and slow or moderately slow in the substratum. Available water capacity is moderate. The seasonal high water table is at a depth of 1.5 to 3.0 feet in late fall, in winter and early spring, and after periods of heavy precipitation.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are cultivated.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. The seasonal high water table commonly keeps the soil wet in early spring and delays farming activities. A drainage system is needed for maximum crop yields and the efficient use of machinery. In the gently sloping areas, farming on the contour or across the slope, including grasses and legumes in the crop rotation, establishing diversions, applying a system of conservation tillage, and growing cover crops reduce the hazard of erosion. Growing cover crops and including grasses and legumes in the cropping system improve tilth. Mixing crop residue and manure into the surface layer also improves tilth.

This soil is well suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is well suited to woodland. No major hazards or limitations restrict woodland management. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are eastern white pine, red maple, white oak, and scarlet oak.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with or without basements or as a site for septic tank absorption fields. The slow or moderately slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption field helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material below a depth of 60 inches, excavations that extend to this material generally can overcome the restricted permeability.

The capability subclass is IIw.

BaB—Barnstable sandy loam, 3 to 8 percent slopes. This very deep, gently sloping, well drained soil is on the crests and sides of small hills in areas of ground moraine and ice-contact deposits. It makes up approximately 0.2 percent (468 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are areas of Carver, Merrimac, Nantucket, and Plymouth soils. Also included are small areas where slopes are less than 3 percent or more than 8 percent and scattered spots where stones are on the surface. Included soils make up about 25 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are farmed.

This soil is well suited to cultivated crops. Good tilth can be easily maintained in cultivated areas. The soil is subject to erosion and tends to be droughty during periods of low rainfall. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

This soil is suitable as a site for buildings with or without basements. It readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIs.

BaC—Barnstable sandy loam, 8 to 15 percent slopes. This very deep, strongly sloping, well drained soil is on hills and ridges in areas of ground moraine and ice-contact deposits. It makes up less than 0.1 percent (169 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are areas of Carver, Merrimac, Nantucket, and Plymouth soils. Also included are small areas where slopes are less than 8 percent or more than 15 percent and scattered spots where stones are on the surface. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are farmed.

This soil is suited to cultivated crops. Good tilth can be easily maintained in cultivated areas. The soil is subject to erosion, especially in the steeper areas, and tends to be droughty during periods of low rainfall. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer increases the organic matter content and helps to maintain good tilth.

This soil is well suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if this soil is used as a building site. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is limited as a site for septic tank absorption fields because of the slope and the rapid or very rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IIIe.

BbB—Barnstable sandy loam, 3 to 8 percent slopes, very stony. This very deep, gently sloping, well drained soil is on the crests and sides of small hills in areas of ground moraine and ice-contact deposits. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up approximately 0.5 percent (1,251 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 175 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are areas of Carver, Nantucket, and Plymouth soils. Also included are small areas where slopes are less than 3 percent or more than 8 percent and some areas where stones and boulders cover more than 3 percent of the surface. Included soils make up about 25 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is unsuitable as cropland because the surface stones and boulders restrict the use of equipment. It is well suited, however, if the stones and boulders are removed.

This soil is well suited to native pasture. It is poorly suited to hay and improved pasture, however, because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. No major hazards or limitations restrict woodland management. The use of equipment may be hampered because of the surface stones and boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

This soil is suitable as a site for buildings with or without basements. The surface and subsurface stones and boulders may hamper site development. The soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

BbC—Barnstable sandy loam, 8 to 15 percent slopes, very stony. This very deep, strongly sloping, well drained soil is on small hills and ridges in areas of ground moraine and ice-contact deposits. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up approximately 0.2 percent (406 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are areas of Carver, Nantucket, and Plymouth soils. Also included are small areas where slopes are less than 8 percent or more than 15 percent and some areas where stones and boulders cover more than 3 percent of the surface. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is unsuitable as cropland because the surface stones and boulders restrict the use of equipment. It is suited to cultivated crops, however, if the stones and boulders are removed.

This soil is well suited to native pasture. It is poorly suited to hay and improved pasture, however, because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. No major hazards or limitations restrict woodland management. The use of equipment may be hampered because of the surface stones and boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if this soil is used as a building site. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may hamper site development.

This soil is limited as a site for septic tank absorption fields because of the slope and the rapid or very rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

BbD—Barnstable sandy loam, 15 to 25 percent slopes, very stony. This very deep, moderately steep, well drained soil is on the sides of hills and ridges in areas of ground moraine and ice-contact deposits. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up approximately 0.1 percent (173 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are areas of Carver, Hinckley, Nantucket, and Plymouth soils and small areas where slopes are less than 15 percent or more than 25 percent. Also included are areas where stones and boulders cover more than 3 percent of the surface. Included soils make up about 35 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

This soil is unsuitable as cropland because of the slope and the surface stones. The stones interfere with the use of equipment.

This soil is suited to native pasture. It is poorly suited to hay and improved pasture, however, because the use of equipment is limited by the surface stones and the slope. The main management objective is the prevention of overgrazing. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. No major hazards or limitations restrict woodland management. The use of equipment may be difficult because of the slope and the surface stones. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is the main limitation if this soil is used as a site for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is poorly suited to septic tank absorption fields because of the slope and the rapid or very rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

BcC—Barnstable-Plymouth complex, rolling. These undulating and rolling, very deep, excessively drained and well drained soils are on side slopes and hills in glacial moraine areas. Slopes range from 3 to 15 percent. The soils make up approximately 1.5 percent (3,776 acres) of the survey area. They are mapped in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 500 acres in size. They are about 40 percent Barnstable soil, 30 percent Plymouth soil, and 30 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with these soils in mapping are many small areas of Carver soils and fewer areas of Merrimac and Nantucket soils. Also included are small areas where slopes are less than 3 percent or more than 15 percent and scattered spots where stones are on the surface. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas have been developed for homesites. Many areas are used as pasture, and some are used as woodland. A few areas have been developed for golf courses.

These soils are suited to cultivated crops. Because of the variability of the soils, however, crop growth may vary. Erosion is a management concern in the strongly sloping areas. Stripcropping, terracing, minimizing tillage, growing cover crops, and including grasses and legumes in the cropping system help to control runoff and erosion. Droughtiness is a limitation in areas of the Plymouth soil. Irrigation is needed for most cultivated crops. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content.

These soils are suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soils to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are suited to woodland. No major hazards or limitations restrict woodland management on the Barnstable soil. The Plymouth soil is droughty. As a result, some seedling loss is expected. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

Areas of these soils that have slopes of more than 8 percent are limited as sites for buildings. Land grading is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

These soils are limited as sites for septic tank absorption fields because of the slope and the rapid or very rapid permeability in the substratum. The soils may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IIIe.

BdC—Barnstable-Plymouth complex, rolling, bouldery. These undulating and rolling, very deep, excessively drained and well drained soils are on side slopes and hills in moraine areas. Stones and boulders cover 0.1 to 1.0 percent of the surface. Slopes range from 3 to 15 percent. The soils make up approximately 0.6 percent (1,541 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 400 acres in size. They are about 40 percent Barnstable soil, 30 percent Plymouth soil, and 30 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with these soils in mapping are many small areas of Carver soils, fewer areas of Nantucket soils, and small areas where slopes are less than 3 percent or more than 15 percent. Also included are small isolated areas that have no boulders on the surface. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. A few areas have been developed for homesites.

These soils are unsuitable as cropland because the surface stones and boulders restrict the use of equipment. They are suited to cultivated crops, however, if the stones and boulders are removed.

These soils are suited to native pasture. They are poorly suited to hay and improved pasture, however, because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are suited to woodland. No major hazards or limitations restrict woodland management on the Barnstable soil. The Plymouth soil is droughty. As a result, some seedling loss is expected. The use of equipment may be hampered because of the surface boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

Areas of these soils that have slopes of more than 8 percent are limited as sites for buildings. Land grading is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may hamper site development.

These soils are limited as sites for septic tank absorption fields because of the slope and the rapid or very rapid permeability in the substratum. The soils may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

BeC—Barnstable-Plymouth complex, rolling, very bouldery. These undulating and rolling, very deep, excessively drained and well drained soils are on side slopes and hills in moraine areas. Stones and boulders cover 1 to 3 percent of the surface. Slopes range from 3 to 15 percent. The soils make up approximately 0.9 percent (2,224 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 500 acres in size. They are about 40 percent Barnstable soil, 30 percent Plymouth soil, and 30 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with these soils in mapping are many small areas of Carver soils, fewer areas of Nantucket soils, and small areas where slopes are less than 3 percent or more than 15 percent. Also included are small isolated areas that have no boulders on the surface. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. A few areas have been developed for homesites.

These soils are unsuitable as cropland because the surface stones and boulders restrict the use of equipment. They are suited to cultivated crops, however, if the stones and boulders are removed.

These soils are suited to native pasture. They are poorly suited to hay and improved pasture, however, because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are suited to woodland. No major hazards or limitations restrict woodland management on the Barnstable soil. The Plymouth soil is droughty. As a result, some seedling loss is expected. The use of equipment may be hampered because of the surface boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

Areas of these soils that have slopes of more than 8 percent are limited as sites for buildings. Land grading is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may hamper site development.

These soils are limited as sites for septic tank absorption fields because of the slope and the rapid or very rapid permeability in the substratum. The soils may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

BfC—Barnstable-Plymouth-Nantucket complex, rolling. These undulating and rolling, very deep, excessively drained and well drained soils are on side slopes and hills in moraine areas. Slopes range from 3 to 15 percent. The soils make up approximately 0.5 percent (1,183 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 100 acres in size. They are about 35 percent Barnstable soil, 25 percent Plymouth soil, 15 percent Nantucket soil, and 25 percent other soils. The soils occur as areas so intricately mixed or sc small that separating them in mapping is not practical.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Typically, the surface of the Nantucket soil is covered with an organic layer. This layer is about 1.5 inches of undecomposed leaves and twigs and 0.5 inch of partly decomposed and well decomposed organic material. The surface layer is about 5 inches thick. It is very dark grayish brown, very friable sandy loam in the upper 1 inch and dark yellowish brown, friable sandy loam in the lower 4 inches. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches is light olive brown, firm loam. Below a depth of 65 inches, the soil varies in texture and may have layers of loose gravel and sand.

Included with these soils in mapping are small areas of Boxford, Carver, Merrimac, and Hinckley soils. Also included are small areas where slopes are less than 3 percent or more than 15 percent and scattered spots where stones and boulders are on the surface. Included soils make up about 25 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Nantucket soil and moderately slow or slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas a perched seasonal high water table is at a depth of 2.0 to 2.5 feet in early spring.

Most areas have been developed for homesites. Many areas are wooded, and some areas are farmed.

These soils are suited to cultivated crops. Because of the variability of the soils, however, crop growth may vary. Erosion is a management concern in the strongly sloping areas. Stripcropping, terracing, minimizing tillage, growing cover crops, and including grasses and legumes in the cropping system help to control runoff and erosion. Droughtiness is a limitation in areas of the Plymouth soil. Irrigation is needed for most cultivated crops. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content.

These soils are suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soils to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are suited to woodland. No major hazards or limitations restrict woodland management on the Barnstable and Nantucket soils. The Plymouth soil is droughty. As a result, some seedling loss is expected. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

Areas of these soils that have slopes of more than 8 percent are limited as sites for buildings. Land grading is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

These soils are limited as sites for septic tank absorption fields. The Barnstable and Plymouth soils may not adequately filter the effluent, and the Nantucket soil does not readily absorb the effluent. The pollution of ground water is a hazard in areas of the Barnstable and Plymouth soils, and seepage is a hazard in areas of the Nantucket soil. Onsite investigation is needed to determine the suitability of a given area and the measures needed to overcome the limitations.

The capability subclass is IIIe.

BgC—Barnstable-Plymouth-Nantucket complex, rolling, very bouldery. These undulating and rolling, very deep, excessively drained and well drained soils are on side slopes and hills in moraine areas. Boulders and stones cover 1 to 3 percent of the surface. Slopes range from 3 to 15 percent. The soils make up approximately 1.3 percent (3,292 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 600 acres in size. They are about 35 percent Barnstable soil, 30 percent Plymouth soil, 20 percent Nantucket soil, and 15 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Typically, the surface of the Nantucket soil is covered with an organic layer. This layer is about 1.5 inches of undecomposed leaves and twigs and 0.5 inch of partly decomposed and well decomposed organic material. The surface layer is about 5 inches thick. It is very dark grayish brown, very friable sandy loam in the upper 1 inch and dark yellowish brown, friable sandy loam in the lower 4 inches. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches is light olive brown, firm loam. Below a depth of 65 inches, the soil varies in texture and may have layers of loose gravel and sand.

Included with these soils in mapping are small areas of Boxford, Carver, Merrimac, and Hinckley soils. Also included are small areas where slopes are less than 3 percent or more than 15 percent. Included soils make up about 15 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Nantucket soil and moderately slow or slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas a perched seasonal high water table is at a depth of 2.0 to 2.5 feet in early spring.

Most areas are used as woodland. A few areas have been developed for homesites.

These soils are unsuitable as cropland because the surface stones and boulders restrict the use of equipment. They are suited to cultivated crops, however, if the stones and boulders are removed.

These soils are suited to native pasture. They are poorly suited to hay and improved pasture, however, because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are suited to woodland. No major hazards or limitations restrict woodland management or the Barnstable and Nantucket soils. The Plymouth soil is droughty. As a result, some seedling loss is expected. The use of equipment may be hampered because of the boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

Figure 8.—An area of Beaches. In most areas the surface layer is sandy, but in a few areas it is gravelly or cobbly.

Areas of these soils that have slopes of more than 8 percent are limited as sites for buildings. Land grading is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may hamper site preparation.

These soils are limited as sites for septic tank absorption fields. The Barnstable and Plymouth soils may not adequately filter the effluent, and the Nantucket soil does not readily absorb the effluent. The pollution of ground water is a hazard in areas of the Barnstable and Plymouth soils, and seepage is a hazard in areas of the Nantucket soil. Onsite investigation is needed to determine the suitability of a given area and the measures needed to overcome the limitations.

The capability subclass is VIs.

Bh—Beaches. This very deep, nearly level map unit is adjacent to the ocean. It is not vegetated. It makes up approximately 1.9 percent (4,738 acres) of the survey area. It is mapped mainly in the Hooksan-Beaches-Dune land general soil map unit. Areas are typically long and narrow and range from 50 to 200 feet in width. They are 5 to 300 acres in size.

This map unit consists of very deep, fine, medium, or coarse sand. In some areas the surface layer is gravelly or cobbly (fig. 8). Areas closest to the water are gently sloping and are inundated by tides twice a day. Generally, the entire beach is flooded by spring tides and storm tides.

Included in this unit in mapping are small areas of Hooksan, Ipswich, Pawcatuck, and Matunuck soils. Also included are unvegetated areas of dune sand. Included areas make up about 5 percent of this unit.

Beaches support no vegetation because of inundation by salt water and frequent reworking of the sand by wave action. They are used mainly for recreation and are unsuited to most other uses.

No capability subclass is assigned.

BlB—Belgrade silt loam, 3 to 8 percent slopes. This very deep, gently sloping, moderately well drained soil is in depressions and swales in areas of glacial lake deposits. It makes up approximately 0.2 percent (628 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsoil is about 32 inches thick. The upper 9 inches is yellowish brown, friable silt loam; the next 11 inches is light olive brown, mottled, friable silt loam; and the lower 12 inches is light olive brown, mottled, friable very fine sandy loam. The substratum extends to a depth of 65 inches or more. It is mottled. It is grayish brown, firm silt loam in the upper 13 inches and light yellowish brown, loose fine sand in the lower 11 inches.

Included with this soil in mapping are small areas of Amostown, Boxford, Scitico, and Walpole soils and areas where slopes are less than 3 percent. Also included are areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included areas make up about 30 percent of this unit.

Permeability is moderate in the subsoil of the Belgrade soil and slow to moderately rapid in the substratum. Available water capacity is high. The seasonal high water table is at a depth of 1.5 to 3.5 feet in late fall, in winter and early spring, and after periods of heavy precipitation.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. The seasonal high water table and erosion are management concerns. Wetness in early spring often delays farming activities. A drainage system is commonly needed for the best yields. Stripcropping, terracing, applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system help to control erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is well suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are eastern white pine, red maple, pitch pine, wild cherry, white oak, scarlet oak, and redcedar.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with or without basements or as a site for septic tank absorption fields. The slow to moderately rapid permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome these limitations. Enlarging the absorption field helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability.

The capability subclass is IIe.

BmA—Berryland mucky loamy coarse sand, 0 to 2 percent slopes. This very deep, nearly level, very poorly drained soil is in depressions, at the base of swales, and in low areas adjacent to ponds and streams. It formed on outwash plains and in areas of glacial lake deposits. It makes up approximately 0.6 percent (1,662 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is partly organic and partly mineral material. The organic part is about 4 inches of loose, undecomposed sphagnum moss, pine needles, leaves, and twigs and of 2 inches of well decomposed organic material. The mineral part is about 4 inches of very dark gray, very friable loamy coarse sand and 6 inches of gray, loose coarse sand. This part of the surface layer may be gleyed, mottled, or both. The subsoil is dark reddish brown gravelly loamy coarse sand that is firm in the upper 5 inches and friable in the lower 11 inches. The substratum to a depth of 65 inches or more is dark reddish brown, loose gravelly coarse sand.

Included with this soil in mapping are small areas of Freetown, Maybid, Pipestone, Swansea, and Walpole soils and areas where the subsoil does not have a firm layer. Also included are areas where the soil shows no evidence of profile development and does not have a mucky surface layer. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil and substratum of the Berryland soil. Available water capacity is low. The seasonal high water table is at or near the surface in fall, winter, and spring. The soil is ponded in some areas.

Most areas are used as woodland. Some areas support shrubby vegetation.

Because of the seasonal high water table, this soil is unsuited to cultivated crops, hay, and pasture. Draining the soil is difficult because suitable outlets are not readily available.

This soil is poorly suited to woodland because of the wetness and a high seedling mortality rate. Optimum tree growth is unlikely, and many seedlings do not survive. Because of low soil strength, the use of equipment should be limited to periods when the soil is dry or frozen. Onsite investigation may identify areas where trees can be planted if special management is applied. The most common trees are red maple, pitch pine, and tupelo.

The seasonal high water table is a limitation affecting most engineering uses of this soil. Alternative sites should be selected.

This soil is well suited to wetland wildlife habitat. The common native plant communities provide adequate food and cover for wildlife nesting areas.

The capability subclass is Vw.

BoA—Boxford silt loam, 0 to 3 percent slopes. This very deep, nearly level, moderately well drained soil is in areas of glacial lake deposits. It makes up approximately 0.1 percent (198 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 70 acres in size.

Typically, the surface is covered with a 1-inch layer of loose, undecomposed leaves and twigs. The surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 17 inches thick. It is brown, friable silt loam in the upper 11 inches and grayish brown, friable silty clay loam in the lower 6 inches. The lower 14 inches of the subsoil is mottled. The substratum to a depth of 65 inches or more is grayish brown, mottled, firm silty clay loam.

Included with this soil in mapping are small areas of Belgrade, Amostown, and Scitico soils. Also included are areas where slopes are more than 3 percent and many areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included areas make up about 30 percent of this unit.

Permeability is slow or very slow in the subsoil and substratum of the Boxford soil. Available water capacity is high. The soil has a seasonal high water table at a depth of 1.5 to 3.0 feet in late fall, in winter and early spring, and after periods of heavy precipitation.

Many areas are used as woodland. Some areas are farmed, and a few areas have been developed for homesites.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. The seasonal high water table and a high content of clay are management concerns. Wetness in early spring often delays farming activities. A drainage system is commonly needed in areas used for crops but is generally not needed in areas used for hay or pasture. Working the soil when it is wet results in the formation of clods that become hard when dry. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is well suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are eastern white pine, red maple, pitch pine, wild cherry, white oak, scarlet oak, and redcedar.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with or without basements or as a site for septic tank absorption fields. The slow or very slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption field helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability.

The capability subclass is IIw.

BoB—Boxford silt loam, 3 to 8 percent slopes. This very deep, gently sloping, moderately well drained soil is in areas of glacial lake deposits. It makes up approximately 0.2 percent (198 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface is covered with a 1-inch layer of loose, undecomposed leaves and twigs. The surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsoil is about 17 inches thick. It is brown, friable silt loam in the upper 11 inches and grayish brown, friable silty clay loam in the lower 6 inches. The lower 14 inches of the subsoil is mottled. The substratum to a depth of 65 inches or more is grayish brown, mottled, firm silty clay loam.

Included with this soil in mapping are small areas of Belgrade, Amostown, and Scitico soils and areas where slopes are less than 3 percent or more than 8 percent. Also included are many areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included soils make up about 30 percent of this unit.

Permeability is slow or very slow in the subsoil and substratum of the Boxford soil. Available water capacity is high. The seasonal high water table is at a depth of 1.5 to 3.0 feet in late fall, in winter and early spring, and after periods of heavy precipitation.

Many areas are used as woodland. Some areas are farmed, and a few areas have been developed for homesites.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. The seasonal high water table, a high content of clay, and the hazard of erosion are management concerns. Wetness in early spring often delays farming activities. A drainage system is commonly needed in areas used for crops but is generally not needed in areas used for hay or pasture. Working the soil when it is wet results in the formation of clods that become hard when dry. Stripcropping, terracing, applying a system of conservation tillage, growing cover crops, and including grasses and legumes in the cropping system help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is well suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are eastern white pine, red maple, pitch pine, wild cherry, white oak, scarlet oak, and redcedar.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with or without basements or as a site for septic tank absorption fields. The slow or very slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption field helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability.

The capability subclass is IIe.

CcA—Carver loamy coarse sand, 0 to 3 percent slopes. This very deep, nearly level, excessively drained soil generally is in broad areas on outwash plains but is also in areas of sandy glacial lake deposits. It makes up approximately 1.2 percent (3,020 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of matted, partly decomposed and well decomposed organic material. The surface layer is light brownish gray, very friable loamy coarse sand about 3 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Eastchop, Enfield, Hinckley, and Merrimac soils and areas where slopes are more than 3 percent. Included soils make up about 20 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. The soil is droughty in late summer. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops because of the low available water capacity. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity, helps to maintain good tilth, and increases the organic matter content.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is poorly suited to woodland because of the droughtiness. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are pitch pine, scrub oak, scarlet oak, white oak, and black oak. Generally, these trees are of poor quality and seldom attain heights of more than 35 feet.

Few limitations affect the use of this soil as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IVs.

CcB—Carver loamy coarse sand, 3 to 8 percent slopes. This very deep, gently sloping, excessively drained soil generally is in broad areas on outwash plains but is also in areas of sandy glacial lake deposits. It makes up approximately 5.1 percent (12,888 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of matted, partly decomposed and well decomposed organic material. The surface layer is light brownish gray, very friable loamy coarse sand about 3 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Eastchop, Enfield, Hinckley, and Merrimac soils and areas where slopes are less than 3 percent or more than 8 percent. Included soils make up about 20 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. The soil is droughty in late summer. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops. The low available water capacity and the susceptibility to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are pitch pine, scrub oak, scarlet oak, and white oak. Generally, these trees are of poor quality and seldom attain heights of more than 35 feet.

Few limitations affect the use of this soil as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IVs.

CdA—Carver coarse sand, 0 to 3 percent slopes. This very deep, nearly level, excessively drained soil is in broad areas on outwash plains. It makes up approximately 6.4 percent (16,446 acres) of the survey area. It is mapped mainly in the Carver general soil map unit. Areas are irregular in shape and range from 5 to 1,500 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 2 inches of matted, partly decomposed and well decomposed organic material. The surface layer is brown, loose coarse sand about 7 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Eastchop, Enfield, Hinckley, and Merrimac soils and areas where slopes are more than 3 percent. Included soils make up about 20 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are used as cropland.

This soil is very poorly suited to cultivated crops because of the very low available water capacity. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity, helps to maintain good tilth, and increases the organic matter content.

This soil is very poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are pitch pine, scrub oak, scarlet oak, and white oak. Generally, these trees are of poor quality and seldom attain heights of more than 25 feet.

Few limitations affect the use of this soil as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

CdB—Carver coarse sand, 3 to 8 percent slopes. This very deep, gently sloping, excessively drained soil is in broad areas and on the tops of knobs on outwash plains. It makes up approximately 10.3 percent (26,175 acres) of the survey area. It is mapped mainly in the Carver general soil map unit. Areas are irregular in shape and range from 5 to 1,000 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 2 inches of matted, partly decomposed and well decomposed organic material. The surface layer is brown, loose coarse sand about 7 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Eastchop, Enfield, Hinckley, and Merrimac soils and areas where slopes are less than 3 percent or more than 8 percent. Included soils make up about 20 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are used as cropland.

This soil is very poorly suited to cultivated crops. The very low available water capacity and the susceptibility to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

This soil is very poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are pitch pine, scrub oak, scarlet oak, and white oak. Generally, these trees are of poor quality and seldom attain heights of more than 25 feet.

Few limitations affect the use of this soil as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

CdC—Carver coarse sand, 8 to 15 percent slopes. This very deep, strongly sloping, excessively drained soil is on small hills and ridges in areas of ice-contact deposits and on the side slopes of swales on outwash plains. It makes up approximately 8.6 percent (22,004 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 500 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 2 inches of matted, partly decomposed and well decomposed organic material. The surface layer is brown, loose coarse sand about 7 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Eastchop, Hinckley, Merrimac, and Plymouth soils and areas where slopes are less than 8 percent or more than 15 percent. Included soils make up about 25 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are used as pasture or hayland.

This soil is very poorly suited to cultivated crops because of the very low available water capacity, the slope, and the hazard of erosion.

This soil is very poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are pitch pine, scrub oak, and white oak. Generally, these trees are of poor quality and seldom attain heights of more than 25 feet.

The slope is a limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is limited as a site for septic tank absorption fields because of the slope and the very rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

CdD—Carver coarse sand, 15 to 35 percent slopes. This very deep, moderately steep and steep, excessively drained soil is on hills and ridges in areas of ice-contact deposits and on the side slopes of swales on outwash plains. It makes up approximately 7.5 percent (19,251 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 500 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 2 inches of matted, partly decomposed and well decomposed organic material. The surface layer is brown, loose coarse sand about 7 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Eastchop, Freetown, Hinckley, Plymouth, and Swansea soils and areas where slopes are less than 15 percent. Also included are areas where isolated stones and boulders are on the surface. Included soils make up about 35 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. This soil is generally unsuited to cultivated crops, hay, and pasture because of the very low available water capacity, the slope, and a severe hazard of erosion.

This soil is poorly suited to woodland. The droughtiness and the slope are limitations affecting woodland management. Operating equipment may be hazardous on the steeper slopes. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, and black oak.

The slope is the main limitation if this soil is used as a site for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is poorly suited to septic tank absorption fields because of the slope and the very rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

CoB—Carver-Hinesburg loamy coarse sands, undulating. These nearly level and undulating, very deep, excessively drained and well drained soils are on broad outwash plains and on low hills in areas of glacial lake deposits. Slopes range from 0 to 8 percent. The soils make up about 1 percent (2,566 acres) of the survey area. They are mapped in the Carver-Hinesburg-Nantucket general soil map unit. Areas are irregular in shape and generally range from 5 to 800 acres in size. They are about 40 percent Carver soil, 30 percent Hinesburg soil, and 30 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Carver soil is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of matted, partly decomposed and well decomposed organic material. The surface layer is light brownish gray, very friable loamy coarse sand about 3 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface layer of the Hinesburg soil is dark brown, very friable sandy loam about 10 inches thick. The subsoil is about 22 inches thick. The upper 12 inches is yellowish brown, very friable loamy coarse sand, and the lower 10 inches is light olive brown, very friable loamy sand. The substratum extends to a depth of 65 inches or more. It may be mottled. It is light brownish gray, friable fine sandy loam in the upper 6 inches and light olive brown, firm sandy clay loam in the lower part.

Included with these soils in mapping are small areas of Amostown, Nantucket, and Plymouth soils. Also included are small areas where slopes are more than 8 percent, a few areas where stones are on the surface, and many areas where the Hinesburg soil is underlain by sandy and gravelly material below a depth of 60 inches. Included soils make up about 30 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. The soil is droughty in late summer. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Hinesburg soil and moderately slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is above the loamy and silty substratum in late fall, in winter and spring, and after periods of heavy precipitation.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are farmed.

These soils are poorly suited to cultivated crops. The low available water capacity of the Carver soil and the susceptibility of areas with slopes of more than 3 percent to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

These soils are poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates and timely grazing help to maintain plant density and minimize surface compaction.

Because of the droughtiness of the Carver soil, this map unit is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are pitch pine, white oak, and scarlet oak.

Few limitations affect the use of these soils as sites for buildings without basements. The droughtiness of the Carver soil is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation. In areas where the Hinesburg soil has a seasonal high water table, wetness is a limitation on sites for dwellings with basements.

These soils are limited as sites for septic tank absorption fields because the Carver soil may not adequately filter the effluent and the Hinesburg soil does not readily absorb the effluent. Because of the poor filtering capacity, the pollution of ground water is a hazard. In areas where the Hinesburg soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability. Onsite investigation is needed to determine the suitability of a given area and the measures needed to overcome the limitations.

The capability subclass is IVs.

CoC—Carver-Hinesburg loamy coarse sands, rolling. These rolling, very deep, excessively drained and well drained soils are on side slopes and hills in areas of glacial lake deposits and ice-contact deposits. Slopes range from 8 to 15 percent. The soils make up about 0.3 percent (673 acres) of the survey area. They are mapped mainly in the Carver-Hinesburg-Nantucket general soil map unit. Areas are irregular in shape and generally range from 5 to 100 acres in size. They are about 45 percent Carver soil, 25 percent Hinesburg soil, and 30 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Carver soil is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of matted, partly decomposed and well decomposed organic material. The surface layer is light brownish gray, very friable loamy coarse sand about 3 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface layer of the Hinesburg soil is dark brown, very friable sandy loam about 10 inches thick. The subsoil is about 22 inches thick. It is yellowish brown, very friable loamy coarse sand in the upper 12 inches and light olive brown, very friable loamy sand in the lower 10 inches. The substratum extends to a depth of 65 inches or more. It may be mottled. It is light brownish gray, friable fine sandy loam in the upper 6 inches and light olive brown, firm sandy clay loam in the lower part.

Included with these soils in mapping are small areas of Hinckley, Nantucket, and Plymouth soils. Also included are small areas where slopes are less than 8 percent or more than 15 percent, a few areas where stones are on the surface, and many areas where the Hinesburg soil is underlain by sandy and gravelly material below a depth of 60 inches. Included soils make up about 30 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. The soil is droughty in late summer. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Hinesburg soil and moderately slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is above the loamy and silty substratum in late fall, in winter and spring, and after periods of heavy precipitation.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are farmed.

These soils are very poorly suited to cultivated crops. The low available water capacity of the Carver soil and the susceptibility to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

These soils are poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness of the Carver soil, this map unit is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are pitch pine, white oak, scarlet oak, and white oak.

The slope is a limitation if these soils are used as sites for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The droughtiness of the Carver soil is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

These soils are limited as sites for septic tank absorption fields because the Carver soil may not adequately filter the effluent and the Hinesburg soil does not readily absorb the effluent. Because of the poor filtering capacity, the pollution of ground water is a hazard. In areas where the Hinesburg soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability. The slope is an additional limitation. It can be overcome by installing the distribution lines on the contour. Onsite investigation is needed to determine the suitability of a given area and the measures needed to overcome the limitations.

The capability subclass is VIIs.

CoD—Carver-Hinesburg loamy coarse sands, hilly. These hilly and steep, very deep, excessively drained and well drained soils are on side slopes, ridges, and hills in areas of ice-contact deposits. Slopes range from 15 to 35 percent. The soils make up about 0.1 percent (347 acres) of the survey area. They are mapped mainly in the Carver-Hinesburg-Nantucket general soil map unit. Areas are irregular in shape and generally range from 5 to 40 acres in size. They are about 45 percent Carver soil, 20 percent Hinesburg soil, and 35 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Carver soil is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of matted, partly decomposed and well decomposed organic material. The surface layer is light brownish gray, very friable loamy coarse sand about 3 inches thick. The subsoil is coarse sand about 33 inches thick. The upper 10 inches is strong brown and very friable, the next 9 inches is yellowish brown and very friable, and the lower 14 inches is brownish yellow and loose. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface layer of the Hinesburg soil is dark brown, very friable sandy loam about 10 inches thick. The subsoil is about 22 inches thick. It is yellowish brown, very friable loamy coarse sand in the upper 12 inches and light olive brown, very friable loamy sand in the lower 10 inches. The substratum extends to a depth of 65 inches or more. It may be mottled. It is light brownish gray, friable fine sandy loam in the upper 6 inches and light olive brown, firm sandy clay loam in the lower part.

Included with these soils in mapping are small areas of Hinckley, Nantucket, and Plymouth soils, small areas where slopes are less than 15 percent, and a few areas where stones are on the surface. Also included are areas where the Hinesburg soil is underlain by sandy and gravelly material below a depth of 60 inches. Included areas make up about 35 percent of this unit.

Permeability is very rapid in the subsoil and substratum of the Carver soil. Available water capacity is very low. The soil is droughty in late summer. Depth to the seasonal high water table is more than 6 feet.

Permeability is rapid in the subsoil of the Hinesburg soil and moderately slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet.

Most areas are used as woodland. These soils are generally unsuited to cultivated crops, hay, and pasture because of the low available water capacity, the slope, and a severe hazard of erosion.

These soils are poorly suited to woodland. The droughtiness and the slope are limitations affecting woodland management. Operating equipment may be hazardous on the steeper slopes. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, and black oak.

The slope is a limitation if these soils are used as sites for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The droughtiness of the Carver soil is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

These soils are limited as sites for septic tank absorption fields because the Carver soil may not adequately filter the effluent and the Hinesburg soil does not readily absorb the effluent. Because of the poor filtering capacity, the pollution of ground water is a hazard. In areas where the Hinesburg soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability. The slope is an additional limitation. It can be overcome by installing the distribution lines on the contour or in areas that were graded during construction of the dwelling. Onsite investigation is needed to determine the suitability of a given area and the measures needed to overcome the limitations.

The capability subclass is VIIs.

DeA—Deerfield loamy fine sand, 0 to 5 percent slopes. This very deep, nearly level and gently sloping, moderately well drained soil is in depressions, swales, and low areas adjacent to streams and ponds. It is on outwash plains and in areas of glacial lake deposits. It makes up about 0.4 percent (1,116 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed leaves and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is friable loamy fine sand about 10 inches thick. The upper 1 inch is dark gray, and the lower 9 inches is dark brown. The subsoil is about 19 inches thick. The upper 14 inches is yellowish brown, loose fine sand, and the lower 5 inches is light yellowish brown, mottled, loose sand. The substratum to a depth of 65 inches or more is light olive brown, mottled, stratified, loose sand and gravel.

Included with this soil in mapping are small areas of Amostown, Carver, Eastchop, Pipestone, and Sudbury soils. These soils make up about 20 percent of this unit.

Permeability is rapid in the subsoil of the Deerfield soil and rapid or very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is 1.5 to 3.0 feet in winter and early spring.

Most areas are used as woodland. Some areas are used as cropland, and a few areas have been developed for homesites.

This soil is suited to cultivated crops. The seasonal high water table and the low available water capacity are management concerns. The seasonal high water table commonly keeps the soil wet in early spring and delays farming activities. Irrigation is generally needed for the optimum growth of most cultivated crops during dry periods. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the available water capacity. Establishing diversions, growing cover crops, stripcropping, and farming across the slope or on the contour reduce the risk of erosion in gently sloping areas.

This soil is suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is fairly well suited to woodland. Seedling mortality is moderate because of the droughtiness. Minimizing surface disturbance helps to retain a spongelike mulch of leaves, which absorb precipitation. Designing regeneration cuts to optimize shade and reduce the rate of evapotranspiration helps to maintain the limited moisture supply. The most common trees are white oak, pitch pine, scarlet oak, and red maple.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with or without basements or as a site for septic tank absorption fields. Additions of fill and a regional drainage system help to overcome the wetness. Because of the rapid or very rapid permeability in the substratum, the soil may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing.

The capability subclass is IIIw.

Dm—Dumps, landfill. This map unit consists of areas used for residential or commercial trash disposal. It makes up about 0.1 percent (366 acres) of the survey area. It is mapped in isolated areas throughout the county. Most areas range from 10 to 100 acres in size.

Dumps are commonly called landfills or sanitary landfills and consist mostly of paper, metal, plastic, glass, rubble, cinders, and organic debris. The characteristics of each area vary, depending on the kinds of refuse and the manner in which it has been deposited and packed. All areas are subject to some degree of subsidence.

Included in this unit in mapping are sand and gravel pits and a few areas that have been reclaimed and revegetated.

Onsite investigation is needed to determine the suitability of areas of this unit for alternative land uses.

No capability subclass is assigned.

Dn—Dune land. This map unit consists of nearly level to very steep areas of shifting, windblown sand (fig. 9). These areas are devoid of vegetation. They make up approximately 0.4 percent of the survey area.

Figure 9.—An area of Dune land on the right and Hooksan sand, hilly, on the left.

The unit is mapped in one area 935 acres in size. This area is between Provincetown and Truro.

Generally, these areas are light brownish gray, loose sand to a depth of 60 inches or more.

Included in this unit in mapping are vegetated areas of Hooksan soils. Also included, in depressions, are areas where the seasonal high water table is near the surface. Included areas make up about 10 percent of this unit.

Permeability is very rapid throughout the Dune land. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Because of droughtiness, low fertility, and the slope, this unit is unsuited to cultivated crops, hay, pasture, and trees. It is unsuited to most nonfarm uses because of the unstable nature of the shifting sand, the very rapid permeability, and the slope.

No capability subclass is assigned.

EaA—Eastchop loamy fine sand, 0 to 3 percent slopes. This very deep, nearly level, excessively drained soil is in broad areas on outwash plains and in areas of glacial lake deposits. It makes up about 1.4 percent (3,567 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is very friable loamy fine sand about 6 inches thick. The upper 1 inch is very dark gray, and the lower 5 inches is yellowish brown. The subsoil is about 19 inches thick. The upper 4 inches is yellowish brown, very friable loamy fine sand; the next 9 inches is yellowish brown, very friable loamy fine sand; and the lower 6 inches is olive yellow, loose fine sand. The substratum to a depth of 65 inches or more is loose very fine sand. It is light yellowish brown in the upper 16 inches and light olive brown in the lower part.

Included with this soil in mapping are small areas of Carver, Enfield, Merrimac, and Hinckley soils. Also included are areas where slopes are more than 3 percent. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil and substratum of the Eastchop soil. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops because of the low available water capacity. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity, helps to maintain good tilth, and increases the organic matter content.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are eastern white pine, pitch pine, scarlet oak, and white oak.

This soil is suitable as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation. The soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIIs.

EaB—Eastchop loamy fine sand, 3 to 8 percent slopes. This very deep, gently sloping, excessively drained soil is in broad areas on outwash plains and on low hills in areas of glacial lake deposits. It makes up about 1.9 percent (4,738 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is very friable loamy fine sand about 6 inches thick. The upper 1 inch is very dark gray, and the lower 5 inches is yellowish brown. The subsoil is about 19 inches thick. The upper 4 inches is yellowish brown, very friable loamy fine sand; the next 9 inches is yellowish brown, very friable loamy fine sand; and the lower 6 inches is olive yellow, loose fine sand. The substratum to a depth of 65 inches or more is loose very fine sand. It is light yellowish brown in the upper 16 inches and light olive brown in the lower part.

Included with this soil in mapping are small areas of Carver, Enfield, Hinckley, and Merrimac soils and areas where slopes are less than 3 percent or more than 8 percent. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil and substratum of the Eastchop soil. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops. The low available water capacity and the susceptibility to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are eastern white pine, pitch pine, scarlet oak, and white oak. Generally, these trees are of poor quality.

This soil is suitable as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation. The soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIIs.

EaC—Eastchop loamy fine sand, 8 to 15 percent slopes. This very deep, strongly sloping, excessively drained soil is on small hills and ridges on outwash plains and in areas of ice-contact deposits. It makes up about 0.6 percent (1,415 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is very friable loamy fine sand about 6 inches thick. The upper 1 inch is very dark gray, and the lower 5 inches is yellowish brown. The subsoil is about 19 inches thick. The upper 4 inches is yellowish brown, very friable loamy fine sand; the next 9 inches is yellowish brown, very friable loamy fine sand; and the lower 6 inches is olive yellow, loose fine sand. The substratum to a depth of 65 inches or more is loose very fine sand. It is light yellowish brown in the upper 16 inches and light olive brown in the lower part.

Included with this soil in mapping are small areas of Carver, Hinckley, Merrimac, and Plymouth soils. Also included are areas where slopes are less than 8 percent or more than 15 percent. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil and substratum of the Eastchop soil. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are used as pasture or hayland.

This soil is poorly suited to cultivated crops. The low available water capacity and the susceptibility to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are eastern white pine, pitch pine, scarlet oak, and white oak. Generally, these trees are of poor quality.

The slope is the main limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil is poorly suited to septic tank absorption fields because of the slope and the rapid permeability. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IVs.

EnA—Enfield silt loam, 0 to 3 percent slopes. This very deep, nearly level, well drained soil is in broad areas on outwash plains. It makes up about 3.3 percent (8,474 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 1,000 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed leaves and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is brown, very friable silt loam about 1 inch thick. The subsoil is about 30 inches thick. It grades from reddish brown and strong brown in the upper part to yellowish brown in the lower part. It is friable silt loam in the upper 28 inches and friable very fine sandy loam in the lower 2 inches. The substratum extends to a depth of 65 inches or more. It is yellowish brown, friable gravelly loamy coarse sand in the upper 2 inches and brownish yellow, light yellowish brown, and pale brown, loose, stratified sand and gravel in the lower part.

Included with this soil in mapping are small areas of Carver, Hinckley, and Merrimac soils and areas where slopes are more than 3 percent. Included soils make up about 20 percent of this unit.

Permeability is moderate in the subsoil of the Enfield soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and some areas are used as cropland.

This soil is well suited to cultivated crops. It is among the most productive soils in the survey area. Incorporating crop residue and manure into the surface layer increases the organic matter content and improves tilth.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is well suited to woodland. No major hazards or limitations restrict woodland management. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are white oak, eastern white pine, pitch pine, scarlet oak, and black oak.

This soil is suitable as a site for buildings with or without basements. It readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability class is I.

EnB—Enfield silt loam, 3 to 8 percent slopes. This very deep, gently sloping, well drained soil is in broad, undulating areas and on low hills on outwash plains. It makes up about 1.4 percent (3,519 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and from 5 to 800 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed leaves and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is brown, very friable silt loam about 1 inch thick. The subsoil is about 30 inches thick. It grades from reddish brown and strong brown in the upper part to yellowish brown in the lower part. It is friable silt loam in the upper 28 inches and friable very fine sandy loam in the lower 2 inches. The substratum extends to a depth of 65 inches or more. It is yellowish brown, friable gravelly loamy coarse sand in the upper 2 inches and brownish yellow, light yellowish brown, and pale brown, loose, stratified sand and gravel in the lower part.

Included with this soil in mapping are small areas of Carver, Hinckley, and Merrimac soils and areas where slopes are less than 3 percent or more than 8 percent. Included soils make up about 20 percent of this unit.

Permeability is moderate in the subsoil of the Enfield soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and some areas are used as cropland.

This soil is well suited to cultivated crops. It is among the most productive soils in the survey area. Good tilth can be easily maintained. Erosion is a management concern. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is well suited to woodland. No major hazards or limitations restrict woodland management. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are white oak, eastern white pine, pitch pine, scarlet oak, and black oak.

This soil is suitable as a site for buildings with or without basements. It readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIe.

EnC—Enfield silt loam, 8 to 15 percent slopes. This very deep, strongly sloping, well drained soil is on small hills and ridges on outwash plains and in areas of ice-contact deposits. It makes up about 0.3 percent (732 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed leaves and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is brown, very friable silt loam about 1 inch thick. The subsoil is about 30 inches thick. It grades from reddish brown and strong brown in the upper part to yellowish brown in the lower part. It is friable silt loam in the upper 28 inches and friable very fine sandy loam in the lower 2 inches. The substratum extends to a depth of 65 inches or more. It is yellowish brown, friable gravelly loamy coarse sand in the upper 2 inches and brownish yellow, light yellowish brown, and pale brown, loose, stratified sand and gravel in the lower part.

Included with this soil in mapping are small areas of Carver, Hinckley, Merrimac, and Plymouth soils. Also included are a few areas where slopes are less than 8 percent or more than 15 percent. Included soils make up about 30 percent of this unit.

Permeability is moderate in the subsoil of the Enfield soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. A few areas have been developed for homesites.

This soil is suited to cultivated crops. Good tilth can be easily maintained. Erosion is a management concern. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is well suited to woodland. It is among the most productive soils in the survey area. No major hazards or limitations restrict woodland management. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are white oak, eastern white pine, pitch pine, scarlet oak, and black oak.

The slope is a limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is limited as a site for septic tank absorption fields because of the slope. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IIIe.

Fm—Freetown mucky peat, 0 to 1 percent slopes, ponded. This very deep, level, very poorly drained soil is on outwash plains, on moraines, and in areas of glacial lake deposits. It is in depressions and in areas adjacent to streams, ponds, and lakes. Generally, 1 to 2 feet of water covers the surface for most of the year (fig. 10). Aquatic vegetation is on the surface. The soil makes up about 0.4 percent (1,063 acres) of the survey area. It is mapped throughout the county. Areas are irregularly shaped and range from 5 to 100 acres in size.

Typically, the surface layer is dark reddish brown mucky peat about 2 inches thick. Below this to a depth of 65 inches or more are alternating layers of dark reddish brown and very dusky red muck and mucky peat.

Included with this soil in mapping are small areas of Swansea soils and areas that are not covered by water. Included soils make up about 10 percent of this unit.

Figure 10.—An area of Freetown mucky peat, 0 to 1 percent slopes, ponded.

Permeability is moderate or moderately rapid throughout the Freetown soil. Available water capacity is very high.

Most areas support either emergent wetland vegetation or shrubby vegetation. This soil is unsuited to cultivated crops, hay, and pasture because of the ponding. Draining the soil is difficult because suitable outlets are not readily available and cannot be maintained.

This soil is unsuited to woodland because of the ponding, the wetness, a high seedling mortality rate, and a hazard of windthrow. Optimum growth and survival of seedlings are not expected. Because of the ponding and low soil strength, the use of equipment should be limited to periods when the soil is frozen. Generally, trees are not common on this soil, but some areas support Atlantic white cedar and red maple.

This soil is unsuited to most nonfarm uses because of the ponding and low strength in the organic material. Alternative sites should be selected.

This soil is well suited to wetland wildlife habitat. The common native plant communities provide adequate food and cover for nesting areas.

The capability subclass is VIIw.

Fs—Freetown and Swansea mucks, 0 to 1 percent slopes. These very deep, level, very poorly drained soils are on outwash plains and moraines and in areas of glacial lake deposits. They are in depressions and in areas adjacent to streams, ponds, and lakes. They make up about 1.4 percent (3,537 acres) of the survey area. They are mapped throughout the county. Areas are irregular in shape and range from 3 to 200 acres in size. They consist of Freetown soil, Swansea soil, or both. These soils were not separated in mapping because no major differences affect their use and management.

Typically, the Freetown soil has a surface layer of dark reddish brown mucky peat about 2 inches thick. Below this to a depth of 65 inches or more are alternating layers of dark reddish brown and very dusky red muck and mucky peat.

Typically, the surface layer of the Swansea soil is black muck about 2 inches thick. Below this is very dark gray and black muck about 26 inches thick. The substratum extends to a depth of 65 inches or more. The upper part is 3 inches of dark yellowish brown, very friable loamy sand and 8 inches of black muck. The next 8 inches is very dark grayish brown, friable loamy sand. The lower part is 18 inches of dark yellowish brown, very friable loamy sand.

Included with these soils in mapping are areas of Berryland, Maybid, and Pipestone soils. These included soils make up about 10 percent of this unit.

Permeability is moderate or moderately rapid throughout the Freetown soil. Available water capacity is very high. A seasonal high water table is at or near the surface for most of the year.

Permeability is moderate or moderately rapid in the organic part of the Swansea soil and very rapid in the mineral substratum. Available water capacity is very high. A seasonal high water table is at or near the surface for most of the year.

Most areas are wooded or support shrubby vegetation. These soils are unsuited to cultivated crops, hay, and pasture because of the seasonal high water table. Draining the soil is difficult because suitable outlets are not readily available and cannot be maintained.

These soils are poorly suited to woodland because of the wetness, a high seedling mortality rate, and a hazard of windthrow. Optimum growth and survival of seedlings are not expected. Because of low soil strength, equipment use should be limited to periods when the soils are frozen. The most common trees are red maple, tupelo, and Atlantic white cedar.

These soils are generally unsuitable for most nonfarm uses because of the wetness and low strength in the organic material. Alternative sites should be selected.

These soils are well suited to wetland wildlife habitat. The common native plant communities provide adequate food and cover for nesting areas.

The capability subclass is Vw.

Ft—Freetown coarse sand, 0 to 1 percent slopes. This very deep, level, very poorly drained soil is on outwash plains, on moraines, and in areas of glacial lake deposits. It is in depressions and in areas adjacent to streams, ponds, and lakes. Areas of this soil have been altered for the production of cranberries. Most have a network of open ditches for drainage control. The soil makes up about 1.6 percent (4,153 acres) of the survey area. Isolated areas of the soil are mapped throughout the county. They are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface layer is brown, loose coarse sand about 10 inches thick. Below this to a depth of 65 inches or more are alternating layers of dark reddish brown and very dusky red muck and mucky peat.

Included with this soil in mapping are areas of Berryland, Pipestone, and Swansea soils. These soils make up about 15 percent of this unit.

Permeability is very rapid in the mineral surface layer of the Freetown soil and moderate or moderately rapid in the organic underlying material. Available water capacity is very high. The seasonal high water table, which is controlled for cranberry production, is within a depth of 1.5 feet.

Most areas are used for cranberry production. Some areas have been abandoned and support shrubby vegetation. Because of the seasonal high water table, this soil is unsuited to cultivated crops other than cranberries and blueberries.

This soil is poorly suited to woodland because of the wetness, a high seedling mortality rate, and a hazard of windthrow. Optimum growth and survival of seedlings are not expected. Generally, trees are not common in areas of this soil.

This soil is generally unsuited to most nonfarm uses because of the wetness and low strength in the organic material. Alternative sites should be selected.

The capability subclass is IVw.

HeA—Hinckley sandy loam, 0 to 3 percent slopes. This very deep, nearly level, excessively drained soil is in broad areas on outwash plains. It makes up about 0.2 percent (468 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is very friable sandy loam about 2 inches thick. The upper 1 inch is black, and the lower 1 inch is dark grayish brown. The subsoil is about 15 inches thick. The upper 1 inch is dark reddish brown, friable gravelly sandy loam; the next 7 inches is yellowish brown, friable gravelly sandy loam; and the lower 7 inches is yellowish brown, friable gravelly loamy coarse sand. The substratum extends to a depth of 65 inches or more. It is brownish yellow, loose very gravelly coarse sand in the upper 37 inches and light yellowish brown, loose gravelly coarse sand in the lower part.

Included with this soil in mapping are small areas of Carver, Enfield, Merrimac, and Plymouth soils. Also included are areas where slopes are more than 3 percent. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil of the Hinckley soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops because of the low available water capacity. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity, helps to maintain good tilth, and increases the organic matter content.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, poorly formed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are eastern pitch pine, white oak, scarlet oak, black oak, and eastern white pine. Generally, these trees are of poor quality.

This soil is suitable as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation. The soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIIs.

HeB—Hinckley sandy loam, 3 to 8 percent slopes. This very deep, gently sloping, excessively drained soil is in broad hummocky areas and on low hills on outwash plains. It makes up about 0.6 percent (1,595 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 1,000 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is very friable sandy loam about 2 inches thick. The upper 1 inch is black, and the lower 1 inch is dark grayish brown. The subsoil is about 15 inches thick. The upper 1 inch is dark reddish brown, friable gravelly sandy loam; the next 7 inches is yellowish brown, friable gravelly sandy loam; and the lower 7 inches is yellowish brown, friable gravelly loamy coarse sand. The substratum extends to a depth of 65 inches or more. It is brownish yellow, loose very gravelly coarse sand in the upper 37 inches and light yellowish brown, loose gravelly coarse sand in the lower part.

Included with this soil in mapping are small areas of Carver, Enfield, Merrimac, and Plymouth soils. Also included are areas where slopes are less than 3 percent or more than 8 percent. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil of the Hinckley soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops. The low available water capacity and the hazard of erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are eastern pitch pine, white oak, scarlet oak, black oak, and eastern white pine. Generally, these trees are of poor quality.

This soil is suitable as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation. The soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIIs.

HkC—Hinckley gravelly sandy loam, 8 to 15 percent slopes. This very deep, strongly sloping, excessively drained soil is on small hills and ridges on outwash plains and in areas of ice-contact deposits. It makes up about 0.2 percent (545 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is very friable gravelly sandy loam about 2 inches thick. The upper 1 inch is black, and the lower 1 inch is dark grayish brown. The subsoil is about 15 inches thick. The upper 1 inch is dark reddish brown, friable gravelly sandy loam; the next 7 inches is yellowish brown, friable gravelly sandy loam; and the lower 7 inches is yellowish brown, friable gravelly loamy coarse sand. The substratum extends to a depth of 65 inches or more. It is brownish yellow, loose very gravelly coarse sand in the upper 37 inches and light yellowish brown, loose gravelly coarse sand in the lower part.

Included with this soil in mapping are small areas of Carver, Merrimac, and Plymouth soils. Also included are areas where slopes are less than 8 percent or more than 15 percent. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil of the Hinckley soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is poorly suited to cultivated crops. The low available water capacity and the hazard of erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are eastern pitch pine, white oak, scarlet oak, black oak, and eastern white pine. Generally, these trees are of poor quality.

The slope is the main limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil is poorly suited to septic tank absorption fields because of the slope and the rapid or very rapid permeability. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IVs.

HkD—Hinckley gravelly sandy loam, 15 to 35 percent slopes. This very deep, moderately steep and steep, excessively drained soil is on the sides of depressions and swales on outwash plains and on hills and ridges in areas of ice-contact deposits. It makes up about 0.4 percent (907 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is very friable gravelly sandy loam about 2 inches thick. The upper 1 inch is black, and the lower 1 inch of dark grayish brown. The subsoil is about 15 inches thick. The upper 1 inch is dark reddish brown, friable gravelly sandy loam; the next 7 inches is yellowish brown, friable gravelly sandy loam; and the lower 7 inches is yellowish brown, friable gravelly loamy coarse sand. The substratum extends to a depth of 65 inches or more. It is brownish yellow, loose very gravelly coarse sand in the upper 37 inches and light yellowish brown, loose gravelly coarse sand in the lower part.

Included with this soil in mapping are small areas of Carver, Merrimac, and Plymouth soils and areas where slopes are less than 15 percent. Also included are isolated areas where stones and boulders are on the surface. Included soils make up about 35 percent of this unit.

Permeability is rapid in the subsoil of the Hinckley soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. This soil is generally unsuited to cultivated crops, hay, and pasture because of the low available water capacity, the slope, and a severe hazard of erosion.

Because of the droughtiness, this soil is poorly suited to woodland. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Diseased, deformed, and otherwise undesirable trees should be removed when the stands are thinned. The most common trees are eastern pitch pine, white oak, scarlet oak, black oak, and eastern white pine. Generally, these trees are of poor quality.

The slope is the main limitation if this soil is used as a site for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil is poorly suited to septic tank absorption fields because of the slope and the rapid or very rapid permeability. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

HnA—Hinesburg sandy loam, 0 to 3 percent slopes. This very deep, nearly level, well drained soil is in areas of glacial lake deposits on broad plains. It makes up about 0.1 percent (233 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface layer is dark brown, very friable sandy loam about 10 inches thick. The subsoil is about 22 inches thick. The upper 12 inches is yellowish brown, very friable loamy coarse sand, and the lower 10 inches is light olive brown, very friable loamy sand. The substratum extends to a depth of 65 inches or more. It is mottled. It is light brownish gray, friable fine sandy loam in the upper 6 inches and light olive brown, firm sandy clay loam in the lower part.

Included with this soil in mapping are small areas of Amostown, Carver, and Plymouth soils and areas where slopes are more than 3 percent. Also included are areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil of the Hinesburg soil and moderately slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is above the loamy and silty substratum in late fall, in winter and spring, and after periods of heavy precipitation.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. Irrigation is needed for maximum crop yields. Mixing crop residue and manure into the surface helps to maintain good tilth and increases the organic matter content and the available water capacity.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is fairly well suited to woodland. No major hazards or limitations restrict woodland management. Minimizing surface disturbance helps to retain a spongelike mulch of leaves, which absorb precipitation and help to maintain the limited moisture supply. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, and eastern white pine.

In areas where this soil has a seasonal high water table, wetness is a limitation on sites for dwellings with basements and on sites for septic tank absorption fields. The moderately slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption fields helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the wetness and slow permeability.

The capability subclass is IIs.

HnB—Hinesburg sandy loam, 3 to 8 percent slopes. This very deep, gently sloping, well drained soil is in undulating areas and on low hills in areas of glacial lake plains. It makes up about 0.1 percent (386 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface layer is dark brown, very friable sandy loam about 10 inches thick. The subsoil is about 22 inches thick. The upper 12 inches is yellowish brown, very friable loamy coarse sand, and the lower 10 inches is light olive brown, very friable loamy sand. The substratum extends to a depth of 65 inches or more. It is mottled. It is light brownish gray, friable fine sandy loam in the upper 6 inches and light olive brown, firm sandy clay loam in the lower part.

Included with this soil in mapping are small areas of Amostown, Carver, and Plymouth soils and areas where slopes are less than 3 percent or more than 8 percent. Also included are areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil of the Hinesburg soil and moderately slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is above the loamy and silty substratum in late fall, in winter and spring, and after periods of heavy precipitation.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. Erosion is a management concern. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content and the available water capacity.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is fairly well suited to woodland. Minimizing surface disturbance helps to retain a spongelike mulch of leaves, which absorb precipitation and help to maintain the limited moisture supply. Removal or contro of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, and eastern white pine.

In areas where this soil has a seasonal high water table, wetness is a limitation on sites for dwellings with basements and on sites for septic tank absorption fields. The moderately slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption fields helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the wetness and slow permeability.

The capability subclass is IIs.

HnC—Hinesburg sandy loam, 8 to 15 percent slopes. This very deep, strongly sloping, well drained soil is on small hills and ridges in areas of glacial lake deposits. It makes up about 0.1 percent (115 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is dark brown, very friable sandy loam about 10 inches thick. The subsoil is about 22 inches thick. The upper 12 inches is yellowish brown, very friable loamy coarse sand, and the lower 10 inches is light olive brown, very friable loamy sand. The substratum extends to a depth of 65 inches or more. It is mottled. It is light brownish gray, friable fine sandy loam in the upper 6 inches and light olive brown, firm sandy clay loam in the lower part.

Included with this soil in mapping are small areas of Carver and Plymouth soils and areas where slopes are less than 8 percent or more than 15 percent. Also included are many areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included soils make up about 35 percent of this unit.

Permeability is rapid in the subsoil of the Hinesburg soil and moderately slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is above the loamy and silty substratum in late fall, in winter and spring, and after periods of heavy precipitation.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is suited to cultivated crops. Good tilth can be easily maintained. Erosion is a management concern. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content and the available water capacity.

This soil is suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is fairly well suited to woodland. Minimizing surface disturbance helps to retain a spongelike mulch of leaves, which absorb precipitation and help to maintain the limited moisture supply. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, and eastern white pine.

The slope is a limitation on sites for dwellings with or without basements. Land grading helps to overcome the slope. Erosion is a hazard in disturbed areas. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. In areas where the soil has a seasonal high water table, wetness is a limitation on sites for dwellings with basements and on sites for septic tank absorption fields. The slope and the moderately slow permeability in the substratum also are limitations on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption fields helps to overcome the restricted permeability. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the wetness and slow permeability.

The capability subclass is IIIe.

HoC—Hooksan sand, rolling. This very deep, undulating and rolling, excessively drained soil is on vegetated sand dunes along the coast. Slopes are complex and generally range from 3 to 15 percent. The soil makes up about 2.3 percent (5,787 acres) of the survey area. It is mapped in the Hooksan-Beaches-Dune land general soil map unit. Areas are elongated or irregular in shape and parallel the shoreline. They range from 5 to 600 acres in size.

Typically, the surface layer is pale brown, loose sand about 20 inches thick. The upper part of the substratum also is pale brown, loose sand. The lower part to a depth of 65 inches or more is light yellowish brown, loose sand.

Included with this soil in mapping are small areas of Berryland, Ipswich, Matunuck, Pawcatuck, and Pipestone soils; small, narrow areas of Beaches; and areas of Dune land, which are not vegetated. Also included, in Provincetown, are wooded areas of Hooksan soils that commonly have a better developed profile than this Hooksan soil. Included areas make up about 10 percent of this unit.

Permeability is very rapid throughout the Hooksan soil. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Most areas support beachgrass. Summer cottages are located in some areas. Many areas in Provincetown are wooded.

This soil is unsuited to cultivated crops, hay, and pasture because of droughtiness, low fertility, and the slope.

This soil is poorly suited to trees. Establishing trees is difficult because of the droughtiness and low fertility of the soil. Because the soil is close to salt water, the strong prevailing winds and salt spray severely limit tree growth. The common vegetation includes beachgrass, poison ivy, beach plum, and bayberry.

This soil is generally unsuited to most nonfarm uses because of the very rapid permeability and the susceptibility to erosion after the plant cover has been disturbed.

The capability subclass is VIIs.

HoD—Hooksan sand, hilly. This very deep, hilly and steep, excessively drained soil is on vegetated sand dunes along the coast. Slopes are complex and generally range from 15 to 35 percent. The soil makes up about 0.9 percent (2,325 acres) of the survey area. It is mapped in the Hooksan-Beaches-Dune land general soil map unit. Areas are elongated or irregular in shape and parallel the shoreline. They range from 10 to 200 acres in size.

Typically, the surface layer is pale brown, loose sand about 20 inches thick. The upper part of the substratum also is pale brown, loose sand. The lower part to a depth of 65 inches or more is light yellowish brown, loose sand.

Included with this soil in mapping are small areas of Berryland, Ipswich, Matunuck, Pawcatuck, and Pipestone soils; small, narrow areas of Beaches; and areas of Dune land, which are not vegetated. Also included, in Provincetown, are wooded areas of Hooksan soils that commonly have a better developed profile than this Hooksan soil. Included areas make up about 10 percent of this unit.

Permeability is very rapid throughout the Hooksan soil. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Most areas support beachgrass. Many areas in Provincetown are wooded. Some areas support low shrubs.

This soil is unsuited to cultivated crops, hay, and pasture because of droughtiness, low fertility, and the slope.

This soil is poorly suited to trees. Establishing trees is difficult because of the droughtiness and low fertility of the soil. Because the soil is close to salt water, the strong prevailing winds and salt spray severely limit tree growth. The common vegetation includes beachgrass, poison ivy, beach plum, and bayberry.

This soil is generally unsuited to most nonfarm uses because of the slope, the very rapid permeability, and the susceptibility to erosion after the plant cover has been disturbed.

The capability subclass is VIIs.

HxC—Hooksan-Dune land complex, hilly. This map unit consists of a very deep, hilly and steep, excessively drained Hooksan soil and areas of Dune land. The unit is on hills and ridges within areas of sand dunes (fig. 11). It makes up about 1.3 percent (3,227 acres) of the survey area. It is mapped in the Hooksan-Beaches-Dune land general soil map unit. Slopes range from 15 to 35 percent. Areas are elongated or irregular in shape and parallel the shoreline. They range from 10 to 1,000 acres in size. They are about 50 percent Hooksan soil, 45 percent Dune land, and 5 percent included soils. The Hooksan soil and Dune land occur as areas so intricately mixed that separating them in mapping is not practical.

Typically, the surface layer of the Hooksan soil is pale brown, loose sand about 20 inches thick. The upper part of the substratum also is pale brown, loose sand. The lower part to a depth of 65 inches or more is light yellowish brown, loose sand.

Typically, Dune land is light brownish gray, loose sand to a depth of 65 inches or more.

Included in this unit in mapping are small areas of Berryland and Pipestone soils. These soils make up about 5 percent of this unit.

Permeability is very rapid throughout the Hooksan soil and Dune land. Available water capacity is very low. Depth to the seasonal high water table is more than 6 feet.

Areas of the Hooksan soil generally support beachgrass. A few areas support low shrubs and trees. Areas of Dune land are not vegetated.

This unit is unsuited to cultivated crops, hay, and pasture because of droughtiness, low fertility, and the slope.

This map unit is poorly suited to trees. Establishing trees is difficult because of the droughtiness and low fertility. Because the unit is close to salt water, the strong prevailing winds and salt spray severely limit tree growth. The common vegetation on the Hooksan soil includes beachgrass, poison ivy, beach plum, and bayberry.

This map unit is generally unsuited to most nonfarm uses because of the very rapid permeability, the slope, and the susceptibility to erosion after the plant cover has been disturbed.

The capability subclass is VIIs.

ImA—Ipswich, Pawcatuck, and Matunuck peats, 0 to 1 percent slopes. These very deep, level, very poorly drained soils are in tidal areas that are subject to daily inundation by salt water. They are adjacent to shore areas and brackish ponds. They make up about 5.6 percent (14,176 acres) of the survey area. Areas are irregular in shape and range from 5 to 2,500 acres in size. They consist of Ipswich soil, Pawcatuck soil, Matunuck soil, or a combination of these. The total acreage is about 60 percent Ipswich soil, 25 percent Pawcatuck soil, 10 percent Matunuck soil, and 5 percent other soils. The soils are mapped together

Figure 11.—An area of Hooksan-Dune land complex, hilly.

because no major differences affect their use and management.

Typically, the surface layer of the Ipswich soil is dark grayish brown, nonsticky peat about 7 inches thick. The subsurface layer is dark grayish brown, nonsticky mucky peat about 33 inches thick. Below this to a depth of 65 inches or more is very dark grayish brown, nonsticky mucky peat.

Typically, the surface layer of the Pawcatuck soil is very dark grayish brown, nonsticky peat about 13 inches thick. The subsurface layer is very dark gray, nonsticky peat in the upper 3 inches and dark grayish brown nonsticky peat in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is grayish brown, loose coarse sand in the upper 8 inches and dark gray, very friable loamy coarse sand in the lower part.

Typically, the surface layer of the Matunuck soil is dark grayish brown, nonsticky peat about 13 inches thick. The substratum extends to a depth of 65 inches or more. The upper 30 inches is grayish brown, loose coarse sand; the next 3 inches is dark gray, loose coarse sand; and the lower part is very dark gray, very friable coarse sandy loam.

Included with these soils in mapping are small areas of Hooksan soils, Beaches, and Dune land. Also included are areas where the organic surface layer is less than 8 inches thick. Included areas make up about 5 percent of this unit.

Permeability is moderate to rapid throughout the Ipswich soil. Available water capacity is high.

Permeability is moderate to rapid in the organic part of the Pawcatuck soil and very rapid in the sandy substratum. Available water capacity is high.

Permeability is rapid in the surface layer of the Matunuck soil and rapid or very rapid in the substratum.

Figure 12.—An area of Ipswich, Pawcatuck, and Matunuck peats, 0 to 1 percent slopes. These soils are flooded daily by tidal water.

Available water capacity is moderate.

Most areas support salt-tolerant grasses. All three soils are subject to tidal flooding twice a day (fig. 12). The flooding limits most uses other than wetland wildlife habitat.

The capability subclass is VIIIw.

MaA—Maybid silt loam, 0 to 3 percent slopes. This very deep, nearly level, very poorly drained soil is in depressions, at the base of swales, and in low areas bordering ponds, streams, and swamps. It formed in areas of glacial lake deposits. It makes up about 0.1 percent (172 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 60 acres in size.

Typically, this soil has an organic surface layer. This layer is about 1 inch of loose, undecomposed leaves and twigs and 2 inches of dark reddish brown muck. The mineral surface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is gray, mottled, friable silty clay loam about 13 inches thick. The substratum to a depth of 65 inches or more is mottled, firm silty clay loam. The upper 10 inches is gray, the next 6 inches is light olive brown, the next 11 inches is gray, and the lower part is greenish gray.

Included with this soil in mapping are small areas of Berryland, Scitico, Swansea, and Walpole soils. Also included are areas where the content of clay is less than 35 percent. Included soils make up about 30 percent of this unit.

Permeability is moderately slow in the surface layer of the Maybid soil and slow or very slow in the subsoil and substratum. Available water capacity is high. A seasonal high water table is at or near the surface during most of the year.

Most areas are used as woodland. Some areas support shrubby vegetation.

This soil is very poorly suited to cultivated crops. Wetness is a major management concern. It severely limits crop growth and interferes with the use of machinery. Surface drains, diversions, tile drains, or a combination of these can help to remove excess water.

This soil is very poorly suited to hay and pasture. The seasonal high water table is a limitation. Installing a drainage system and planting water-tolerant species improve the suitability for hay and pasture. Restricted grazing when the soil is wet and proper stocking rates help to maintain plant density and desirable species.

This soil is poorly suited to woodland because of the wetness and a high seedling mortality rate. The optimal growth and survival of seedlings are not expected. Because of low soil strength, the use of equipment should be limited to periods when the soil is dry or frozen. Onsite investigation may identify areas where trees can be planted if special management is applied. The most common trees are red maple, tupelo, and holly.

The seasonal high water table limits the use of this soil as a site for dwellings and septic tank absorption fields. The slow or very slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Alternative sites should be selected.

This soil is well suited to wetland wildlife habitat. The common native plant communities provide adequate food and cover for nesting areas.

The capability subclass is VIw.

MbA—Maybid Variant silty clay loam, 0 to 1 percent slopes. This very deep, level, poorly drained soil is in low areas along the Herring River in the northwestern section of the town of Wellfleet. The soil formed in tidal marsh deposits that are no longer subject to tidal flooding and have been drained of salt water. It makes up about 0.1 percent of the survey area. It is mapped mainly in the Ipswich-Pawcatuck-Matunuck general soil map unit. Areas are irregular in shape and are about 360 acres in size.

Typically, the surface layer is about 3 inches of black muck. Below this is a layer of dark grayish brown, mottled, friable silty clay loam about 12 inches thick. The subsoil is dark grayish brown, friable silty clay loam about 6 inches thick. The substratum extends to a depth of 65 inches or more. The upper 7 inches is dark greenish gray, mottled, slightly plastic, slightly sticky silty clay loam, and the lower part is very dark gray, slightly plastic, slightly sticky loam.

Included with this soil in mapping are small areas of Berryland and Swansea soils. Also included, in an area of limited extent upstream from tidal gates, are soils that are coarser textured than the Maybid Variant soil and are affected by the leakage of water past the gates. Included soils make up about 10 percent of this unit.

Permeability is moderate to slow in the subsoil of the Maybid Variant soil and slow or very slow in the substratum. Available water capacity is high. Depth to the seasonal high water table is 1.0 to 1.5 feet.

Most areas are used as woodland or support shrubby vegetation. Some open areas support grasses.

This soil is unsuited to most cultivated crops and to hay and pasture. An extremely acid reaction in the surface layer and subsoil, sulfates in the substratum, and the seasonal high water table severely limit most farm uses.

This soil is unsuited to woodland because of the extremely acid reaction in the surface layer and subsoil, the sulfates in the substratum, and the seasonal high water table. Because of low soil strength, the use of equipment should be limited to periods when the soil is dry or frozen. The most common trees are chokecherry, pitch pine, gray birch, and shadbush.

The seasonal high water table is a limitation if this soil is used as a site for dwellings or septic tank absorption fields. The slow or very slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Alternative sites should be selected.

This soil is well suited to wetland wildlife habitat. The common native plant communities provide adequate food and cover for nesting areas.

The capability subclass is VIIIw.

MeA—Merrimac sandy loam, 0 to 3 percent slopes. This very deep, nearly level, well drained soil is mainly in broad areas on outwash plains but is also on glacial lake plains. It makes up about 2.4 percent (6,012 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 500 acres in size.

Typically, the surface is covered with an organic layer of loose, undecomposed pine needles, leaves, and twigs about 3 inches thick. The surface layer is very friable sandy loam about 3 inches thick. The upper 1 inch is black, and the lower 2 inches is light brownish gray. The subsoil is sandy loam about 21 inches thick.

The upper 4 inches is strong brown and very friable, the next 10 inches is yellowish brown and friable, and the lower 7 inches is brownish yellow and friable. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Carver, Enfield, and Hinckley soils. Also included are areas where slopes are more than 3 percent. Included soils make up about 20 percent of this unit.

Permeability is moderately rapid in the subsoil of the Merrimac soil and rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and some areas are used as cropland.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. Droughtiness during periods of low rainfall is a management concern. Irrigation is needed for maximum crop yields. Conservation tillage, cover crops, and incorporation of grasses and legumes into the cropping system improve tilth. Mixing crop residue and manure into the surface layer improves tilth and increases the available water capacity.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

This soil is suitable as a site for buildings with or without basements. It readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIs.

MeB—Merrimac sandy loam, 3 to 8 percent slopes. This very deep, gently sloping, well drained soil is mainly in broad areas and on low hills on outwash plains but is also in areas of glacial lake deposits. It makes up about 1.7 percent (4,424 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface is covered with an organic layer of loose, undecomposed pine needles, leaves, and twigs about 3 inches thick. The surface layer is very friable sandy loam about 3 inches thick. The upper 1 inch is black, and the lower 2 inches is light brownish gray. The subsoil is sandy loam about 21 inches thick. The upper 4 inches is strong brown and very friable, the next 10 inches is yellowish brown and friable, and the lower 7 inches is brownish yellow and friable. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Carver, Enfield, and Hinckley soils. Also included are areas where slopes are less than 3 percent or more than 8 percent. Included soils make up about 20 percent of this unit.

Permeability is moderately rapid in the subsoil of the Merrimac soil and rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Many areas have been developed for homesites, and some areas are used as cropland.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. Erosion and droughtiness during periods of low rainfall are management concerns. Irrigation is needed for maximum crop yields. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the available water capacity.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

This soil is suitable as a site for buildings with or without basements. It readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIs.

MeC—Merrimac sandy loam, 8 to 15 percent slopes. This very deep, strongly sloping, well drained soil is on small hills and ridges on outwash plains and in areas of ice-contact deposits. It makes up about 0.6 percent (1,550 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface is covered with an organic layer of loose, undecomposed pine needles, leaves, and twigs about 3 inches thick. The surface layer is very friable sandy loam about 3 inches thick. The upper 1 inch is black, and the lower 2 inches is light brownish gray. The subsoil is sandy loam about 21 inches thick. The upper 4 inches is strong brown and very friable, the next 10 inches is yellowish brown and friable, and the lower 7 inches is brownish yellow and friable. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Carver, Enfield, Hinckley, and Plymouth soils. Also included are a few areas where slopes are less than 8 percent or more than 15 percent. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Merrimac soil and rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is suited to cultivated crops. Good tilth can be easily maintained. Erosion and droughtiness during periods of low rainfall are management concerns. Irrigation is needed for maximum crop yields. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the available water capacity.

This soil is well suited to hay and pasture. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is limited as a site for septic tank absorption fields because of the slope and the rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IIIe.

MeD—Merrimac sandy loam, 15 to 25 percent slopes. This very deep, moderately steep, well drained soil is on the sides of depressions and swales on outwash plains and on hills and ridges in areas of ice-contact deposits. It makes up about 0.1 percent (174 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface is covered with an organic layer of loose, undecomposed pine needles, leaves, and twigs about 3 inches thick. The surface layer is very friable sandy loam about 3 inches thick. The upper 1 inch is black, and the lower 2 inches is light brownish gray. The subsoil is sandy loam about 21 inches thick. The upper 4 inches is strong brown and very friable, the next 10 inches is yellowish brown and friable, and the lower 7 inches is brownish yellow and friable. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are small areas of Carver, Eastchop, Hinckley, and Plymouth soils. Also included are areas where slopes are less than 15 percent or more than 25 percent. Included soils make up about 35 percent of this unit.

Permeability is moderately rapid in the subsoil of the Merrimac soil and rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. This soil is poorly suited to cultivated crops because of the hazard of erosion, the slope, and droughtiness during periods of low rainfall.

This soil is suited to hay and pasture. The slope limits the use of equipment. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. The slope limits the use of equipment. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if this soil is used as a site for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is limited as a site for septic tank absorption fields because of the slope and the rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IVe.

Mg—Merrimac-Udipsamments-Urban land complex. This map unit consists of nearly level and gently sloping areas of a Merrimac soil; Udipsamments, which are areas that have been excavated or filled for construction projects; and Urban land. This unit makes up about 0.5 percent (1,194 acres) of the survey area. It is mapped only on the Otis Air Force and Camp Edwards military base complex in the northeastern section of the Enfield-Merrimac-Carver general soil map unit. Most areas are rectangular and range from 25 to 700 acres in size. They are about 30 percent Merrimac soil, 30 percent Udipsamments, 20 percent Urban land, and 20 percent included soils. The components of the unit occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface layer of the Merrimac soil is dark yellowish brown, very friable sandy loam about 7 inches thick. The subsoil is sandy loam about 21 inches thick. The upper 4 inches is strong brown and very friable, the next 10 inches is yellowish brown and friable, and the lower 7 inches is brownish yellow and friable. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, Udipsamments have a surface layer of yellowish brown, friable loamy sand about 4 inches thick. Below this to a depth of 60 inches or more is light yellowish brown, loose coarse sand.

Urban land consists of developed areas that have been altered or obscured by urban works and structures.

Included in this unit in mapping are areas of Carver and Enfield soils and small areas where slopes are more than 8 percent. Included soils make up about 20 percent of this unit.

Permeability is moderately rapid in the subsoil of the Merrimac soil and rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

The soil properties and characteristics of the Urban land and Udipsamments can vary within short distances.

This map unit generally occurs as open grassed areas and sites for buildings, roads, parking lots, or foundations of razed buildings. Some areas have reverted to woodland vegetation.

This map unit is unsuited to cultivated crops, hay, pasture, and woodland. The urban structures restrict any other uses.

The Merrimac soil is suitable as a site for buildings with or without basements. It readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

Onsite investigation is needed to determine the suitability of the Udipsamments and Urban land for specific uses and the limitations affecting those uses.

No capability subclass is assigned.

NaB—Nantucket sandy loam, 3 to 8 percent slopes. This very deep, gently sloping, well drained soil is on the crests and sides of hills in areas of ground moraine and glacial lake deposits. It makes up about 0.3 percent (885 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 2 to 50 acres in size.

Typically, the surface is covered with a 2-inch organic layer of loose, undecomposed leaves and twigs and partly decomposed and well decomposed organic material. The surface layer is sandy loam about 5 inches thick. The upper 1 inch is very dark grayish brown and very friable, and the lower 4 inches is dark yellowish brown and friable. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches or more is light olive brown, firm loam. Below a depth of 65 inches, it may have layers of loose sand and gravel.

Included with this soil in mapping are small areas of Barnstable, Boxford, and Plymouth soils. Also included are areas where slopes are less than 3 percent or more than 8 percent and a few areas where stones are on the surface. Included soils make up about 30 percent of this unit.

Permeability is moderate or moderately rapid in the subsoil of the Nantucket soil and moderately slow or slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, the soil has a perched water table at a depth of 2.0 to 2.5 feet in early spring.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are farmed.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. Erosion is a management concern. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture species.

This soil is fairly well suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, eastern white pine, black oak, scarlet oak, and white oak.

This soil is suitable as a site for buildings with or without basements. In areas where the soil has a perched water table, wetness is a limitation on sites for dwellings with basements and for septic tank absorption fields. The moderately slow or slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption field helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches, excavations that extend to this material generally can overcome the wetness and the restricted permeability.

The capability subclass is IIs.

NaC—Nantucket sandy loam, 8 to 15 percent slopes. This very deep, strongly sloping, well drained soil is on small hills and ridges in areas of ground moraine and glacial lake deposits. It makes up about 0.1 percent (319 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface is covered with a 2-inch organic layer of loose, undecomposed leaves and twigs and partly decomposed and well decomposed organic material. The surface layer is sandy loam about 5 inches thick. The upper 1 inch is very dark grayish brown and very friable, and the lower 4 inches is dark yellowish brown and friable. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches or more is light olive brown, firm loam. Below a depth of 65 inches, it may have layers of loose sand and gravel.

Included with this soil in mapping are small areas of Barnstable, Boxford, and Plymouth soils. Also included are areas where slopes are less than 8 percent or more than 15 percent and a few areas where stones are on the surface. Included soils make up about 35 percent of this unit.

Permeability is moderate or moderately rapid in the subsoil of the Nantucket soil and moderately slow or slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is at a depth of 2.0 to 2.5 feet in early spring.

Most areas are used as woodland. Many areas have been developed for homesites, and a few areas are used as cropland.

This soil is suited to cultivated crops. Good tilth can be easily maintained. Erosion is a management concern. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion. Mixing crop residue and manure into the surface layer helps to maintain good tilth and increases the organic matter content.

This soil is well suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture species.

This soil is fairly well suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, eastern white pine, black oak, scarlet oak, and white oak.

The slope is a limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. In areas that have a perched water table, a drainage system is needed.

The moderately slow or slow permeability in the substratum and the slope are limitations on sites for septic tank absorption fields. Enlarging the absorption field helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. In areas where the soil has a perched water table, wetness is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness.

The capability subclass is IIIe.

NsB—Nantucket sandy loam, 3 to 8 percent slopes, stony. This very deep, gently sloping, well drained soil is on the crests and sides of hills in areas of ground moraine and glacial lake deposits. Stones and boulders cover 0.1 to 1.0 percent of the surface. The soil makes up about 0.2 percent (590 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1.5 inches of undecomposed leaves and twigs and 0.5 inch of partly decomposed and well decomposed organic material. The surface layer is sandy loam about 5 inches thick. The upper 1 inch is very dark grayish brown and very friable, and the lower 4 inches is dark yellowish brown and friable. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches is light olive brown, firm loam. Below a depth of 65 inches, it may have layers of loose gravel and sand.

Included with this soil in mapping are small areas of Barnstable, Boxford, and Plymouth soils and areas where slopes are less than 3 percent or more than 8 percent. Also included are areas where stones and boulders cover more than 1 percent of the surface. Included soils make up about 30 percent of this unit.

Permeability is moderate or moderately rapid in the subsoil of the Nantucket soil and moderately slow or slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is at a depth of 2.0 to 2.5 feet in early spring.

Most areas are used as woodland. Many areas have been developed for homesites.

This soil is unsuitable as cropland because the surface stones and boulders restrict the use of equipment. It is well suited to cultivated crops, however, if the stones and boulders are removed.

This soil is suited to native pasture. It is poorly suited to hay because the surface stones restrict the use of equipment. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is fairly well suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, eastern white pine, black oak, scarlet oak, and white oak.

This soil is suitable as a site for buildings with or without basements. In areas where the soil has a perched water table, wetness is a limitation on sites for dwellings with basements and for septic tank absorption fields. The moderately slow or slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness. Enlarging the absorption fields helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the wetness and the restricted permeability.

The capability subclass is VIs.

NsC—Nantucket sandy loam, 8 to 15 percent slopes, stony. This very deep, gently sloping, well drained soil is on hills and ridges in areas of ground moraine and glacial lake deposits. Stones and boulders cover 0.1 to 1.0 percent of the surface. The soil makes up less than 0.1 percent (105 acres) of the survey area.

It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1.5 inches of undecomposed leaves and twigs and 0.5 inch of partly decomposed and well decomposed organic material. The surface layer is sandy loam about 5 inches thick. The upper 1 inch is very dark grayish brown and very friable, and the lower 4 inches is dark yellowish brown and friable. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches is light olive brown, firm loam. Below a depth of 65 inches, it may have layers of loose gravel and sand.

Included with this soil in mapping are small areas of Barnstable, Boxford, and Plymouth soils and areas where slopes are less than 8 percent or more than 15 percent. Also included are areas where stones and boulders cover more than 1 percent of the surface. Included soils make up about 35 percent of this unit.

Permeability is moderate or moderately rapid in the subsoil of the Nantucket soil and moderately slow or slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is generally more than 6 feet. In some areas, however, a perched water table is at a depth of 2.0 to 2.5 feet in early spring.

Most areas are used as woodland. Many areas have been developed for homesites.

This soil is unsuitable as cropland because the surface stones and boulders restrict the use of equipment. It is suited to cultivated crops, however, if the surface stones and boulders are removed.

This soil is suited to native pasture. It is poorly suited to hay because the surface stones restrict the use of equipment. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is fairly well suited to woodland. No major hazards or limitations restrict woodland management. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, eastern white pine, black oak, scarlet oak, and white oak.

The slope is a limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. In areas where the soil has a perched water table, a drainage system is needed.

The slope and the moderately slow or slow permeability in the substratum are limitations on sites for septic tank absorption fields. Enlarging the absorption field helps to overcome the restricted permeability. In areas where the soil is underlain by sandy and gravelly material, excavations that extend to this material generally can overcome the restricted permeability. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. In areas where the soil has a perched water table, wetness is a limitation on sites for septic tank absorption fields. Additions of fill or a regional drainage system helps to overcome the wetness.

The capability subclass is VIs.

PeA—Pipestone loamy coarse sand, 0 to 3 percent slopes. This very deep, nearly level, poorly drained soil is in depressions, at the base of swales, and in low areas bordering streams, ponds, and swamps. It is on outwash plains and in areas of glacial lake deposits. It makes up about 0.3 percent (753 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 3 inches of partly decomposed and well decomposed organic material. The surface layer is about 15 inches thick. It is black, very friable loamy coarse sand in the upper 2 inches and light brownish gray, mottled, loose coarse sand in the lower 13 inches. The subsoil is about 19 inches thick. It is mottled throughout. The upper 1 inch is dark reddish brown, very friable loamy coarse sand; the next 4 inches is dark brown, firm coarse sand; and the lower 14 inches is yellowish brown, loose coarse sand. The upper 14 inches of the substratum is brown, loose very gravelly coarse sand. The lower part to a depth of 65 inches or more is grayish brown, loose coarse sand.

Included with this soil in mapping are small areas of Berryland, Deerfield, and Walpole soils. Also included are areas where the soil shows no evidence of profile development and does not have an organic layer on the surface. Included soils make up about 30 percent of this unit.

Permeability is rapid throughout the Pipestone soil. Available water capacity is low. Depth to the seasonal high water table is 0.5 foot to 1.5 feet in fall, winter, and spring and after periods of heavy precipitation.

Most areas are used as woodland or support shrubby vegetation.

This soil is poorly suited to many of the crops commonly grown in the county. Wetness is a major management concern. Droughtiness during dry periods is an additional concern. Drainage and irrigation systems are needed for good yields. Growing cover crops, incorporating grasses and legumes into the crop rotation, and mixing manure and crop residue into the plow layer improve tilth.

This soil is poorly suited to hay and pasture. Water-tolerant grasses and legumes should be selected for planting. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Poor drainage is the main management concern. Equipment can become mired when the soil is wet. Thinning dense stands to standard stocking levels results in more vigorous tree growth. The most common trees are pitch pine and red maple.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with or without basements or as a site for septic tank absorption fields. The rapid permeability also is a limitation on sites for septic tank absorption fields. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. Alternative sites should be selected.

The capability subclass is IVw.

Pg—Pits, sand and gravel. This map unit consists of irregularly shaped areas from which sand and gravel have been removed. It makes up about 1.1 percent (2,737 acres) of the survey area. It is mapped throughout the survey area. Areas range from 3 to 120 acres in size. The pits are 5 to 40 feet deep and generally have steep sides and a nearly level floor. Some areas have small pools of shallow water.

The pits generally support no vegetation, although some of the older ones support scattered shrubs and grasses. Most of the pits are droughty, but some have been excavated to or below the seasonal high water table.

Soil properties and the slope vary. Generally, this unit is poorly suited to farm uses, woodland, and residential development. Onsite investigation is needed to determine the suitability of the pits for specific uses and the limitations affecting those uses.

No capability subclass is assigned.

PmA—Plymouth loamy coarse sand, 0 to 3 percent slopes. This very deep, nearly level, excessively drained soil is on outwash plains, in areas of glacial lake deposits, and on ground moraines. It makes up about 0.2 percent (571 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with this soil in mapping are small areas of Barnstable, Carver, Hinckley, and Merrimac soils, areas where slopes are more than 3 percent, and a few areas where stones are on the surface. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops because of the low available water capacity. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity, helps to maintain good tilth, and increases the organic matter content.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

This soil is suitable as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIIs.

PmB—Plymouth loamy coarse sand, 3 to 8 percent slopes. This very deep, gently sloping, excessively drained soil is on undulating outwash plains and on low hills in areas of ground moraine and glacial lake deposits. It makes up about 1.8 percent (4,699 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 800 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with this soil in mapping are small areas of Barnstable, Carver, Hinckley, Merrimac, and Nantucket soils. Also included are areas where slopes are less than 3 percent or more than 8 percent and a few areas where stones are on the surface. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops. The low available water capacity and the susceptibility to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help control runoff and erosion.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

This soil is suitable as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation.

This soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is IIIs.

PmC—Plymouth loamy coarse sand, 8 to 15 percent slopes. This very deep, strongly sloping, excessively drained soil is on small hills and ridges in areas of glacial lake and ice-contact deposits and on ground moraines. It makes up about 0.7 percent (1,839 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with this soil in mapping are small areas of Barnstable, Carver, Hinckley, and Nantucket soils. Also included are areas where slopes are less than 8 percent or more than 15 percent and a few areas where stones are on the surface. Included soils make up about 35 percent of this unit.

Permeability is rapid in the subsoil of the Nantucket soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites, and a few areas are farmed.

This soil is poorly suited to cultivated crops. The low available water capacity and the susceptibility to erosion are management concerns. Irrigation is needed for most cultivated crops. Mixing plant residue and manure into the surface layer increases the available water capacity. Farming on the contour or across the slope, terracing, stripcropping, including grasses and legumes in the crop rotation, growing cover crops, and applying a system of conservation tillage help to control runoff and erosion.

This soil is poorly suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is the main limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is poorly suited to septic tank absorption fields because of the slope and the rapid and very rapid permeability. The soil does not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is IVs.

PmD—Plymouth loamy coarse sand, 15 to 35 percent slopes. This very deep, moderately steep and steep, excessively drained soil is on hills and ridges in areas of ice-contact deposits and on moraines. It makes up about 0.5 percent (1,391 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with this soil in mapping are small areas of Barnstable, Carver, Hinckley, and Nantucket soils. Also included are areas where slopes are less than 15 percent and a few areas where stones are on the surface. Included soils make up about 35 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is generally unsuited to cultivated crops, hay, and pasture because of the low available water capacity, the slope, and a severe hazard of erosion.

This soil is suited to woodland. Droughtiness and the slope are limitations affecting woodland management. Operating equipment may be hazardous on the steeper slopes. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is the main limitation if this soil is used as a site for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is poorly suited to septic tank absorption fields because of the slope and the rapid and very rapid permeability. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

PsB—Plymouth loamy coarse sand, 3 to 8 percent slopes, very stony. This very deep, gently sloping, excessively drained soil is on the crests and side slopes of hills in areas of glacial lake deposits, on ground moraines, and in areas of ice-contact deposits. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up about 0.6 percent (1,442 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with this soil in mapping are small areas of Barnstable, Carver, Hinckley, and Nantucket soils. Also included are areas where slopes are less than 3 percent or more than 8 percent and some areas where stones and boulders cover more than 3 percent of the surface. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is unsuitable as cropland because the surface stones and boulders restrict the use of equipment. Droughtiness also is a management concern.

This soil is suited to native pasture. It is poorly suited to hay and improved pasture because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

This soil is suitable as a site for buildings with or without basements. The droughtiness is a limitation affecting lawns and shallow-rooted trees and shrubs. Adding a layer of topsoil and frequently watering during dry periods help to overcome this limitation. The soil readily absorbs but may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

PsC—Plymouth loamy coarse sand, 8 to 15 percent slopes, very stony. This very deep, strongly sloping, excessively drained soil is on hills and ridges in areas of ice-contact deposits, on recessional moraines, and on ground moraines. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up about 0.2 percent (437 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 125 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with this soil in mapping are small areas of Barnstable, Carver, Hinckley, and Nantucket soils. Also included are small areas where slopes are less than 8 percent or more than 15 percent and some areas where stones and boulders cover more than 3 percent of the surface. Included soils make up about 30 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is unsuitable as cropland because the surface stones and boulders restrict the use of equipment. Droughtiness also is a management concern.

This soil is suited to native pasture. It is poorly suited to hay and improved pasture because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Because of droughtiness, some seedling loss is expected. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if this soil is used as a site for buildings. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is limited as a site for septic tank absorption fields because of the slope and the rapid and very rapid permeability. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

PsD—Plymouth loamy coarse sand, 15 to 35 percent slopes, very stony. This very deep, moderately steep and steep, excessively drained soil is on hills and ridges in areas of ice-contact deposits and on moraines. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up about 0.2 percent (614 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Included with this soil in mapping are small areas of Barnstable, Carver, Hinckley, and Nantucket soils. Also included are areas where slopes are less than 15 percent and some areas where stones and boulders cover more than 3 percent of the surface. Included soils make up about 35 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Figure 13.—An area of Plymouth-Barnstable complex, rolling, very bouldery. These soils have stones and boulders on the surface.

Most areas are used as woodland. This soil is unsuitable as cropland because of the slope, the surface stones, and droughtiness.

This soil is suited to native pasture. It is poorly suited to hay and improved pasture because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Droughtiness and the slope are limitations affecting woodland management. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if this soil is used as a site for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard.

This soil is limited as a site for septic tank absorption fields because of the slope and the rapid and very rapid permeability. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

PvC—Plymouth-Barnstable complex, rolling, very bouldery. These undulating and rolling, very deep, excessively drained and well drained soils are on the side slopes of moraines. Stones and boulders cover 1 to 3 percent of the surface (fig. 13). Slopes range from 3 to 15 percent. The soils make up about 1.1 percent (2,811 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 600 acres in size. They are about 55 percent Plymouth soil, 20 percent Barnstable soil, and 25 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with these soils in mapping are small areas of Carver, Hinckley, and Nantucket soils. Also included are areas where slopes are less than 3 percent or more than 15 percent and small, isolated areas that do not have boulders on the surface. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. A few areas have been developed for homesites.

These soils are unsuitable as cropland because the surface stones and boulders interfere with the use of equipment. The Barnstable soil is suited to cultivated crops, however, if the stones and boulders are removed. The Plymouth soil is droughty during periods of low rainfall.

These soils are suited to native pasture. They are poorly suited to hay and improved pasture because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are suited to woodland. The Plymouth soil is droughty. As a result, some seedling loss is expected. The use of equipment may be hampered because of the boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

Areas of these soils that have slopes of more than 8 percent are limited as sites for buildings. Land grading is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may hamper site development.

These soils are limited as sites for septic tank absorption fields because of the slope and the rapid or very rapid permeability. The soils may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

PvD—Plymouth-Barnstable complex, hilly, very bouldery. These hilly and steep, very deep, excessively drained and well drained soils are on hills and ridges on moraines. Stones and boulders cover 1 to 3 percent of the surface. Slopes range from 15 to 35 percent. The soils make up about 1.1 percent (2,705 acres) of the survey area. They are mapped in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 200 acres in size. They are about 55 percent Plymouth soil, 20 percent Barnstable soil, and 25 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with these soils in mapping are small areas of Carver, Hinckley, and Nantucket soils and small areas where slopes are less than 15 percent. Also included are small, isolated areas that do not have boulders on the surface. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. These soils are unsuitable as cropland because the surface stones and boulders restrict the use of equipment. Erosion is a hazard because of the slope. The Plymouth soil is droughty during periods of low rainfall.

These soils are suited to native pasture. They are poorly suited to hay and improved pasture because the use of equipment is limited by the slope and the stones and boulders on the surface. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are suited to woodland. The Plymouth soil is droughty. As a result, some seedling loss is expected. The use of equipment may be hampered because of the slope and the boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if these soils are used as sites for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may hamper site development.

These soils are limited as sites for septic tank absorption fields because of the slope and the rapid or very rapid permeability. The soils may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

PxC—Plymouth-Barnstable complex, rolling, extremely bouldery. These undulating and rolling, very deep, excessively drained and well drained soils are on the side slopes of moraines. Stones and boulders cover 3 to 15 percent of the surface. Slopes range from 3 to 15 percent. The soils make up about 1.1 percent (2,761 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 600 acres in size. They are about 55 percent Plymouth soil, 20 percent Barnstable soil, and 25 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with these soils in mapping are small areas of Carver, Hinckley, and Nantucket soils and small areas where slopes are less than 3 percent or more than 15 percent. Also included are small, isolated areas where less than 3 percent of the surface is covered with boulders. Included soils make up about 35 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. A few areas have been developed for homesites.

These soils are unsuitable as cropland because the surface stones and boulders restrict the use of equipment. The Plymouth soil is droughty during periods of low rainfall.

These soils are very poorly suited to hay and pasture because of the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are poorly suited to woodland. The use of equipment is restricted because of the boulders. The Plymouth soil is droughty. As a result, some seedling loss is expected. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

Areas of these soils that have slopes of more than 8 percent are limited as sites for buildings. Land grading is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface boulders may interfere with site development.

These soils are limited as sites for septic tank absorption fields because of the slope and the rapid or very rapid permeability. The soils may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

PxD—Plymouth-Barnstable complex, hilly, extremely bouldery. These hilly and steep, very deep, excessively drained and well drained soils are on hills and ridges on moraines. Stones and boulders cover 3 to 15 percent of the surface. Slopes range from 15 to 35 percent. The soils make up about 3.4 percent (8,688 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 700 acres in size. They are about 55 percent Plymouth soil, 20 percent Barnstable soil, and 25 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with these soils in mapping are small areas of Carver, Hinckley, and Nantucket soils and small areas where slopes are less than 15 percent. Also included are small, isolated areas where less than 3 percent of the surface is covered with boulders. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. These soils are unsuitable as cropland because the surface stones and boulders restrict the use of equipment. Erosion is a hazard because of the slope. The Plymouth soil is droughty during periods of low rainfall.

These soils are very poorly suited to hay and pasture because of the slope and the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are poorly suited to woodland. The use of equipment is restricted because of the slope and the boulders. The Plymouth soil is droughty. As a result, some seedling loss is expected. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is the main limitation if these soils are used as sites for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface boulders may interfere with site development.

These soils are poorly suited to septic tank absorption fields because of the slope and the rapid or very rapid permeability. The soils may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIIs.

PyD—Plymouth-Barnstable-Nantucket complex, hilly, very bouldery. These hilly and steep, very deep, excessively drained and well drained soils are on hills and ridges on moraines. Stones and boulders cover 1 to 3 percent of the surface. Slopes range from 15 to 35 percent. The soils make up about 0.8 percent (2,168 acres) of the survey area. They are mapped mainly in the Plymouth-Barnstable-Nantucket general soil map unit. Areas are irregular in shape and generally range from 20 to 300 acres in size. They are about 40 percent Plymouth soil, 20 percent Barnstable soil, 15 percent Nantucket soil, and 25 percent other soils. The soils occur as areas so intricately mixed or so small that separating them in mapping is not practical.

Typically, the surface of the Plymouth soil is covered with an organic layer. This layer is about 1 inch of loose, undecomposed pine needles, leaves, and twigs and 1 inch of partly decomposed and well decomposed organic material. The surface layer is about 3 inches thick. It is black, very friable loamy coarse sand in the upper 1 inch and gray, loose coarse sand in the lower 2 inches. The subsoil is about 26 inches thick. In sequence downward, it is 1 inch of dark brown, very friable gravelly loamy coarse sand; 5 inches of strong brown, very friable gravelly loamy coarse sand; 10 inches of yellowish brown, very friable gravelly loamy coarse sand; and 10 inches of light yellowish brown, loose gravelly coarse sand. The substratum extends to a depth of 65 inches or more. It is light brownish gray, loose gravelly coarse sand in the upper 12 inches and pale brown, loose coarse sand in the lower part.

Typically, the surface of the Barnstable soil is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Typically, the surface of the Nantucket soil is covered with an organic layer. This layer is about 1.5 inches of undecomposed leaves and twigs and 0.5 inch of partly decomposed and well decomposed organic material. The surface layer is sandy loam about 5 inches thick. It is very dark grayish brown and very friable in the upper 1 inch and dark yellowish brown and friable in the lower 4 inches. The subsoil is friable sandy loam about 22 inches thick. The upper 12 inches is yellowish brown, and the lower 10 inches is light olive brown. The substratum to a depth of 65 inches is light olive brown, firm loam. Below a depth of 65 inches, it may have layers of loose gravel and sand.

Included with these soils in mapping are small areas of Carver and Hinckley soils and small areas where slopes are less than 15 percent. Also included are small, isolated areas where the soils have no boulders on the surface. Included soils make up about 25 percent of this unit.

Permeability is rapid in the subsoil of the Plymouth soil and very rapid in the substratum. Available water capacity is low. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Permeability is moderately rapid in the subsoil of the Nantucket soil and moderately slow or slow in the substratum. Available water capacity is moderate. Depth to the seasonal high water table generally is more than 6 feet. In some areas, however, a perched water table is at a depth of 2.0 to 2.5 feet in early spring.

Most areas are used as woodland. These soils are unsuitable as cropland because the surface stones and boulders restrict the use of equipment. The Barnstable and Nantucket soils are suited to cultivated crops, however, if the surface stones and boulders are removed. Erosion is a hazard because of the slope. The Plymouth soil is droughty during periods of low rainfall.

These soils are poorly suited to hay and pasture because of the slope and the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

These soils are poorly suited to woodland. The use of equipment is restricted because of the slope and the surface boulders. The Plymouth soil is droughty. As a result, some seedling loss is expected. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is the main limitation if these soils are used as sites for buildings. Extensive land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a severe hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may interfere with site development.

These soils are limited as sites for septic tank absorption fields. The Barnstable and Plymouth soils may not adequately filter the effluent, and the Nantucket soil does not readily absorb the effluent. The pollution of ground water is a hazard in areas of the Barnstable and Plymouth soils, and seepage is a hazard in areas of the Nantucket soil. The slope is an additional limitation. Onsite investigation is needed to determine the suitability of a given area and the measures needed to overcome the limitations.

The capability subclass is VIs.

ScA—Scitico silt loam, 0 to 3 percent slopes. This very deep, nearly level, poorly drained soil is in depressions, at the base of swales, and in low areas of glacial lake deposits that border streams, ponds, and swamps. It makes up about 0.1 percent (320 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 140 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 2 inches of loose, undecomposed pine needles, leaves, and twigs and 3 inches of black, partly decomposed and well decomposed organic material. The surface layer is very dark grayish brown, friable silt loam about 2 inches thick. The subsoil is mottled, friable silty clay loam 21 inches thick. The upper part is grayish brown, and the lower part is gray. The substratum to a depth of 65 inches or more is dark grayish brown, mottled, firm silty clay loam.

Included with this soil in mapping are small areas of Boxford, Maybid, and Walpole soils and some areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included soils make up about 25 percent of this unit.

Permeability is moderately slow or slow in the subsoil of the Scitico soil and slow or very slow in the substratum. Available water capacity is high. The seasonal high water table is at or near the surface in fall, winter, and spring and after periods of heavy precipitation.

Most areas are used as woodland or support shrubby vegetation.

Because of the wetness, this soil is very poorly suited to many of the crops commonly grown in the county. A surface drainage system is needed for good yields. Growing cover crops, incorporating grasses and legumes into the crop rotation, and mixing manure and crop residue into the plow layer improve tilth.

This soil is poorly suited to hay and pasture because of the wetness. The suitability can be improved by installing a drainage system and planting water-tolerant species. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is poorly suited to woodland because of the wetness and a high seedling mortality rate. Optimal tree growth is unlikely, and many seedlings do not survive. Because of low soil strength, the use of equipment should be limited to periods when the soil is dry or frozen. Onsite investigation may identify areas where trees can be planted if special management is applied. The most common trees are red maple, tupelo, and pitch pine.

The seasonal high water table limits the use of this soil as a site for dwellings and for septic tank absorption fields. The slow or very slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Alternative sites should be selected. In areas where the soil is underlain by sandy and gravelly material, excavation to this material helps to overcome the restricted permeability.

The capability subclass is IVw.

SdA—Sudbury fine sandy loam, 0 to 3 percent slopes. This very deep, nearly level, moderately well drained soil is in depressions, swales, and low areas on outwash plains bordering streams, ponds, and swamps. It makes up less than 0.1 percent (121 acres) of the survey area. It is mapped mainly in the Enfield-Merrimac-Carver general soil map unit. Areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 10 inches thick. The subsoil is yellowish brown, friable sandy loam about 20 inches thick. It is mottled below a depth of 22 inches. The substratum extends to a depth of 65 inches or more. It is mottled. The upper 6 inches is strong brown, loose sand; the next 3 inches is light brownish gray, friable loamy fine sand; the next 6 inches is brownish yellow, loose sand; and the lower 20 inches is light yellowish brown, loose gravelly coarse sand.

Included with this soil in mapping are small areas of Amostown, Deerfield, Merrimac, and Pipestone soils. Also included are small areas where the lower part of the subsoil is very fine sandy loam. Included soils make up about 25 percent of this unit.

Permeability is moderately rapid in the subsoil of the Sudbury soil and moderately rapid or rapid in the substratum. Available water capacity is moderate. The seasonal high water table is at a depth of 1.5 to 3.0 feet in late fall, in winter, in early spring, and after periods of heavy precipitation.

Most areas are in open fields or support shrubby vegetation. Some areas are wooded.

This soil is well suited to cultivated crops. Good tilth can be easily maintained. Planting or harvesting may be delayed by the seasonal high water table. A drainage system is needed for maximum crop yields and the most efficient use of machinery. Growing cover crops and including grasses and legumes in the cropping system improve tilth. Mixing crop residue and manure into the surface layer also improves tilth.

This soil is well suited to hay and pasture. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants and exposes the soil to erosion. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is fairly well suited to woodland. No major hazards or limitations restrict woodland management. Minimizing surface disturbance helps to retain a spongelike mulch of leaves, which absorb precipitation and maintain the limited moisture supply. Removal or control of competing vegetation helps to obtain the best growth of newly established seedlings. The most common trees are pitch pine, red maple, eastern white pine, and white oak.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with or without basements or as a site for septic tank absorption fields. Because of the moderately rapid or rapid permeability in the substratum, the soil may not adequately filter the effluent in septic tank absorption fields. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Additions of fill or a regional drainage system helps to overcome the wetness.

The capability subclass is IIw.

Ud—Udipsamments, smoothed. These nearly level soils are in areas that have been excavated or filled during construction. They make up about 1.8 percent (4,593 acres) of the survey area. They are mapped throughout the survey area. Areas are commonly rectangular and generally have straight boundaries. They range from 5 to 200 acres in size. Most are about 15 acres.

Most areas are used for roads, highways, schools, housing developments, or athletic fields. Commonly, the more nearly level areas have structures and the more sloping areas are vegetated.

Generally, these soils have a surface layer of yellowish brown, friable loamy sand about 4 inches thick. Below this to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

The characteristics of these soils vary from one area to another. Onsite investigation is needed to determine the suitability for most uses.

No capability subclass is assigned.

Ur—Urban land. This map unit consists of nearly level to moderately steep areas where the soils have been altered or obscured by urban works and structures. Buildings and pavement cover more than 85 percent of the surface. This unit makes up about 1.4 percent (3,474 acres) of the survey area. It is mapped throughout the county. Areas are irregular in shape and range from 10 to 1,500 acres in size.

Included in this unit in mapping are many small areas where the original soil material has been disturbed by construction and areas where fill has been added. Also included are small areas of undisturbed soils. Included areas make up about 15 percent of this unit.

The soil properties and characteristics of this unit vary. Onsite investigation is needed to determine the suitability for specific uses and the limitations affecting those uses.

No capability subclass is assigned.

WvA—Walpole sandy loam, loamy substratum, 0 to 3 percent slopes. This very deep, nearly level, poorly drained soil is in depressions, at the base of swales, and in low areas of glacial lake deposits bordering streams, ponds, and swamps. It makes up about 0.2 percent (461 acres) of the survey area. It is mapped mainly in the Plymouth-Eastchop-Carver-Boxford general soil map unit. Areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface is covered by a layer of loose, undecomposed leaves and twigs about 1 inch thick. The surface layer is black, friable sandy loam about 9 inches thick. The subsoil is about 13 inches thick. It is mottled and friable throughout. The upper 5 inches is light olive brown sandy loam, the next 4 inches is olive brown sandy loam, and the lower 4 inches is olive gray fine sandy loam. The substratum extends to a depth of 65 inches or more. It is mottled throughout. It is yellowish brown, loose coarse sand in the upper 15 inches and light olive brown, firm silt loam in the lower part.

Included with this soil in mapping are small areas of Amostown, Maybid, Pipestone, and Scitico soils and some areas where the soil is underlain by sandy and gravelly material below a depth of 65 inches. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Walpole soil. It is very rapid in the sandy strata in the substratum and slow or very slow in the silty or clayey strata. Available water capacity is moderate. A seasonal high water table is at or near the surface in late fall, in winter and spring, and after periods of heavy precipitation.

Most areas are used as woodland or support shrubby vegetation.

This soil is poorly suited to cultivated crops because of the wetness, which limits the choice of crops. Diversions and drainage systems help to remove excess water. Incorporating grasses and legumes into the cropping system and mixing crop residue and manure into the surface layer improve tilth.

This soil is poorly suited to hay and pasture. The grasses and legumes that can withstand wetness should be selected for planting. The main management concern is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. Poor drainage is the main management concern. Equipment can become mired when the soil is wet. Thinning dense stands to standard stocking levels results in more vigorous tree growth. The most common trees are pitch pine, red maple, tupelo, and redcedar.

The seasonal high water table limits the use of this soil as a site for dwellings or septic tank absorption fields. The slow or very slow permeability in the substratum also is a limitation on sites for septic tank absorption fields. Alternative sites should be selected. In areas where the soil is underlain by sandy and gravelly material, excavation to this material helps to overcome the restricted permeability.

The capability subclass is IIIw.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. Identification of prime farmland is a major step in meeting the nation's needs for food and fiber.

The U.S. Department of Agriculture defines prime farmland as the land that is best suited to food, feed, forage, fiber, and oilseed crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields and requires minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

An area identified as prime farmland must be used for food or fiber or must be available for those uses. Thus, urban or built-up land and water areas are not classified as prime farmland.

The general criteria for prime farmland are as follows: a generally adequate and dependable supply of moisture from precipitation or irrigation, favorable temperature and growing-season length, acceptable levels of acidity or alkalinity, few or no rocks, and permeability to air and water. Prime farmland is not excessively erodible, is not saturated for long periods, and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

The survey area has about 22,234 acres of prime farmland. That acreage makes up about 8.7 percent of the total acreage in the survey area and is mainly in the western part of the county.

The map units that are considered prime farmland in the survey area are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4, and the location of each unit is shown on the detailed soil maps at the back of this publication. The soil properties and characteristics that affect use and management of the units are described in the section "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Richard J. DeVergilio, district conservationist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Agriculture in Barnstable County consists of a variety of small enterprises interspersed among residential and commercial land uses. In 1984, the county had approximately 175 agricultural enterprises, which made up about 5,000 acres. Of this total, 65 were cranberry enterprises (fig. 14) and 50 were vegetable and fruit crop enterprises. The rest were farms for horses and other livestock, orchards, nurseries, and Christmas tree farms. There is one dairy farm, which is operated by the county. The vegetable and fruit crops grown commercially include sweet corn, tomatoes, potatoes, snapbeans, peas, lettuce, squash, strawberries, raspberries, blueberries, apples, and peaches.

The soils in Barnstable County vary. There are limited areas of prime farmland. Many of the soils in the county have a coarse, sandy subsoil and substratum that do not retain much moisture. As a result, irrigation is necessary in areas used for most marketable crops. Large water resources are available for agricultural uses; however, urban development competes more and more for these resources, making water conservation efforts necessary. Maintaining the quality of drinking water is a high priority on Cape Cod. As a result, agricultural users develop and practice innovative approaches for pest control and fertilization. Frequent fogs during the haying season prevent proper drying in some areas; however, the dew is often an important source of moisture during dry periods.

Water erosion on farms in the county is generally not a significant problem because the soils tend to be sandy and absorb most of the rainfall that they receive. The steep areas are not commonly tilled. Wind erosion

Figure 14.—A sprinkler system used for irrigation and protection of a cranberry field against frost in an area of Freetown coarse sand, 0 to 1 percent slopes.

can be a problem if tilled areas are unprotected, and so winter cover crops are commonly planted.

The soils in the county require careful management to maintain good tilth. Regular additions of ground limestone raise and maintain the pH at a nearly neutral level, which is needed for the best growth of most crops. Additions of organic material improve tilth and increase the available water capacity.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w,* or *s,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w* or *s* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Barnstable County has approximately 65,000 acres of forest land. This acreage is about 26 percent of the total land area. The dominant forest type is pitch pine-oak and some areas of white pine, mixed oak, and mixed hardwoods.

Carver and Plymouth soils are in a large percentage of the forested areas. These excessively drained, sandy soils have a low productivity rating for hardwood timber. They are suited to good-quality white pine. Because the county has experienced many forest fires, the soils support vast stands of low-quality species, such as pitch pine and scrub oak, which regenerate well in burned-over areas. Because of the application of proven stand conversion techniques and adequate control of forest fires and gypsy moths, the soils are suitable for high-quality white pine.

Only a few of the forested sites in the county, such as those in areas of Enfield and Nantucket soils, can support high-quality hardwoods. The lack of markets for low-quality hardwoods used for roundwood timber and the disinterest of landowners have resulted in a low level of management in these areas.

Large population increases have resulted in the conversion of a considerable amount of forest land to residential and recreational development and have created a substantial market for fuelwood, which is supplied in part by local harvesters. The demand for the fuelwood by individuals and industry provides a market for the low-quality hardwoods harvested when a stand is thinned so that white pine can be established or the quality of the hardwoods can be improved.

Forest management on municipal land has recently increased primarily through the efforts of the Extension Forestry Department and students of the University of Massachusetts, who want to protect municipal water supplies and educate the public about the benefits of carefully planned logging activities on public watersheds. The quality and quantity of water can be improved without the adverse effects usually associated with this type of timber management. Because of the strong fuelwood market, these activities are economically feasible.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed in the tables. The table gives the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, that the indicator species can produce. The larger the number, the greater the potential productivity. The number 1 indicates low productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 or more, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates steep slopes; *X*, stones or rocks on the surface; *W*, excess water in or on the soil; *S*, sandy texture; and *F*, high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that erosion can occur as a result of site preparation or cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope and on the erosion factor K shown in table 15. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities. The proper construction and maintenance of roads, trails, landings, and fire lanes will reduce the erosion hazard.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and the season of use are not significantly restricted by soil factors. If soil wetness is a factor, equipment use is restricted for a period of less than 2 months. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If soil wetness is a factor, equipment use is restricted for 2 to 6 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment or the season of use. If soil wetness is a factor, equipment use is restricted for more than 6 months. Choosing the best suited equipment and deferring the use of harvesting and other equipment during wet periods help to overcome the equipment limitation.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil or topographic conditions. The factors considered in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and aspect of the slope. A rating of *slight* indicates that under usual conditions the expected mortality is less than 25 percent. A rating of *moderate* indicates that the expected mortality is 25 to 50 percent. Extra precautions are advisable. A rating of *severe* indicates that the expected mortality is more than 50 percent. Extra precautions are important. Replanting may be necessary. Selection of special planting stock and special site preparation, such as bedding, furrowing, and a surface drainage system, can reduce the seedling mortality rate.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees but do not uproot them. A rating of *moderate* indicates that a few trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods. The use of special equipment that does not damage surficial root systems during partial cutting operations can reduce the hazard of windthrow. Care in thinning or not thinning at all also can reduce the hazard.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, represents an expected volume produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand. One cubic meter per hectare equals 14.3 cubic feet per acre.

The first species listed under *common trees* for a soil is the indicator species for that soil. This species is common in the survey area. It is generally the most productive species on the soil. The productivity class of the indicator species is the number in the ordination symbol.

Trees to plant are those that are suitable for commercial wood production on the soil.

Recreation

Richard J. DeVergilio, district conservationist, Soil Conservation Service, helped prepare this section.

Barnstable County is a long-established and enormously popular vacation area. It offers many recreational facilities and features of public interest, most of which center on coastal natural resources (fig. 15). Recreation opportunities include swimming and sunbathing, surf and boat fishing, shellfishing, birdwatching and nature study, hiking, bicycling, golfing, boating, camping, and hunting. These activities are made available by all of the 15 towns. The Cape Cod National Seashore draws large numbers of tourists who enjoy its 43,558 acres and recreation facilities.

All of the recreational facilities are used intensively during the summer. It is not unusual for more than 500,000 people to visit Cape Cod on a good day during the July peak. This population puts pressure on the natural resources of the coast. Programs that manage the recreational facilities have been implemented. Two examples of programs in place are the Cape Cod National Seashore, managed by the U.S. Department of the Interior, and the town of Barnstable, managed by the Sandy Neck Governing Board. Although they differ greatly in size, each program promotes and directs compatible, sustained use of recreational and natural resources. Each cape community recreation department manages the many facilities owned by the town.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or

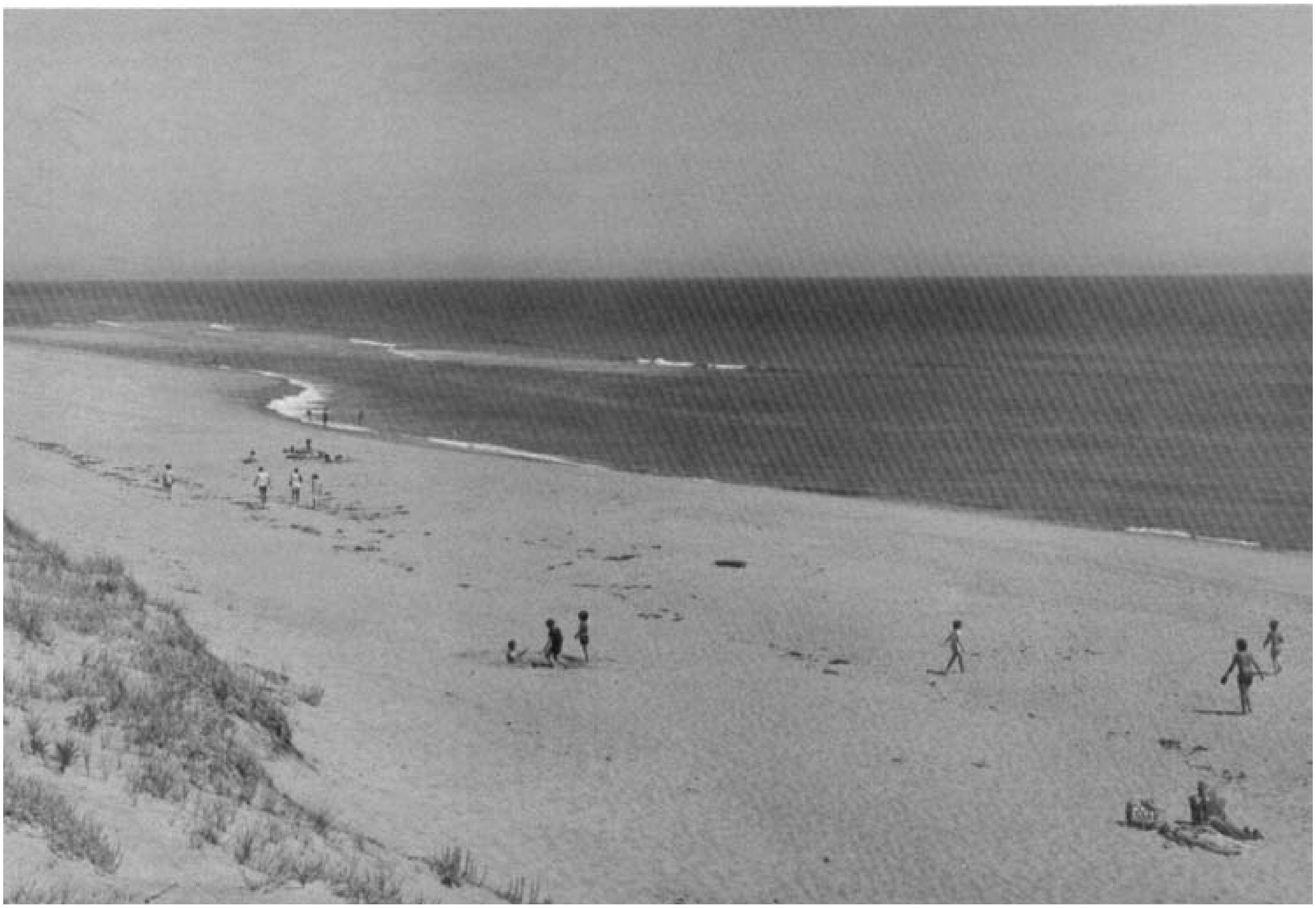


Figure 15.—An area of Beaches, which offers excellent opportunities for recreation.

stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Kathleen Hinkel, biological technician, Soil Conservation Service, helped prepare this section.

Barnstable County has a number of areas used only for the protection or management of wildlife and areas where one of the land use goals is wildlife preservation. These areas contribute to the wide variety of wildlife on Cape Cod. Several towns, including Orleans, Eastham, and Chatham, have active conservation trusts, established in part for the protection of wildlife. The

Cape Cod National Seashore covers 43,558 acres and is administered by the National Park Service. Although it is not managed exclusively for wildlife, it provides good wildlife habitat in many areas.

Monomoy Island, located off Chatham, is a 2,700-acre federal wilderness area established in 1958. It is an important feeding area for migratory birds (principally shore birds) as well as a nesting site for many species of waterfowl. Some of the bird species that inhabit Barnstable County are found exclusively on this island.

The Crane Wildlife Management Area, which consists of 1,668 acres in Falmouth, is the only state-owned area in the county managed specifically for wildlife. The Trustees of Reservation operate the 770-acre Lowell-Holly Reservation in Mashpee. The Cape Cod Museum of Natural History owns and operates 215 acres in two areas, one in Osterville and one at a museum in Brewster. The Massachusetts Audubon Society owns a number of areas, including the Wellfleet Bay Wildlife Sanctuary (700 acres in Wellfleet), the Ashumet-Holly Reservation (46 acres in Falmouth), and the 100-acre Lost Farm Sanctuary in Barnstable. Many smaller private and community areas also provide habitat for wildlife in Barnstable County.

The last verified sighting of an Eskimo curlew in Massachusetts was in Orleans in 1913. The species is rarely seen anywhere in the United States and is now listed on the federal endangered species list. In addition to the Eskimo curlew, a variety of species on both the federal and Massachusetts lists of threatened and endangered species inhabit Barnstable County and the nearby coastal waters. Those listed as endangered include the bald eagle, the peregrine falcon, the Atlantic hawksbill turtle, the Kemp's Ridley turtle, the Atlantic leatherback turtle, and the Plymouth red-bellied turtle. Those listed as threatened include the Atlantic green turtle and the Atlantic logger-head turtle. A number of species are on the Massachusetts list of rare species. These are the gray seal, the eastern box turtle, the northern diamondback terrapin, the arctic and roseate terns, the northern parula warbler, and the short-eared owl.

Because of the abundant nesting sites provided by the extensive freshwater and ocean shorelines, a wide variety of waterfowl and wading birds nest in Barnstable County. The most common nesting species are the green heron, snowy egret, black-crowned night heron, mute swan (an introduced species), Canada goose, American wigeon, mallard, black duck, ruddy duck, wood duck, pintail duck, northern shoveler, green-winged teal, gadwall, American oystercatcher, least terns, common terns, willet, Virginia rail, laughing gull, herring gull, and great black-backed gull. Waterfowl and waders that winter on Cape Cod are: the greater and lesser scaup, common goldeneye, bufflehead, common eider, white-winged scoter, common and red-breasted merganser, canvasback, brant, great blue heron, and common loon.

Upland game birds in Barnstable County include bobwhite quail, ruffed grouse, ring-necked pheasant, American woodcock, and common snipe.

A wide variety of nongame bird species nest in Barnstable County. These are red-tailed hawk, broad-winged hawk, northern harrier (rare), osprey (very rare), American kestrel, mourning dove, screech owl, great horned owl, long-eared owl, whip-poor-will, chimney swift, common flicker, downy woodpecker, eastern kingbird, great crested flycatcher, eastern wood peewee, horned lark, tree swallow, barn swallow, tufted titmouse, white-breasted nuthatch, mockingbird, gray catbird, wood thrush, red-eyed vireo, and a number of warblers and sparrows. Some of the nongame bird species that winter in Barnstable County are the snow bunting, white-throated sparrow, dark-eyed junco, pine siskin, evening grosbeak, yellow-rumped warbler, and black-legged kittiwake.

Of the mammals in the county, the largest game species is white-tailed deer. Other game mammals are eastern cottontail, opossum, river otter (only on the western side of the Cape Cod Canal), muskrat, short-tailed weasel (very rare), long-tailed weasel, red fox, striped skunk, gray squirrel, and raccoon. Common nongame mammals are eastern mole, masked shrew, short-tailed shrew, little brown bat, big brown bat, red bat, eastern chipmunk, woodchuck, white-footed mouse, Gapper's red-backed mouse, meadow vole, Norway rat, and meadow jumping mouse. The star-nosed mole and New England cottontail are both on Cape Cod, but they are rare.

In addition to the rare and endangered turtles mentioned previously, a number of other reptiles inhabit Barnstable County. These are the eastern painted turtle, snapping turtle, musk turtle, spotted turtle, wood turtle (rare), milk snake, northern black racer, red-bellied snake (rare), eastern ribbon snake, and eastern garter snake. Spotted woodland and four-toed salamanders (very rare), red-spotted newt, spring peepers, gray treefrog, bullfrog, eastern spadefoot frog (rare), Fowler's toad, and American toad are among the amphibians in the county.

The freshwater habitat of Cape Cod supports a variety of fish species. These are brown trout, brook trout, white perch, yellow perch, largemouth bass, brown bullheads, bluegills, and chain pickerel.

Although not directly related to the soils in Barnstable County, the coastal fauna of Cape Cod are an important part of the wildlife habitat. The coastal waters off of Cape Cod are fished mainly for bluefish, flounder, black sea bass, striped bass, Atlantic cod, and skate. The brackish ponds, lagoons, and inlets in the county are inhabited by common starfish, sand dollars, fiddler crabs, blue crabs, rock crabs, oysters, bay scallops, and softshell clams.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, rye, and buckwheat.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, milkweed, quackgrass, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, maple, cherry, beech, holly, huckleberry, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are gray dogwood, autumn olive, Tatarian honeysuckle, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, juniper, spruce, and hemlock.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are skunk cabbage, smartweed, arrowhead, cattail, saltgrass, pickerelweed, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, swamps, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadow vole, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, frogs, and tree swallow.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and irrigation.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

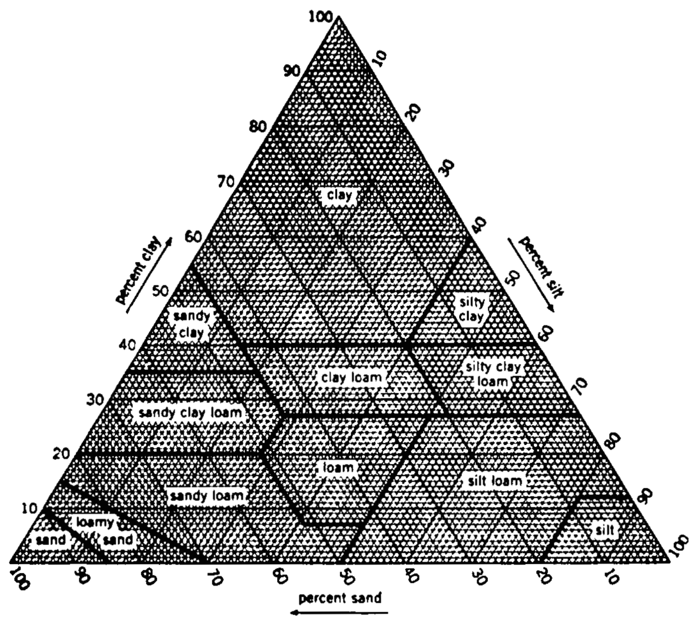


Figure 16.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

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 for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. 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 (fig. 16). "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 as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine 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. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major 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. A bulk density of more than 1.6 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 indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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 inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major 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.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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 acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, 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.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

Soils in table 16 may be assigned to two hydrologic soil groups. Dual grouping is used for some soils that are less than 20 inches deep over bedrock. The first letter is for areas where the bedrock is cracked and pervious, and the second letter is for areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface.

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 high shrink-swell potential, soils that have a permanent 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.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding 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 absence of distinctive horizons that are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. 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.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

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. Frost action occurs when moisture moves into the freezing zone of the soil. 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 and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

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 creates a severe corrosion environment. 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.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(15)*. 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. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven 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 Aquept *(Aqu*, meaning water, 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 Haplaquepts *(Hapl*, meaning minimal horizonation, plus *aquept*, the suborder of the Inceptisols that has an aquic moisture 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 Haplaquepts.

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, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, illitic, nonacid, mesic Typic Haplaquepts.

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.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(14)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(15)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Amostown Series

Coarse-loamy, mixed mesic Typic Dystrochrepts

The Amostown series consists of very deep, moderately well drained soils in areas of glacial lake deposits. These soils formed in loamy eolian or glaciofluvial sediments underlain by glaciolacustrine sediments. Slopes range from 0 to 5 percent.

Amostown soils are similar to Sudbury and Walpole soils and are commonly adjacent to Belgrade, Boxford, Hinesburg, and Plymouth soils. Unlike Amostown soils, Hinesburg and Plymouth soils are not mottled in the subsoil and Walpole soils are mottled in the upper part of the subsoil. Amostown soils have more very fine sand and silt in the substratum and less sand than Sudbury soils. They have more sand and less silt in the solum than Belgrade and Boxford soils.

Typical pedon of Amostown sandy loam, 0 to 5 percent slopes, in a wooded area; 425 feet south of Route 6A, at a point 0.65 mile east of the intersection of Route 6A and Route 124, in the town of Brewster:

Oi—2 inches to 1 inch; loose, undecomposed pine needles, leaves, and twigs.

Oe—1 inch to 0; partly decomposed and well decomposed organic material.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) sandy loam; moderate medium granular structure; friable; common very fine and fine roots; very strongly acid; abrupt wavy boundary.

Ap—2 to 7 inches; dark brown (10YR 4/3) sandy loam; massive; friable; common very fine and fine roots; very strongly acid; abrupt irregular boundary.

Bw1—7 to 13 inches; yellowish brown (10YR 5/4) sandy loam; massive; friable; common very fine and fine roots; strongly acid; clear wavy boundary.

Bw2—13 to 27 inches; light olive brown (2.5Y 5/4) sandy loam; massive; friable; few very fine and fine roots; strongly acid; clear wavy boundary.

Bw3—27 to 33 inches; light olive brown (2.5Y 5/4) sandy loam; few fine distinct grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6) mottles; massive; friable; few very fine and fine roots; strongly acid; abrupt wavy boundary.

2C1—33 to 42 inches; light olive brown (2.5Y 5/4) very fine sandy loam; common medium distinct grayish brown (2.5Y 5/2) and yellowish brown (10YR 5/6) mottles; weak fine and medium angular blocky structure; friable; few clay films on faces of peds and within pores; few very fine and fine roots; strongly acid; clear wavy boundary.

2C2—42 to 51 inches; light olive brown (2.5Y 5/4) very fine sandy loam; many medium prominent light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid; abrupt wavy boundary.

2C3—51 to 56 inches; grayish brown (2.5Y 5/2) silt loam; few fine prominent yellowish red (5YR 5/6) mottles; massive; firm, slightly sticky and plastic; strongly acid; abrupt wavy boundary.

2C4—56 to 65 inches; yellowish brown (10YR 5/4) very fine sandy loam; common medium distinct light olive brown (2.5Y 5/6) and yellowish red (5YR 5/6) mottles; massive; friable; strongly acid.

The thickness of the solum, or the depth to lithologic discontinuity, ranges from 22 to 40 inches. The depth to low-chroma mottles ranges from 24 to 40 inches. The content of coarse fragments ranges from 0 to 10 percent in the solum. The 2C horizon generally has no coarse fragments. Unless lime has been applied, reaction is very strongly acid to medium acid in the solum. It is strongly acid to neutral in the 2C horizon.

The Ap horizon has hue of 10YR or 2.5Y and value and chroma of 2 to 4. It is fine sandy loam, sandy loam, or loam. It has weak granular or subangular blocky structure, or it is massive.

The Bw1 horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 or 5, and chroma of 4 to 8. The Bw2 and Bw3 horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. All three horizons are fine sandy loam or sandy loam.

The 2C horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 to 4. It is mottled. It is mainly very fine sandy loam, silt loam, or silt and is commonly stratified. Thin strata of very fine sand are in some pedons.

Barnstable Series

Sandy, mixed, mesic Typic Dystrochrepts

The Barnstable series consists of very deep, well drained soils on moraines and in areas of ice-contact deposits. These soils formed in sandy, loose glacial till, reworked outwash, and glaciofluvial deposits. Slopes range from 0 to 35 percent.

Barnstable soils are similar to Merrimac and Nantucket soils and are commonly adjacent to Carver and Plymouth soils. Barnstable soils have more sand and less silt and clay in the substratum than Nantucket soils. They have more cobbles and stone-sized rock fragments in the subsoil and substratum than Merrimac soils. They have more silt and clay in the solum than Carver and Plymouth soils.

Typical pedon of Barnstable sandy loam, in a wooded area of Barnstable-Plymouth complex, rolling; 10 feet southeast of an unnamed dirt road, 370 feet southwest of a pipeline, where the unnamed dirt road intersects with the pipeline, 800 feet west of Barlow Road, in the town of Sandwich:

Oi—3 to 2 inches; loose, undecomposed pine needles, leaves, and twigs.

Oe—2 inches to 0; partly decomposed and well decomposed organic material.

E—0 to 1 inch; dark gray (10YR 4/1) sandy loam; massive; very friable; common fine and very fine roots; about 5 percent gravel and 5 percent cobblestones; extremely acid; abrupt wavy boundary.

Bs—1 to 2 inches; dark brown (7.5YR 4/2) sandy loam; massive; friable; common fine and medium roots; about 5 percent gravel and 5 percent cobblestones; extremely acid; abrupt wavy boundary.

Bw1—2 to 9 inches; yellowish brown (10YR 5/6) sandy loam; massive; friable; common fine and medium roots; about 5 percent gravel and 5 percent cobblestones; very strongly acid; clear wavy boundary.

Bw2—9 to 23 inches; light olive brown (2.5Y 5/4) sandy loam; massive; friable; few fine and medium roots; about 5 percent gravel; very strongly acid; abrupt wavy boundary.

2C—23 to 65 inches; light yellowish brown (10YR 6/4) coarse sand; single grain; loose; about 5 percent gravel; strongly acid.

The thickness of the solum ranges from 18 to 25 inches and corresponds closely to the depth to sandy till or outwash. The content of gravel in the solum ranges from 5 to 20 percent, and the content of cobblestones ranges from 0 to 5 percent. The content of stones and boulders ranges from 0 to 20 percent in the surface layer and from 0 to 10 percent in the subsoil. The content of gravel in the substratum ranges from 0 to 30 percent, the content of cobblestones ranges from 0 to 5 percent, and the content of stones ranges from 0 to 10 percent. Reaction is extremely acid or very strongly acid in the solum and very strongly acid to medium acid in the substratum.

Some pedons have an A horizon. This horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is sandy loam, fine sandy loam, or coarse sandy loam.

The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is sandy loam, fine sandy loam, coarse sandy loam, loamy sand, or loamy coarse sand.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 6. It is sandy loam, fine sandy loam, or coarse sandy loam. The lower part has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 4 to 6. It is sandy loam or coarse sandy loam. Some pedons have a 2B horizon of loamy sand or loamy coarse sand below a depth of 15 inches.

The 2C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. It is loamy sand, loamy coarse sand, sand, or coarse sand.

Belgrade Series

Coarse-silty, mixed, mesic Aquic Dystric Eutrochrepts

The Belgrade series consists of very deep, moderately well drained soils in areas of glacial lake deposits. These soils formed in silty and loamy eolian sediments underlain by silty and loamy glaciolacustrine sediments. Slopes range from 3 to 8 percent.

Belgrade soils are similar to Boxford soils and are commonly adjacent to Amostown, Carver, Hinesburg, Pipestone, Plymouth, Scitico, and Walpole soils. Belgrade soils have more silt and finer sand sized particles in the subsoil than Amostown soils and have more silt and less clay in the substratum than Boxford soils. Unlike Belgrade soils, Carver, Hinesburg, and Plymouth soils are not mottled in the subsoil and Pipestone, Scitico, and Walpole soils are mottled in the upper part of the subsoil.

Typical pedon of Belgrade silt loam, 3 to 8 percent slopes, in a pasture; 280 feet east of Route 124, 400 feet south of the intersection of Route 124 and Route 6A, in the town of Brewster (fig. 17):

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam; moderate medium granular structure; friable; many fine and very fine roots; strongly acid; abrupt wavy boundary.

Bw1—9 to 18 inches; yellowish brown (10YR 5/4) silt loam; weak medium angular blocky structure; friable, slightly sticky and slightly plastic; common fine and very fine roots; strongly acid; clear wavy boundary.

Bw2—18 to 29 inches; light olive brown (2.5Y 5/4) silt loam; common fine distinct yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; weak medium angular blocky structure; friable, slightly sticky and slightly plastic; common fine and very fine roots; strongly acid; clear wavy boundary.

BC—29 to 41 inches; light olive brown (2.5Y 5/4) very fine sandy loam; many medium prominent strong brown (7.5YR 5/6) and grayish brown (2.5Y 5/2) mottles; massive; friable; few fine roots; medium acid; abrupt wavy boundary.

2C—41 to 54 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct yellowish red (5YR 5/8) and strong brown (7.5YR 5/6) mottles; massive; firm, slightly sticky and slightly plastic; slightly acid; abrupt wavy boundary.

3C—54 to 65 inches; light yellowish brown (2.5Y 6/4) fine sand; many medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/8) mottles; single grain; loose; slightly acid.

The thickness of the solum ranges from 20 to 44 inches. Reaction is very strongly acid to neutral in the solum and slightly acid or neutral in the C horizon. The content of gravel ranges from 0 to 5 percent to a depth of 40 inches and from 0 to 30 percent below that depth.

The Ap horizon has value of 3 or 4 and chroma of 2 to 4. It is silt loam or very fine sandy loam.

The B horizon has hue of 10YR to 2.5Y. It has value of 4 or 5 and chroma of 4 to 6 in the upper part and value of 4 to 6 and chroma of 2 to 4 in the lower part. The Bw2 horizon has mottles with chroma of 2 or less. The B horizon is dominantly silt loam or very fine sandy loam, but some subhorizons are loamy very fine sand.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It is mottled. It is dominantly silt loam, very fine sandy loam, or loamy very fine sand. In some pedons, however, it has thin strata of loamy fine sand, fine sand, or silt, and in others it has strata of sand or sand and gravel below a depth of 40 inches. When moist, this horizon is firm to loose.

Berryland Series

Sandy, siliceous, mesic Typic Haplaquods

The Berryland series consists of very deep, very poorly drained soils on outwash plains and in areas of glacial lake deposits. These soils formed in sandy glaciofluvial and glaciolacustrine sediments. Slopes range from 0 to 2 percent.

Berryland soils are similar to Pipestone and Matunuck soils and are commonly adjacent to Carver, Deerfield, Freetown, and Swansea soils. Deerfield and Pipestone soils are not so gray in the upper part of the subsoil as Berryland soils. Berryland soils formed in a freshwater environment, whereas Matunuck soils formed in a marine environment. Berryland soils formed in mineral material and may have an organic surface layer that is less than 16 inches thick. Freetown and Swansea soils formed in thicker deposits of organic material. Unlike Berryland soils, Carver soils are not gray in part of the solum.

Typical pedon of Berryland mucky loamy coarse sand, 0 to 2 percent slopes, in a shrubby area; 1,000 feet north of Carriage Shop Road, 0.7 mile southeast of the intersection of Sandwich Road and Carriage Shop Road, in the town of Falmouth:

Oi—4 inches to 0; loose, undecomposed sphagnum moss, pine needles, leaves, and twigs.

Oa—0 to 2 inches; well decomposed organic material.

A—2 to 6 inches; very dark gray (10YR 3/1) loamy coarse sand; massive; very friable; few very fine and fine roots; about 5 percent gravel; very strongly acid; abrupt irregular boundary.

Eg—6 to 12 inches; gray (10YR 5/1) coarse sand; common coarse prominent very dark gray (10YR 3/1) mottles; single grain; loose; few medium roots; about 5 percent gravel; very strongly acid; abrupt wavy boundary.

Bh—12 to 17 inches; dark reddish brown (5YR 2/2) gravelly loamy coarse sand; massive; firm; common coarse rounded very firm nodules; common very fine and fine roots; about 30 percent gravel; very strongly acid; clear wavy boundary.

Bhs—17 to 28 inches; dark reddish brown (5YR 3/3) gravelly loamy coarse sand; massive; friable; few very fine and fine roots; about 30 percent gravel; strongly acid; gradual wavy boundary.

C—23 to 65 inches; dark reddish brown (5YR 3/4) gravelly coarse sand; single grain; loose; about 30 percent gravel; strongly acid.

The thickness of the solum ranges from 28 to 40 inches. The content of gravel ranges from 0 to 30 percent in the solum and substratum. Reaction is extremely acid to strongly acid throughout the profile.

The A horizon has value of 2 to 5 and chroma of 1 or 2. It is mucky loamy coarse sand, mucky loamy sand, loamy coarse sand, loamy sand, sand, or coarse sand.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled. It is loamy coarse sand, loamy sand, sand, or coarse sand.

The B horizon has hue of 2.5YR, 5YR, 7.5YR, or 10YR and value and chroma of 2 to 4. It is mottled. It is loamy coarse sand, loamy sand, sand, coarse sand, or the gravelly analogs of those textures. This horizon may have varying amounts of iron accumulations and nodules ranging from firm and uncemented to very firm and strongly cemented.

The C horizon has hue of 2.5YR, 5YR, 7.5YR, or 10YR, value of 3 to 6, and chroma of 1 to 4. It is mottled. It is loamy coarse sand, loamy sand, sand, or coarse sand.

The Berryland soils in this survey area are outside the range of the Berryland series because their texture includes coarse sand and loamy coarse sand. Also, they have more gravel throughout and are less acid in the subsoil than is defined as the range for the series.

Boxford Series

Fine, mixed, mesic Aquic Dystric Eutrochrepts

The Boxford series consists of very deep, moderately well drained soils in areas of glacial lake deposits. These soils formed in silty and clayey glaciolacustrine sediments. Slopes range from 0 to 8 percent.

Boxford soils are similar to Belgrade and Scitico soils and are commonly adjacent to Amostown, Carver, Eastchop, Maybid, and Plymouth soils. Boxford soils have more clay and less silt in the subsoil and substratum than Belgrade soils. They have more clay and less sand in the subsoil and substratum than Amostown soils. Unlike Boxford soils, Maybid and Scitico soils are gray and mottled in the upper part and Carver, Eastchop, and Plymouth soils are not mottled.

Typical pedon of Boxford silt loam, 3 to 8 percent slopes, in a wooded area; 600 feet south of the shoreline at Calves Pasture Point and 0.5 mile northwest of the intersection of Scudder Lane and Route 6A, in the town of Barnstable:

Oi—1 inch to 0; loose, undecomposed leaves and twigs.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak very fine and fine granular structure; friable, slightly sticky and slightly plastic; common very fine and fine roots; about 1 percent gravel; strongly acid; abrupt smooth boundary.

Bw1—9 to 12 inches; silt loam that has brown (10YR 5/3) ped faces and light olive brown (2.5Y 5/4) ped interiors; moderate fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine and fine roots; about 2 percent gravel; medium acid; gradual wavy boundary.

Bw2—12 to 20 inches; silt loam that has brown (10YR 5/3) ped faces and light olive brown (2.5Y 5/4) ped interiors; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate fine and medium angular blocky structure; friable, slightly sticky and slightly plastic; few very fine and fine roots; about 2 percent gravel; medium acid; gradual wavy boundary.

Bw3—20 to 26 inches; silty clay loam that has grayish brown (10YR 5/2) ped faces and light olive brown (2.5Y 5/4) ped interiors; many medium distinct yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; moderate medium angular blocky structure; friable, sticky and plastic; common silt or clay films within pores and on faces of peds; about 2 percent gravel and 1 percent cobbles; slightly acid; clear wavy boundary.

C—26 to 65 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; firm, sticky and plastic; about 1 percent gravel and 2 percent cobbles; neutral.

The thickness of the solum ranges from 20 to 40 inches. The content of coarse fragments ranges from 0 to 5 percent throughout the profile. The depth to low-chroma mottles ranges from 12 to 24 inches. Unless lime has been applied, reaction is very strongly acid to slightly acid in the upper part of the solum and strongly acid to neutral in the lower part and in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 2 or 3. When dry, it has value of 6 or more. It is silt loam or silty clay loam.

The B horizon has hue of 10YR to 5Y. The upper part has value of 3 to 5 and chroma of 3 to 6. It is silt loam or silty clay loam. The lower part has value of 4 to 6 and chroma of 3 or 4 and is mottled. It is silty clay loam or silty clay.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It is mottled. It is silty clay loam, silty clay, or clay.

Carver Series

Mesic, uncoated Typic Quartzipsamments

The Carver series consists of very deep, excessively drained soils on outwash plains, on moraines, and in areas of glacial lake deposits. These soils formed in sandy glaciofluvial and glaciolacustrine sediments. Slopes range from 0 to 35 percent.

Carver soils are similar to Deerfield, Eastchop, Hooksan, and Plymouth soils and are commonly adjacent to Barnstable, Belgrade, Berryland, Enfield, Freetown, Hinckley, Hinesburg, Merrimac, Pipestone, and Swansea soils. Unlike Carver soils, Belgrade, Boxford, Deerfield, and Pipestone soils are mottled in the subsoil. Carver soils have a lower content of gravel and cobbles in the subsoil and substratum than Hinckley and Plymouth soils. They have more sand and less silt and clay in the substratum than Hinesburg soils and have more coarse and very coarse sand in the solum than Eastchop soils. They have brighter colors in the subsoil than Hooksan soils and have a higher content of coarse sand and a lower content of silt in the surface layer and subsoil than Barnstable, Enfield, and Merrimac soils. Unlike Carver soils, Berryland and Maybid soils are gleyed in the solum. Carver soils formed in unconsolidated mineral material, whereas Freetown and Swansea soils formed in organic material.

Typical pedon of Carver coarse sand, 0 to 3 percent slopes, in a wooded area; 20 feet north of an unnamed dirt road, 3,250 feet east of its intersection with Old King's Highway, 1.2 miles south of the road leading to Marconi Beach, in the town of Wellfleet (fig. 18):

Oi—3 to 2 inches; loose, undecomposed pine needles, leaves, and twigs.

Oe—2 inches to 0; dark reddish brown (5YR 2/2), matted, partly decomposed and well decomposed organic material.

E—0 to 7 inches; brown (10YR 5/3) coarse sand; single grain; loose; few fine and medium roots; very strongly acid; abrupt wavy boundary.

Bw1—7 to 17 inches; strong brown (7.5YR 5/6) coarse sand that has brown (10YR 5/3) and dark brown

(7.5YR 4/4) blotches in the upper part; massive; very friable; few fine and medium roots; strongly acid; gradual wavy boundary.

Bw2—17 to 26 inches; yellowish brown (10YR 5/6) coarse sand; massive; very friable; few fine and medium roots; about 2 percent gravel; strongly acid; gradual wavy boundary.

BC—26 to 40 inches; brownish yellow (10YR 6/6) coarse sand; single grain; loose; few fine and medium roots; about 2 percent gravel; strongly acid; gradual wavy boundary.

C—40 to 65 inches; light yellowish brown (10YR 6/4) coarse sand; single grain; loose; about 5 percent gravel; medium acid.

The thickness of the solum ranges from 18 to 40 inches. The content of rock fragments generally is less than 10 percent but ranges from 0 to 20 percent in individual horizons. Generally, no stones or boulders are on the surface, but in places they cover as much as 3 percent of the surface. Unless lime has been applied, reaction is extremely acid to strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 0 to 2. The E horizon has hue of 7.5YR or 10YR, value of 3 to 7, and chroma of 0 to 3. Both horizons are loamy sand, loamy coarse sand, sand, or coarse sand.

The B horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is loamy sand, loamy coarse sand, sand, or coarse sand to a depth of 10 inches and loamy coarse sand or coarse sand below that depth.

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 3 to 6. It is dominantly coarse sand but may have thin strata of fine sand or fine gravel.

Deerfield Series

Mixed, mesic Aquic Udipsamments

The Deerfield series consists of very deep, moderately well drained soils on outwash plains and in areas of glacial lake deposits. These soils formed in sandy glaciofluvial and glaciolacustrine sediments. Slopes range from 0 to 5 percent.

Deerfield soils are similar to Carver, Eastchop, and Sudbury soils and are commonly adjacent to Berryland, Merrimac, and Pipestone soils. Deerfield soils have less silt and clay and more sand in the subsoil than Sudbury soils. They are mottled in the lower part of the subsoil, whereas Pipestone soils are mottled in the upper part. Carver, Eastchop, and Merrimac soils are not mottled.

Typical pedon of Deerfield loamy fine sand, 0 to 5 percent slopes, in a wooded area; 1,500 feet west of Jones Lane, 1,400 feet south of the intersection of Jones Lane and Route 6A, in the town of Sandwich:

Oi—3 inches to 1 inch; loose, undecomposed leaves and twigs.

Oe—1 inch to 0; dark reddish brown (5YR 3/2), partly decomposed and well decomposed organic material.

E—0 to 1 inch; dark gray (10YR 4/1) loamy fine sand; massive; friable; many very fine and fine roots; extremely acid; abrupt wavy boundary.

Ap—1 to 10 inches; dark brown (10YR 4/3) loamy fine sand; massive; friable; common very fine and fine roots; very strongly acid; abrupt wavy boundary.

Bw1—10 to 24 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; few fine and medium roots; very strongly acid; clear wavy boundary.

Bw2—24 to 29 inches; light yellowish brown (2.5Y 6/4) sand; few fine faint light brownish gray (2.5Y 6/2) and brownish yellow (10YR 6/6) mottles; single grain; loose; few fine roots; very strongly acid; clear wavy boundary.

C1—29 to 42 inches; light olive brown (2.5Y 5/4) sand; common fine and medium distinct light brownish gray (2.5Y 6/2) and red (2.5YR 4/6) mottles; single grain; loose; strongly acid; abrupt wavy boundary.

C2—42 to 57 inches; light olive brown (2.5Y 5/4) fine sand; few medium faint light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) mottles; single grain; loose; slightly acid; abrupt wavy boundary.

C3—57 to 65 inches; light olive brown (2.5Y 5/4) gravelly sand; few medium faint light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) mottles; single grain; loose; about 20 percent gravel; slightly acid.

The thickness of the solum ranges from 15 to 35 inches. The content of coarse fragments, generally fine pebbles, ranges from 0 to 15 percent in the solum and from 0 to 20 percent in the substratum. Unless lime has been applied, reaction is extremely acid to slightly acid throughout the profile.

The Ap horizon has value of 2 to 4 and chroma of 1 to 3. The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Both horizons are fine sandy loam, sandy loam, loamy fine sand, loamy sand, fine sand, or sand.

The B horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. It is fine sandy loam, sandy loam, loamy sand, or sand to a depth of 10 inches and loamy fine sand, loamy sand, sand, or coarse sand below that depth. Mottles with chroma of 2 or less are at a depth of 15 to 40 inches.

The C horizon has hue of 10YR to 5Y, value of 4 to

6, and chroma of 1 to 4. It is mottled. It is fine sand, sand, coarse sand, or the gravelly analogs of those textures.

Eastchop Series

Siliceous, mesic Typic Udipsamments

The Eastchop series consists of very deep, excessively drained soils on outwash plains, on moraines, and in areas of glacial lake deposits. These soils formed in sandy glaciofluvial and glaciolacustrine sediments. Slopes range from 0 to 15 percent.

Eastchop soils are similar to Carver, Deerfield, Hooksan, and Plymouth soils and are commonly adjacent to Boxford, Nantucket, and Pipestone soils. Eastchop soils have a higher content of fine and medium sand and a lower content of coarse and very coarse sand in the solum than Carver soils. They have a lower content of gravel and cobbles in the subsoil and substratum than Plymouth soils and have brighter colors in the subsoil than Hooksan soils. Unlike Eastchop soils, Boxford, Deerfield, and Pipestone soils are mottled in the subsoil. Eastchop soils have more sand and less silt and clay in the subsoil and substratum than Nantucket and Boxford soils.

Typical pedon of Eastchop loamy fine sand, 3 to 8 percent slopes, in a wooded area; from the entrance to State Game Lands on Route 6A, about 350 feet west of where Route 6A crosses Scorton Creek, then 325 feet southwest along a trail and 50 feet east, in the town of Sandwich:

Oi—2 inches to 1 inch; loose, undecomposed pine needles, leaves, and twigs.

Oe—1 inch to 0; partly decomposed and well decomposed organic material.

A—0 to 1 inch; very dark gray (10YR 3/1) loamy fine sand; weak fine granular structure; very friable; common fine and medium roots; about 2 percent gravel; extremely acid; abrupt wavy boundary.

Ap—1 to 6 inches; yellowish brown (10YR 5/4) loamy fine sand; massive; very friable; common fine and medium roots; about 2 percent gravel; very strongly acid; abrupt wavy boundary.

Bw1—6 to 10 inches; yellowish brown (10YR 5/8) loamy fine sand; massive; very friable; few fine roots; about 2 percent gravel; very strongly acid; clear wavy boundary.

Bw2—10 to 19 inches; yellowish brown (10YR 5/6) loamy fine sand; massive; very friable; few fine roots; very strongly acid; clear wavy boundary.

BC—19 to 25 inches; olive yellow (2.5Y 6/6) fine sand; single grain; loose; few fine roots; about 2 percent gravel; very strongly acid; clear wavy boundary.

C1—25 to 41 inches; light yellowish brown (2.5Y 6/4) very fine sand; single grain; loose; few fine roots; very strongly acid; clear wavy boundary.

C2—41 to 47 inches; light olive brown (2.5Y 5/4) very fine sand; common strong brown (7.5YR 5/8) blotches and streaks; single grain; loose; very strongly acid; clear wavy boundary.

C3—47 to 65 inches; light olive brown (2.5Y 5/4) very fine sand; single grain; loose; very strongly acid.

The thickness of the solum ranges from 20 to 36 inches. The content of gravel in the surface layer and substratum ranges from 0 to 15 percent, and the content of cobbles in the surface layer and subsoil ranges from 0 to 3 percent. Reaction is extremely acid to strongly acid in the surface layer and the upper part of the subsoil and very strongly acid or strongly acid in the lower part of the subsoil and in the substratum.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 4 to 6. These horizons have a weak granular structure or are structureless. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. Hue is 7.5YR in the upper part of the B horizon and 2.5Y in the lower part. The A, Ap, E, and B horizons are fine sand, loamy fine sand, loamy sand, or sand.

The C horizon has hue of 10YR, 7.5YR, or 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is very fine sand, sand, or coarse sand. In some pedons it is stratified.

Enfield Series

Coarse-silty over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts

The Enfield series consists of very deep, well drained soils on outwash plains. These soils formed in a mantle of silty and loamy eolian material and are underlain by sandy glaciofluvial sediments. Slopes range from 0 to 15 percent.

Enfield soils are similar to Merrimac soils and are commonly adjacent to Carver, Hinckley, and Sudbury soils. Enfield soils have more silt and less sand in the solum than Carver, Hinckley, and Merrimac soils. Unlike Enfield soils, Sudbury soils are mottled in the subsoil.

Typical pedon of Enfield silt loam, 0 to 3 percent slopes, in a gravel pit; 700 feet north of Route 30, about 800 feet east of the intersection of Route 30 and South Sandwich Road, in the town of Mashpee:

Oi—2 inches to 1 inch; loose, undecomposed leaves and twigs.

Oe—1 inch to 0; partly decomposed and well decomposed organic material.

E—0 to 1 inch; brown (7.5YR 4/2) silt loam; massive; very friable; common very fine and fine roots; about 1 percent fine gravel; very strongly acid; abrupt wavy boundary.

Bs—1 to 1.5 inches; reddish brown (5YR 4/4) silt loam; massive; friable; common very fine and fine roots; about 1 percent fine gravel; very strongly acid; abrupt wavy boundary.

Bw1—1.5 to 12 inches; strong brown (7.5YR 5/6) silt loam; massive; friable; common very fine and fine roots; about 1 percent gravel; very strongly acid; gradual wavy boundary.

Bw2—12 to 29 inches; yellowish brown (10YR 5/8) silt loam; massive; friable; common fine roots; about 1 percent fine gravel; very strongly acid; clear broken boundary.

Bw3—29 to 31 inches; yellowish brown (10YR 5/4) very fine sandy loam; few fine distinct yellowish red (5YR 5/6) and light yellowish brown (2.5Y 6/4) variegated colors; massive; friable; common fine roots; about 1 percent gravel; very strongly acid; abrupt wavy boundary.

2C1—31 to 33 inches; yellowish brown (10YR 5/4) gravelly loamy coarse sand; massive; friable; few fine roots; about 20 percent gravel; strongly acid; abrupt wavy boundary.

2C2—33 to 38 inches; brownish yellow (10YR 6/6) sand; single grain; loose; few fine roots; strongly acid; abrupt wavy boundary.

2C3—38 to 46 inches; light yellowish brown (10YR 6/4) very gravelly coarse sand; single grain; loose; few fine roots; about 40 percent gravel; strongly acid; abrupt wavy boundary.

2C4—46 to 65 inches; pale brown (10YR 6/3) gravelly coarse sand; single grain; loose; about 15 percent gravel; strongly acid.

The thickness of the solum ranges from 18 to 40 inches and corresponds to the depth to sand and gravel. The content of coarse fragments ranges from 0 to 10 percent in the solum and from 0 to 70 percent in the substratum. Unless lime has been applied, reaction is very strongly acid to medium acid throughout the profile.

Some pedons have an Ap horizon. This horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The E horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Both horizons are silt loam or very fine sandy loam.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 8. Some pedons have an incipient Bhs or Bs horizon. This horizon has hue of 5YR. The lower part of the B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. The B horizon is dominantly silt loam or very fine sandy loam. In some pedons, however, it is fine sandy loam or sandy loam in the lower part. In some pedons the lower part of the B horizon does not have variegated colors.

The 2C horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 6. It is commonly stratified sand and gravel.

Freetown Series

Dysic, mesic Typic Medisaprists

The Freetown series consists of very deep, very poorly drained soils on outwash plains, on moraines, and in areas of glacial lake deposits (fig. 19). These soils formed in thick deposits of highly decomposed organic material. Slopes are less than 1 percent.

Freetown soils are similar to Ipswich, Pawcatuck, and Swansea soils and are commonly adjacent to Berryland, Carver, Maybid, and Pipestone soils. Freetown soils formed in organic material deposited in a freshwater environment, whereas Ipswich and Pawcatuck soils formed in organic material deposited in a marine environment. Berryland, Carver, Maybid, and Pipestone are mineral soils that may have an organic surface layer that is less than 16 inches thick, whereas Freetown soils formed in organic material more than 16 inches thick.

Typical pedon of Freetown mucky peat, 0 to 1 percent slopes, ponded, in a wooded area; 200 feet west of Gifford Street, 0.55 mile north of the intersection of Gifford Street and Jones Road, in the town of Falmouth:

Oe1—0 to 2 inches; mucky peat, dark reddish brown (5YR 2/2) broken face and rubbed; 70 percent fiber, 30 percent rubbed; massive; nonsticky and nonplastic; common very fine roots; extremely acid; abrupt smooth boundary.

Oe2—2 to 5 inches; mucky peat, dark reddish brown (5YR 3/3) broken face and rubbed; about 50 percent fiber, 20 percent rubbed; massive; nonsticky and nonplastic; many very fine and fine roots; extremely acid; abrupt smooth boundary.

Oa—5 to 15 inches; muck, dark reddish brown (5YR 3/2) broken face and rubbed; 30 percent fiber, 10 percent rubbed; massive; nonsticky and nonplastic; common very fine and fine roots; extremely acid; clear wavy boundary.

Oe′—15 to 21 inches; mucky peat, very dusky red

(2.5YR 2/2) broken face and rubbed; about 35 percent fiber, 20 percent rubbed; massive; nonsticky and nonplastic; common very fine and fine roots; extremely acid; abrupt wavy boundary.

Oa'1—21 to 25 inches; muck, dark reddish brown (2.5YR 2/4) broken face and rubbed; about 35 percent fiber, 10 percent rubbed; massive; nonsticky and nonplastic; few fine roots; extremely acid; abrupt wavy boundary.

Oa'2—25 to 65 inches; muck, very dusky red (2.5YR 2/2) broken face and rubbed; about 30 percent fiber, 10 percent rubbed; massive; nonsticky and nonplastic; extremely acid.

The organic material extends to a depth of 51 inches or more. Some pedons have woody fragments in some or all parts. These fragments make up as much as 25 percent of some horizons. Reaction is less than 4.5 (in 0.01 molar calcium chloride) throughout the control section.

The surface tier has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. It is dominantly sapric material, but some pedons have varying proportions of both sapric and hemic material. This tier generally has weak or moderate, fine or medium granular structure or is massive. In areas where these soils are used for the production of cranberries, however, the upper 4 to 10 inches is sand or coarse sand that is single grain and loose.

The subsurface tier has hue of 2.5YR, 5YR, or 10YR or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 4. It is dominantly sapric material in which the content of fiber is less than 16 percent after rubbing. The bottom tier has textures and colors similar to those of the subsurface tier.

Hinckley Series

Sandy-skeletal, mixed, mesic Typic Udorthents

The Hinckley series consists of very deep, excessively drained soils on outwash plains and in areas of ice-contact deposits. These soils formed in sandy glaciofluvial sediments. Slopes range from 0 to 35 percent.

Hinckley soils are similar to Hinesburg and Plymouth soils and are commonly adjacent to Carver, Enfield, and Merrimac soils. Hinckley soils have more sand and less silt in the solum than Enfield and Merrimac soils. They have a higher content of coarse fragments in the substratum than Plymouth and Carver soils and have less silt and clay in the substratum than Hinesburg soils.

Typical pedon of Hinckley gravelly sandy loam, 15 to 35 percent slopes, in a wooded area on the east bank of a gravel pit; 1,200 feet west of Blacksmith Shop Road, 0.45 mile northeast of the intersection of Blacksmith Shop Road and Locustfield Road, in the town of Falmouth:

Oi—3 inches to 1 inch; loose, undecomposed pine needles, leaves, and twigs.

Oe—1 inch to 0; partly decomposed and well decomposed organic material.

A—0 to 1 inch; black (10YR 2/1) sandy loam; massive; very friable; many very fine and fine roots; about 5 percent gravel and 5 percent cobbles; very strongly acid; abrupt wavy boundary.

E—1 to 2 inches; dark grayish brown (10YR 4/2) sandy loam; massive; very friable; many very fine and fine roots; about 5 percent gravel and 5 percent cobbles; very strongly acid; abrupt wavy boundary.

Bhs—2 to 3 inches; dark reddish brown (5YR 3/4) gravelly sandy loam; massive; friable; many very fine and fine roots; about 10 percent gravel and 5 percent cobbles; very strongly acid; abrupt irregular boundary.

Bw1—3 to 10 inches; yellowish brown (10YR 5/6) gravelly sandy loam; massive; friable; common very fine and fine roots; about 15 percent gravel and 5 percent cobbles; strongly acid; gradual wavy boundary.

Bw2—10 to 17 inches; yellowish brown (10YR 5/6) gravelly loamy coarse sand; massive; friable; common very fine and fine roots; about 25 percent gravel and 5 percent cobbles; strongly acid; clear wavy boundary.

C1—17 to 54 inches; brownish yellow (10YR 6/6) very gravelly coarse sand; single grain; loose; few very fine and fine roots in the upper 6 inches; about 50 percent gravel and 15 percent cobbles; strongly acid; abrupt wavy boundary.

C2—54 to 65 inches; light yellowish brown (10YR 6/4) gravelly coarse sand; single grain; loose; about 15 percent gravel; medium acid.

The thickness of the solum ranges from 12 to 30 inches. The surface soil is 5 to 45 percent gravel, 0 to 15 percent cobbles, and 0 to 3 percent stones. The substratum is 35 to 50 percent gravel, 5 to 15 percent cobbles, and 0 to 5 percent stones. Reaction is extremely acid to medium acid throughout the profile.

The Ap or A horizon has value of 2 to 4 and chroma of 1 to 3. The E horizon has value of 4 to 6 and chroma of 1 or 2. These horizons are loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, or fine sandy loam.

The upper part of the B horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 4 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 4 to 8. This horizon is loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, fine sandy loam, or the gravelly analogs of those textures to a depth of 10 inches and loamy coarse sand, loamy sand, loamy fine sand, or the gravelly analogs of those textures below that depth.

The C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 7, and chroma of 2 to 8. It is coarse sand, sand, loamy coarse sand, or loamy fine sand. It is generally stratified.

Hinesburg Series

Sandy over loamy, mixed, nonacid, mesic Typic Udorthents

The Hinesburg series consists of very deep, well drained soils on outwash plains and in areas of glacial lake sediments. These soils formed in sandy glaciofluvial sediments underlain by loamy glaciolacustrine sediments. Slopes range from 0 to 25 percent.

Hinesburg soils are similar to Hinckley soils and are commonly adjacent to Amostown, Belgrade, Carver, Nantucket, Plymouth, and Walpole soils. Hinesburg soils have more silt and clay and less sand in the substratum than Carver, Hinckley, and Plymouth soils. They have less silt and clay in the subsoil than Nantucket soils. Unlike Hinesburg soils, Amostown, Belgrade, and Walpole soils are mottled in the subsoil.

Typical pedon of Hinesburg sandy loam, 3 to 8 percent slopes, in a cultivated field; 1,050 feet south of the entrance to the Barnstable County Farm off of Route 6A, about 0.38 mile east of the intersection of Route 6A and Indian Trail Road, in the town of Barnstable:

Ap—0 to 10 inches; dark brown (10YR 3/3) sandy loam; weak fine and medium granular structure; very friable; common very fine roots; about 5 percent gravel; slightly acid; abrupt smooth boundary.

Bw1—10 to 22 inches; yellowish brown (10YR 5/6) loamy coarse sand; massive; very friable; few very fine roots; about 10 percent gravel; slightly acid; clear wavy boundary.

Bw2—22 to 32 inches; light olive brown (2.5Y 5/4) loamy sand; massive; very friable; about 2 percent gravel; slightly acid; clear irregular boundary.

2C1—32 to 38 inches; light brownish gray (2.5Y 6/2) fine sandy loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable, slightly acid; clear wavy boundary.

2C2—38 to 65 inches; light olive brown (2.5Y 5/4) sandy clay loam; common fine distinct strong brown (7.5YR 5/6) and light brownish gray (2.5Y 6/2) mottles; weak medium angular blocky structure; firm, sticky and slightly plastic; few clay films on faces of peds; about 5 percent gravel; slightly acid.

The thickness of the solum ranges from 16 to 32 inches. Depth to the 2C horizon ranges from 18 to 40 inches. The content of coarse fragments ranges from 0 to 10 percent throughout the profile. Reaction is medium acid or slightly acid in the solum and strongly acid to neutral in the 2C horizon.

The A horizon has hue of 7.5YR to 2.5Y and value and chroma of 2 to 4. It is loamy coarse sand, loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6. It is loamy coarse sand, loamy sand, or sand.

The 2C horizon has hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 to 4. It is dominantly fine sandy loam, very fine sandy loam, silt loam, sandy clay loam, or silty clay loam. In some pedons, however, it has thin strata of very fine sand, loamy very fine sand, or loamy fine sand.

Hooksan Series

Mesic, uncoated Typic Quartzipsamments

The Hooksan series consists of very deep, excessively drained soils on vegetated sand dunes adjacent to beaches along the coast. These soils formed in thick deposits of sandy windblown sediments. Slopes range from 0 to 35 percent.

Hooksan soils are similar to Carver, Eastchop, and Plymouth soils and are commonly adjacent to Ipswich, Pawcatuck, and Matunuck soils. Unlike Hooksan soils, Carver, Eastchop, and Plymouth soils have redder hues and distinct profile development in the subsoil and Ipswich, Pawcatuck, and Matunuck soils have a thick organic surface layer and are inundated daily by tides.

Typical pedon of Hooksan sand, rolling, in a grassed area; 200 feet southeast of the parking area for Marconi Beach, in the town of Wellfleet:

C1—0 to 20 inches; pale brown (10YR 6/3) sand; single grain; loose; many fine and medium roots; medium acid; diffuse wavy boundary.

C2—20 to 30 inches; pale brown (10YR 6/3) sand; single grain; loose; many fine roots; slightly acid; diffuse wavy boundary.

C3—30 to 40 inches; pale brown (10YR 6/3) sand; single grain; loose; medium acid; gradual wavy boundary.

C4—40 to 65 inches; light yellowish brown (10YR 6/4) sand; single grain; loose; medium acid.

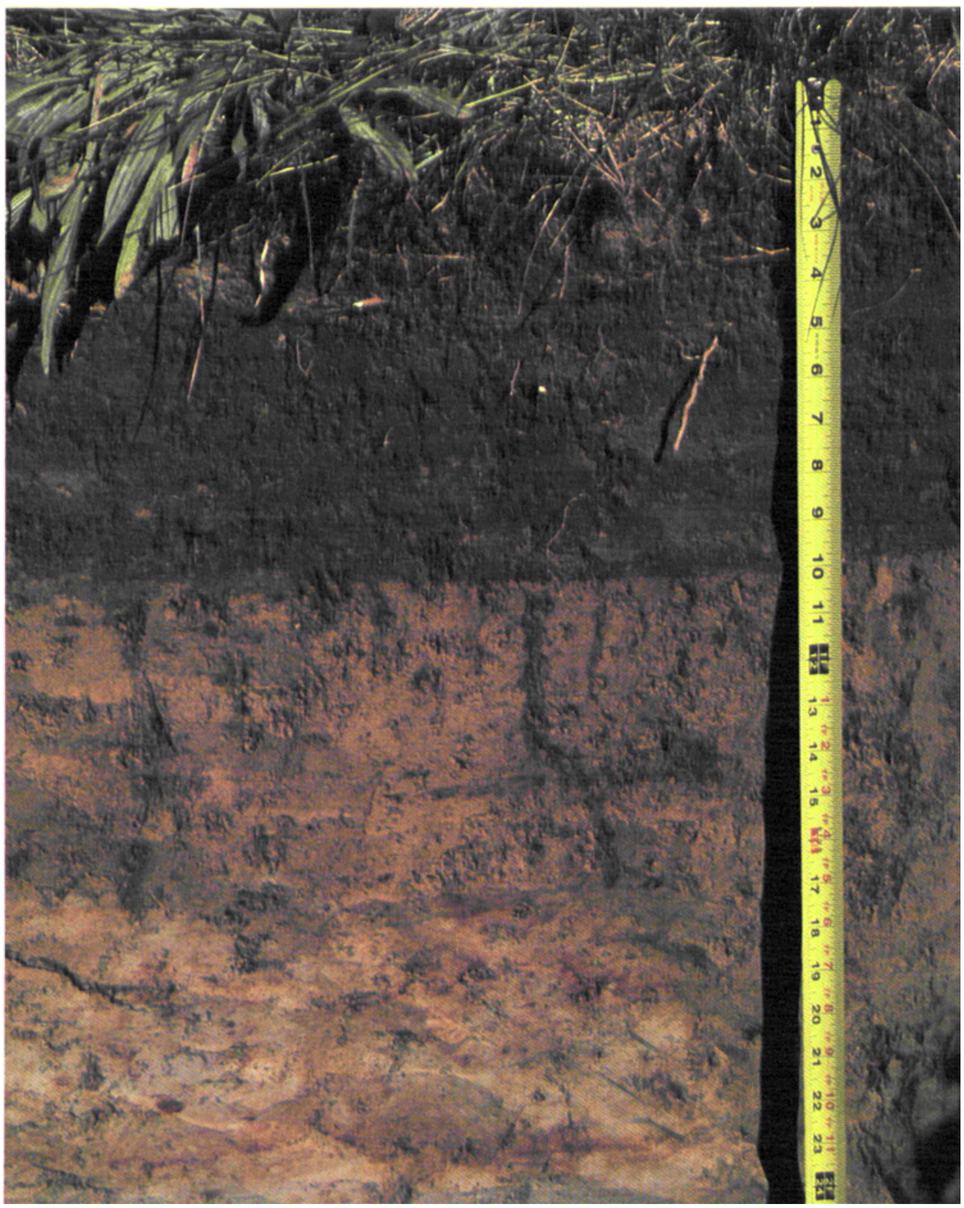


Figure 17.—Typical profile of Belgrade silt loam.

Figure 18.—Typical profile of Carver coarse sand.

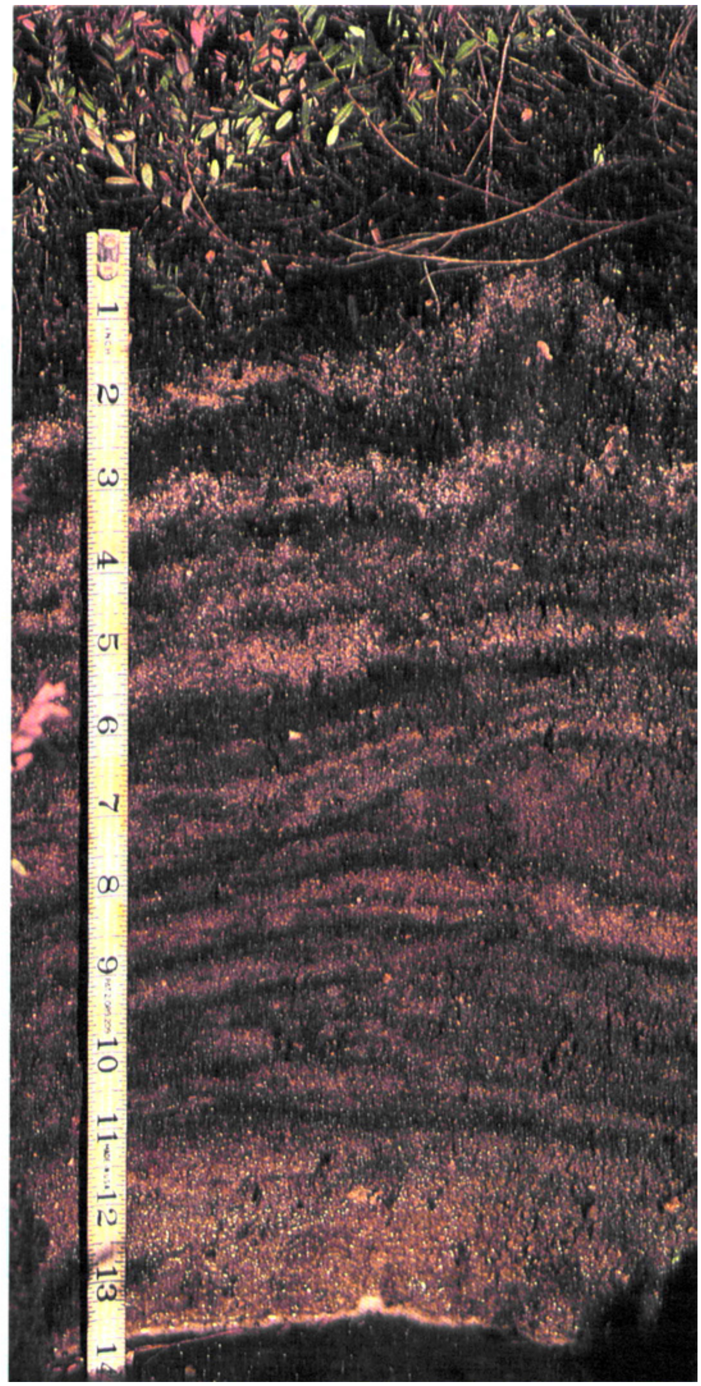


Figure 19.—Profile of the upper part of Freetown coarse sand. The dark and light layers near the surface are the result of sanding for cranberries.

Figure 20.—Typical profile of Ipswich peat.

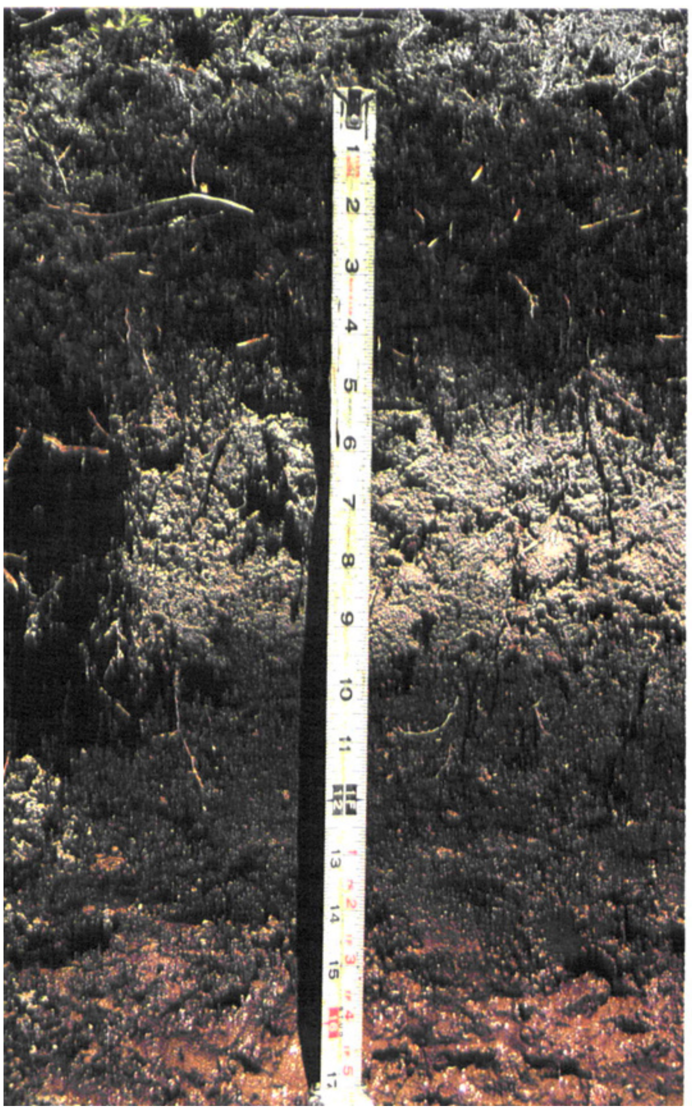


Figure 21.—Typical profile of Pipestone loamy coarse sand.

Figure 22.—Typical profile of Plymouth loamy coarse sand.

The content of silt combined with the content of clay is less than 5 percent to a depth of more than 80 inches. Some pedons have an A horizon. Reaction is strongly acid to neutral in the A horizon and medium acid to mildly alkaline in the C horizon.

The A horizon has value of 3 to 7 and chroma of 1 or 2. It is fine sand or sand.

The upper part of the C horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 3 to 8. The lower part has hue of 10YR, 2.5Y, or 5Y, value of 4 to 8, and chroma of 1 to 8. This horizon is coarse sand, sand, and fine sand. Some pedons have roughly horizontal bands that have a high proportion of dark minerals. These bands are ¼ to ½ inch thick.

Ipswich Series

Euic, mesic Typic Sulfihemists

The Ipswich series consists of very deep, very poorly drained soils in tidal marshes that are flooded daily by salt water. These soils formed in deposits of marine organic material more than 51 inches thick. Slopes are less than 1 percent.

Ipswich soils are similar to Freetown, Pawcatuck, and Swansea soils and are commonly adjacent to Carver, Hooksan, and Matunuck soils. Unlike Ipswich soils, Freetown and Swansea soils formed in freshwater environments. Pawcatuck soils formed in organic marine deposits thinner than those in which Ipswich soils formed. Carver, Hooksan, and Matunuck soils formed in sandy deposits and have an organic surface layer less than 16 inches thick.

Typical pedon of Ipswich peat, in an area of Ipswich, Pawcatuck, and Matunuck peats, 0 to 1 percent slopes, in a tidal marsh; 1,400 feet northeast of a turnaround at the northern end of an unnamed road, north of Route 6A, 0.2 mile northwest of the intersection of Route 6A and Route 132, in the town of Barnstable (fig. 20):

Oi—0 to 7 inches; dark grayish brown (2.5Y 4/2) peat; about 95 percent fiber, 80 percent rubbed; massive; nonsticky and nonplastic; many very fine and fine roots; light gray (2.5Y 7/2) sodium pyrophosphate extract color; herbaceous fibers; about 10 percent silt and very fine sand; medium acid (pH 5.9 in 0.01 molar calcium chloride); abrupt smooth boundary.

Oe1—7 to 16 inches; dark grayish brown (2.5Y 4/2) mucky peat; about 90 percent fiber, 60 percent rubbed; massive; nonsticky and nonplastic; many very fine roots; light gray (2.5Y 7/2) sodium pyrophosphate extract color; herbaceous fibers; about 10 percent silt and very fine sand; neutral (pH 7.0 in 0.01 molar calcium chloride); clear smooth boundary.

Oe2—16 to 25 inches; dark grayish brown (2.5Y 4/2) mucky peat; about 80 percent fiber, 40 percent rubbed; massive; nonsticky and nonplastic; white (5Y 8/2) sodium pyrophosphate extract color; herbaceous fibers; about 10 percent silt and very fine sand; neutral (pH 7.5 in 0.01 molar calcium chloride); clear smooth boundary.

Oe3—25 to 40 inches; dark grayish brown (2.5Y 4/2) mucky peat; about 75 percent fiber, 35 percent rubbed; massive; nonsticky and nonplastic; white (5Y 8/2) sodium pyrophosphate extract color; herbaceous fibers; about 20 percent silt and very fine sand; neutral (pH 7.5 in 0.01 molar calcium chloride); clear smooth boundary.

Oe4—40 to 65 inches; very dark grayish brown (2.5Y 3/2) mucky peat; about 60 percent fiber, 20 percent rubbed; massive; nonsticky and nonplastic; white (5Y 8/2) sodium pyrophosphate extract color; herbaceous fibers; about 70 percent silt and very fine sand; neutral (pH 7.5 in 0.01 molar calcium chloride).

The organic material extends to a depth of more than 51 inches. Reaction is medium acid to neutral throughout the profile. Some pedons have thin layers of very fine sand and silt. The content of mineral material ranges from 5 to 80 percent throughout the profile.

The surface, subsurface, and bottom tiers have hue of 10YR to 5Y or are neutral in hue. They have value of 2 to 4 and chroma of 0 to 3. In the surface tier, the content of fiber is 35 to 100 percent before rubbing and 20 to 95 percent after rubbing. In the subsurface tier, it is 20 to 85 percent before rubbing and 20 to 95 percent after rubbing. In the bottom tier, it is 10 to 90 percent before rubbing and less than 40 percent after rubbing.

Matunuck Series

Sandy, mixed, mesic Typic Sulfaquents

The Matunuck series consists of very deep, very poorly drained soils in tidal marshes that are flooded by salt water. These soils formed in organic material 8 to 16 inches deep over sandy marine sediments. Slopes are less than 1 percent.

Matunuck soils are similar to Berryland, Pawcatuck, and Swansea soils and are commonly adjacent to Carver, Hooksan, and Ipswich soils. Unlike Matunuck soils, Berryland, Carver, Freetown, and Hooksan soils did not form in a marine environment and are not subject to tidal flooding. Freetown, Ipswich, and Pawcatuck soils formed in organic deposits thicker than those in which Mantunuck soils formed.

Typical pedon of Matunuck peat, in an area of Ipswich, Pawcatuck, and Matunuck peats, 0 to 1 percent slopes, in a tidal marsh; 100 feet east of Lieutenant Island Road, 0.6 mile north of a bridge over the tidal creek, in the town of Wellfleet:

Oi—0 to 13 inches; dark grayish brown (10YR 4/2) peat; about 80 percent fiber, 45 percent rubbed; massive; nonsticky and nonplastic; many fine roots; white (10YR 8/2) sodium pyrophosphate extract color; herbaceous fibers; about 25 percent silt and sand; neutral (pH 5.5 in 0.01 molar calcium chloride); abrupt smooth boundary.
2C1—13 to 43 inches; grayish brown (10YR 5/2) coarse sand; single grain; loose neutral; abrupt smooth boundary.
2C2—43 to 46 inches; dark gray (N 4/0) coarse sand; single grain; loose; neutral; abrupt smooth boundary.
2C3—46 to 65 inches; very dark gray (5Y 3/1) coarse sandy loam; massive; very friable; neutral.

The organic surface layer is 8 to 16 inches thick. Reaction is strongly acid to neutral throughout the profile. The total content of salt is generally more than 10,000 parts per million but ranges from 1,000 to 35,000 parts per million in some pedons.

The O horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 2 to 4 and chroma of 0 to 2. The content of fiber is 25 to 80 percent before rubbing and 15 to 50 percent after rubbing. The content of organic matter ranges from 20 to 75 percent.

The C horizon has hue of 10YR to 5G or is neutral in hue. It has value of 2 to 7 and chroma of 0 to 3. The 2C1 horizon is fine sandy loam to coarse sand. The 2C2 horizon is coarse sandy loam, loamy sand, sand, or coarse sand.

Maybid Series

Fine, illitic, nonacid, mesic Typic Humaquepts

The Maybid series consists of very deep, very poorly drained soils in areas of glacial lake deposits. These soils formed in loamy and silty glaciolacustrine and marine sediments. Slopes range from 0 to 3 percent.

Maybid soils are similar to Maybid Variant and Scitico soils and are commonly adjacent to Boxford, Carver, Freetown, Swansea, and Walpole soils. Maybid soils have less sand in the subsoil than Walpole soils. Unlike Maybid soils, Boxford and Carver soils are not gleyed in the subsoil and substratum. Scitico soils have less organic matter in the surface layer than Maybid soils. Maybid soils are less acid in the surface layer and subsoil than Maybid Variant soils. They formed in mineral material, whereas Freetown and Swansea soils formed in organic material.

Typical pedon of Maybid silt loam, 0 to 3 percent slopes, in a wooded swamp; 2,000 feet east of Route 149, about 0.8 mile southwest of the intersection of Route 149 and Route 6A, in the town of Barnstable:

Oi—1 inch to 0; loose, undecomposed leaves and twigs.
Oa—0 to 2 inches; dark reddish brown (5YR 2/2) muck; strongly acid.
A—2 to 7 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable, slightly plastic; many very fine and fine roots; strongly acid; clear irregular boundary.
Bg—7 to 20 inches; gray (5Y 6/1) silty clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak medium angular blocky structure; friable, sticky and plastic; few clay films within pores and on faces of peds; many very fine and fine roots; medium acid; clear wavy boundary.
Cg1—20 to 30 inches; gray (5Y 6/1) silty clay loam; many medium prominent strong brown (7.5YR 5/8) and dark reddish brown (2.5YR 3/4) mottles; massive; firm, slightly sticky and slightly plastic; few clay films within pores; few very fine and fine roots; slightly acid; gradual wavy boundary.
Cg2—30 to 36 inches; olive (5Y 5/3) silty clay loam; many coarse prominent gray (5Y 6/1) and strong brown (7.5YR 5/8) mottles; massive; firm, slightly sticky and slightly plastic; few clay films within pores; few fine roots; slightly acid; clear wavy boundary.
Cg3—36 to 47 inches; gray (5Y 6/1) silty clay loam; many coarse prominent strong brown (7.5YR 5/8) and dark reddish brown (2.5YR 3/4) mottles; massive; firm, sticky and plastic; slightly acid; clear wavy boundary.
Cg4—47 to 65 inches; greenish gray (5BG 5/1) silty clay loam; common medium prominent reddish brown (5YR 4/4) mottles; massive; firm, slightly sticky and slightly plastic; slightly acid.

The thickness of the solum ranges from 18 to 30 inches. The content of coarse fragments is commonly less than 1 percent throughout the profile. Reaction is strongly acid or medium acid in the A horizon, medium acid to neutral in the B horizon, and slightly acid or neutral in the C horizon. At least one subhorizon within a depth of 40 inches is medium acid to neutral.

The A horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is silt loam or silty clay loam.

Some pedons have an E horizon. This horizon has hue of 5Y to 5BG or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2. It is mottled in some pedons.

It is silt loam, silty clay loam, or silty clay.

The Bg horizon has hue of 5Y or 5GY or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It has distinct or prominent, high-chroma mottles, which make up less than 40 percent of the matrix. This horizon is silty clay or silty clay loam.

The Cg horizon has hue of 5Y to 5BG or is neutral in hue. It has value of 4 to 6 and chroma of 0 or 1. It is silty clay loam or silty clay.

Maybid Variant

Fine-silty, mixed, acid, mesic Sulfic Haplaquepts

The Maybid Variant consists of very deep, poorly drained soils in tidal marshes that are no longer subject to tidal flooding. These soils formed in loamy marine sediments drained of salt water. Slopes are less than 1 percent.

Maybid Variant soils are similar to Maybid soils and are commonly adjacent to Carver, Freetown, and Swansea soils. Maybid Variant soils are more acid in the surface layer and subsoil than Maybid soils. They have more silt and clay throughout than Carver soils. They formed in mineral material, whereas Freetown and Swansea soils formed in organic material.

Typical pedon of Maybid Variant silty clay loam, 0 to 1 percent slopes, in a shrubby area; 210 feet southwest of Bound Brook Island Road, 0.65 mile southeast of the intersection of Bound Brook Island Road and Pamet Point Road, in the town of Wellfleet:

Oi—3 inches to 0; black (5YR 2/1) muck; extremely acid.

A—0 to 12 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent yellowish red (5YR 4/6) and dark reddish brown (5YR 2/2) mottles; moderate fine and medium granular structure; friable; many fine roots; extremely acid; clear wavy boundary.

Bg—12 to 18 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common medium prominent reddish brown (5YR 4/4) and very dark gray (2.5Y 3/0) mottles; weak medium and coarse angular blocky structure; friable, slightly plastic and slightly sticky; common fine roots in the upper 3 inches; extremely acid; abrupt wavy boundary.

Cg1—18 to 25 inches; dark greenish gray (5GY 4/1) silty clay loam; massive; slightly plastic and slightly sticky; many medium prominent very pale brown (10YR 8/4) mottles; very strongly acid; clear wavy boundary.

Cg2—25 to 65 inches; very dark gray (N 3/0) loam; massive; slightly plastic and slightly sticky; sulfide odor; neutral.

The thickness of the solum ranges from 18 to 28 inches. The organic surface layer ranges from 3 to 12 inches in thickness. Reaction is extremely acid or very strongly acid in the solum and slightly acid to mildly alkaline in the substratum.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2. The B horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2. Both horizons are silt loam or silty clay loam.

The C horizon has hue of 2.5Y to 5GY or is neutral in hue. It has value of 3 or 4 and chroma of 0 to 2. It is loam, clay loam, or silty clay loam. It generally has the odor of sulfides in the lower part.

Merrimac Series

Sandy, mixed, mesic Typic Dystrochrepts

The Merrimac series consists of very deep, somewhat excessively drained soils on outwash plains. These soils formed in loamy and sandy glaciofluvial deposits. Slopes range from 0 to 25 percent.

Merrimac soils are similar to Barnstable and Enfield soils and are commonly adjacent to Carver, Deerfield, Hinckley, and Sudbury soils. Merrimac soils have more medium and coarse sand and less silt in the solum than Enfield soils. Unlike Merrimac soils, Barnstable soils have stones and boulders within the profile and Deerfield and Sudbury soils are mottled in the subsoil. Merrimac soils have more silt in the solum than Carver and Hinckley soils.

Typical pedon of Merrimac sandy loam, 0 to 3 percent slopes, in a wooded area; 50 feet east of Great Neck Road, 0.9 mile south of the rotary where Route 151 and Route 28 intersect, in the town of Mashpee:

Oi—3 inches to 0; loose, undecomposed pine needles, leaves, and twigs.

A—0 to 1 inch; black (10YR 2/1) sandy loam; weak fine granular structure; very friable; many fine and medium roots; about 5 percent fine gravel; extremely acid; abrupt wavy boundary.

E—1 to 3 inches; light brownish gray (10YR 6/2) sandy loam; weak fine granular structure; very friable; common fine roots; about 5 percent fine gravel; extremely acid; abrupt wavy boundary.

Bw1—3 to 7 inches; strong brown (7.5YR 5/8) sandy loam; weak fine granular structure; very friable; many fine and medium roots; about 5 percent fine gravel; very strongly acid; clear wavy boundary.

Bw2—7 to 17 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; about 5 percent fine gravel; very strongly acid; gradual wavy boundary.

Bw3—17 to 24 inches; brownish yellow (10YR 6/6) sandy loam; massive; friable; few fine roots; about 5 percent fine gravel; strongly acid; abrupt wavy boundary.

2C—24 to 65 inches; light yellowish brown (2.5Y 6/4) coarse sand; single grain; loose; few fine roots in the upper 3 inches; about 10 percent fine gravel; strongly acid.

The thickness of the solum ranges from 18 to 30 inches. The content of gravel is 0 to 10 percent in the solum and 0 to 15 percent in the substratum but ranges to as much as 30 percent in individual strata. The content of cobblestones in the substratum ranges from 0 to 5 percent. Unless lime has been applied, reaction is extremely acid to medium acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. In cultivated areas the Ap horizon has hue similar to that of the A horizon but has value of 3 or 4 and chroma of 2 to 4. The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 1 or 2. These horizons are fine sandy loam or sandy loam.

The B horizon has hue of 7.5YR or 10YR in the upper part and hue of 10YR or 2.5Y in the lower part. It has value of 3 to 6 and chroma of 3 to 8. The upper part of this horizon is fine sandy loam or sandy loam. The lower part is sandy loam, loamy sand, or loamy coarse sand.

The 2C horizon has hue of 10YR to 5Y. It ranges widely in value and chroma. It is sand or stratified sand, gravel, and cobblestones.

Nantucket Series

Coarse-loamy, mixed, mesic Typic Dystrochrepts

The Nantucket series consists of very deep, well drained soils on terminal moraines, on ground moraines, and in areas of glacial lake deposits. These soils formed in loamy dense glacial till and in stony, loamy, and silty flow till. Slopes range from 3 to 35 percent.

Nantucket soils are similar to Barnstable soils and are commonly adjacent to Carver, Eastchop, Hinesburg, and Plymouth soils. Nantucket soils have more silt and less sand in the subsoil than Eastchop and Hinesburg soils. They have more silt and clay in the substratum than Barnstable, Carver, and Plymouth soils.

Typical pedon of Nantucket sandy loam, 3 to 8 percent slopes, in a wooded area; 35 feet north of the circle at the end of Hidden Village Road, 1,750 feet east of the intersection of Hidden Village Road and Old Silver Beach Road, in the town of Falmouth:

Oi—2 inches to 0.5 inch; loose, undecomposed leaves and twigs.

Oe—0.5 inch to 0; partly decomposed and well decomposed organic material.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) sandy loam; weak fine and medium granular structure; very friable; many very fine and fine roots; about 2 percent gravel and cobbles; very strongly acid; abrupt smooth boundary.

E—1 to 5 inches; dark yellowish brown (10YR 3/4) sandy loam; massive; friable; common very fine and fine roots; about 2 percent gravel and cobbles; very strongly acid; abrupt wavy boundary.

Bw1—5 to 17 inches; yellowish brown (10YR 5/6) sandy loam; massive; friable; common very fine and fine roots; about 5 percent gravel and cobbles; very strongly acid; gradual wavy boundary.

Bw2—17 to 27 inches; light olive brown (2.5Y 5/6) sandy loam; massive; friable; few very fine and fine roots; about 5 percent gravel and cobbles; very strongly acid; clear wavy boundary.

2Cd—27 to 65 inches; light olive brown (2.5Y 5/4) loam; massive; firm, slightly sticky and nonplastic; about 10 percent gravel and cobbles; thin lenses and pockets of loamy sand and sand; very strongly acid.

The thickness of the solum ranges from 20 to 34 inches and corresponds closely to depth to the firm substratum. The content of rock fragments ranges from 0 to 20 percent throughout the profile. Unless lime has been applied, reaction is strongly acid or very strongly acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 or 2. It is sandy loam or fine sandy loam.

The B horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 3 to 6. It is sandy loam, fine sandy loam, or loam.

The 2Cd horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 3 to 6. It is mottled in some pedons. It is firm or very firm. It is dominantly sandy loam, loam, sandy clay loam, or silt loam, but in some pedons it has thin strata and lenses of coarse textured sediments. Where this horizon is bedded, the beds are commonly folded and distorted.

Pawcatuck Series

Sandy or sandy-skeletal, mixed, euic, mesic Terric Sulfihemists

The Pawcatuck series consists of very deep, very poorly drained soils in tidal marshes that are flooded daily by salt water. These soils formed in organic marine deposits 16 to 51 inches deep over sandy marine sediments. Slopes are less than 1 percent.

Pawcatuck soils are similar to Freetown, Matunuck, Ipswich, and Swansea soils and are commonly adjacent to Carver and Hooksan soils. Unlike Pawcatuck soils, Freetown and Swansea soils formed in a freshwater environment. Ipswich soils formed in organic marine deposits more than 51 inches thick. Carver, Hooksan, and Matunuck soils formed in mineral deposits and have an organic surface layer less than 16 inches thick.

Typical pedon of Pawcatuck peat, in an area of Ipswich, Pawcatuck, and Matunuck peats, 0 to 1 percent slopes, in a tidal marsh; 200 feet southwest of the bridge on Lieutenant Island Road, in the town of Wellfleet:

Oi1—0 to 13 inches; very dark grayish brown (10YR 3/2) peat; about 90 percent fiber, 80 percent rubbed; nonsticky; many fine and medium roots; white (10YR 8/1) sodium pyrophosphate extract color; herbaceous fibers; about 20 percent silt and very fine sand; strongly acid (pH 5.3 in 0.01 molar calcium chloride); abrupt smooth boundary.

Oi2—13 to 16 inches; very dark gray (5Y 3/1) peat; about 90 percent fiber, 80 percent rubbed; nonsticky; many fine and medium roots; white (10YR 8/1) sodium pyrophosphate extract color; herbaceous fibers; about 30 percent silt and very fine sand; strongly acid (pH 5.5 in 0.01 molar calcium chloride); clear smooth boundary.

Oe—16 to 22 inches; dark grayish brown (10YR 4/2) peat; about 90 percent fiber, 70 percent rubbed; nonsticky; common roots; white (10YR 8/2) sodium pyrophosphate extract color; herbaceous fibers; about 30 percent silt and very fine sand; strongly acid (pH 5.5 in 0.01 molar calcium chloride); clear smooth boundary.

2C1—22 to 30 inches; grayish brown (2.5Y 5/2) coarse sand; single grain; loose; strongly acid; abrupt wavy boundary.

2C2—30 to 65 inches; dark gray (5Y 4/1) loamy coarse sand; massive; very friable; strongly acid.

The thickness of the organic material ranges from 16 to 51 inches and corresponds closely to depth to the underlying sandy material. Reaction is strongly acid to neutral throughout the profile. Thin layers that have a high content of silt are common in the organic material.

The surface tier is neutral in hue or has hue of 10YR to 5Y. It has value of 2 to 4 and chroma of 0 to 2. The content of organic matter in this tier ranges from 20 to 80 percent.

The subsurface and bottom tiers are neutral in hue or have hue of 10YR to 5Y. They have value of 2 to 5 and chroma of 0 to 3. The content of organic matter in these tiers ranges from 20 to 70 percent.

The 2C horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 2 to 7 and chroma of 0 to 3. It is dominantly coarse sand, sand, loamy coarse sand, or loamy sand, but in some pedons it has thin layers of silt or silt loam.

Pipestone Series

Sandy, mixed, mesic Entic Haplaquods

The Pipestone series consists of very deep, poorly drained soils on outwash plains and in areas of glacial lake deposits. These soils formed in sandy glaciofluvial and glaciolacustrine sediments. Slopes range from 0 to 3 percent.

Pipestone soils are similar to Berryland and Walpole soils and are commonly adjacent to Belgrade, Carver, Deerfield, Eastchop, Freetown, Sudbury, and Swansea soils. Unlike Pipestone soils, Berryland soils are gleyed in the upper part of the solum. Pipestone soils have more sand and less silt in the substratum than Walpole soils. They are mottled closer to the surface than Belgrade, Deerfield, and Sudbury soils. Carver and Eastchop soils are not mottled. Pipestone soils formed in mineral material, whereas Freetown and Swansea soils formed in organic mineral.

Typical pedon of Pipestone loamy coarse sand, 0 to 3 percent slopes, in a wooded area; 200 feet south of Hayway Road, 0.55 mile south-southeast from the intersection of Hayway Road and Sandwich Road, in the town of Falmouth (fig. 21):

Oi—1 inch to 0; loose, undecomposed pine needles, leaves, and twigs.

Oa—0 to 3 inches; partly decomposed and well decomposed organic material.

A—3 to 5 inches; black (10YR 2/1) loamy coarse sand; massive; very friable; many very fine and fine roots; extremely acid; abrupt wavy boundary.

E—5 to 18 inches; light brownish gray (10YR 6/2) coarse sand; many coarse faint grayish brown (10YR 5/2) mottles; single grain; loose; few very fine and fine roots; extremely acid; abrupt wavy boundary.

Bh—18 to 19 inches; dark reddish brown (5YR 2/2) loamy coarse sand; massive; very friable; very strongly acid; abrupt irregular boundary.

Bhs—19 to 23 inches; dark brown (10YR 4/3) coarse sand; many coarse distinct dark reddish brown (5YR 3/2) and grayish brown (10YR 5/2) mottles; massive; firm; common firm iron nodules; about 2 percent gravel; strongly acid; clear wavy boundary.

BC—23 to 37 inches; yellowish brown (10YR 5/4) coarse sand; common medium faint light brownish gray (10YR 6/2) and dark brown (10YR 4/3) mottles; single grain; loose; about 2 percent gravel; strongly acid; abrupt wavy boundary.

C1—37 to 51 inches; brown (10YR 5/3) very gravelly coarse sand; single grain; loose; about 40 percent gravel and 5 percent cobblestones; strongly acid; abrupt wavy boundary.

C2—51 to 65 inches; grayish brown (10YR 5/2) coarse sand; single grain; loose; about 10 percent gravel; strongly acid.

The thickness of the solum ranges from 20 to 40 inches. The content of rock fragments is generally less than 10 percent in the solum and ranges from 0 to 50 percent in the substratum. The depth to mottles ranges from 6 to 16 inches. Reaction is extremely acid to slightly acid throughout the profile.

The A horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 or 2. The E horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 1 to 3. In many pedons it is mottled. Both horizons are coarse sand, sand, loamy coarse sand, or loamy sand.

The Bh and Bhs horizons have hue of 5YR to 10YR, value of 2 to 5, and chroma of 2 to 6. They are coarse sand, sand, loamy coarse sand, or loamy sand. The content of ortstein commonly ranges from 0 to about 30 percent of the area exposed in a vertical cut through the Bhs horizon. The lower part of the B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 8.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 6. It is coarse sand, sand, or the gravelly or very gravelly analogs of those textures.

Plymouth Series

Mesic, coated Typic Quartzipsamments

The Plymouth series consists of very deep, excessively drained soils on moraines and outwash plains and in areas of glacial lake deposits. These soils formed in sandy, loose glacial till and glaciofluvial sediments. Slopes range from 0 to 35 percent.

Plymouth soils are similar to Carver, Eastchop, Hinckley, and Hooksan soils and are commonly adjacent to Barnstable, Belgrade, Boxford, and Nantucket soils. Plymouth soils have a higher content of coarse fragments in the solum than Carver, Eastchop, and Hooksan soils. They have less gravel in the substratum than Hinckley soils. They have less silt and clay in the solum than Barnstable and Nantucket soils. They have less silt and clay throughout than Boxford and Belgrade soils.

Typical pedon of Plymouth loamy coarse sand, in a wooded area of Plymouth-Barnstable complex, rolling, very bouldery; in a road cut on the north side of Wood Road, 40 feet east of the intersection of Wood Road and Orchard Road, in the town of Bourne (fig. 22):

Oi—2 inches to 1 inch; loose, undecomposed pine needles, leaves, and twigs.

Oe—1 inch to 0; partly decomposed and well decomposed organic material.

A—0 to 1 inch; black (10YR 2/1) loamy coarse sand; massive; very friable; many fine roots; about 5 percent gravel; extremely acid; abrupt wavy boundary.

E—1 to 3 inches; gray (10YR 6/1) coarse sand; single grain; loose; common fine roots; about 5 percent gravel; very strongly acid; abrupt wavy boundary.

Bh—3 to 4 inches; dark brown (7.5YR 4/4) gravelly loamy coarse sand; massive; very friable; many fine roots; about 10 percent gravel, 5 percent cobbles, and 2 percent stones; very strongly acid; abrupt irregular boundary.

Bw1—4 to 9 inches; strong brown (7.5YR 5/6) gravelly loamy coarse sand; massive; very friable; common medium roots; about 10 percent gravel, 5 percent cobbles, and 2 percent stones; very strongly acid; clear wavy boundary.

Bw2—9 to 19 inches; yellowish brown (10YR 5/6) gravelly loamy coarse sand; massive; very friable; few fine roots; about 15 percent gravel, 5 percent cobbles, and 2 percent stones; strongly acid; gradual wavy boundary.

BC—19 to 29 inches; light yellowish brown (2.5Y 6/4) gravelly coarse sand; single grain; loose; few fine roots; about 15 percent gravel, 5 percent cobbles, and 2 percent stones; strongly acid; gradual wavy boundary.

C—29 to 41 inches; light brownish gray (10YR 6/2) gravelly coarse sand; single grain; loose; few fine roots; about 20 percent gravel and 2 percent cobbles; strongly acid; clear wavy boundary.

2C—41 to 65 inches; pale brown (10YR 6/3) coarse sand; single grain; loose; about 5 percent gravel; very strongly acid.

The thickness of the solum ranges from 20 to 36 inches. The content of rock fragments within a depth of 40 inches is generally more than 10 percent but ranges from 2 to 25 percent in individual horizons. The content of rock fragments below a depth of 40 inches ranges from 0 to 15 percent. Reaction generally is extremely acid to strongly acid throughout the profile.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 1 to 3. The E horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 1 to 3. These horizons are coarse sand, sand, loamy coarse sand, loamy sand, coarse sandy loam, or sandy loam.

The B horizon has hue of 5YR to 2.5Y, value of 4 to 8, and chroma of 4 to 8. It is coarse sand, sand, loamy coarse sand, loamy sand, or the gravelly analogs of those textures.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. It is dominantly sand, coarse sand, or the gravelly or very gravelly analogs of those textures. In some pedons, however, it has lenses or pockets of slowly permeable, silty material.

Scitico Series

Fine, illitic, nonacid, mesic Typic Haplaquepts

The Scitico series consists of very deep, poorly drained soils in areas of glacial lake deposits. These soils formed in silty and clayey glaciolacustrine sediments. Slopes range from 0 to 3 percent.

Scitico soils are similar to Boxford and Maybid soils and are commonly adjacent to Belgrade and Carver soils. Unlike Scitico soils, Belgrade, Boxford, and Carver soils are not mottled in the upper part of the solum. Scitico soils do not have a histic or umbric epipedon and are not so gray in the subsoil and substratum as Maybid soils.

Typical pedon of Scitico silt loam, 0 to 3 percent slopes, in a wooded area; 800 feet east of Beach Road, 0.55 mile north of the intersection of Beach Road and Route 6A, in the town of Sandwich:

Oi—5 to 3 inches; loose, undecomposed pine needles, leaves, and twigs.

Oe—3 inches to 0; black (10YR 2/1), partly decomposed and well decomposed organic material.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable, nonsticky and slightly plastic; many very fine and fine roots; very strongly acid; abrupt wavy boundary.

Bg1—2 to 5 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine faint light olive brown (2.5Y 5/4) mottles; weak fine and medium angular blocky structure; friable, sticky and plastic; common very fine and fine roots; strongly acid; clear wavy boundary.

Bg2—5 to 12 inches; grayish brown (2.5Y 5/2) silty clay loam; many coarse distinct yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; moderate fine and medium angular blocky structure; friable, sticky and plastic; few very fine roots; strongly acid; gradual wavy boundary.

BCg—12 to 23 inches; gray (5Y 5/1) silty clay loam; many medium prominent dark brown (7.5YR 4/4) mottles; moderate fine and medium angular blocky structure; friable, sticky and plastic; few very fine roots; common clay films within pores and on faces of peds; medium acid; clear wavy boundary.

Cg1—23 to 37 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few medium prominent dark brown (7.5YR 4/4) mottles; strong thick platy structure; firm, sticky and plastic; common clay films within pores and on faces of peds; gray (5Y 5/1) faces of peds; medium acid; clear wavy boundary.

Cg2—37 to 65 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few medium prominent dark brown (7.5YR 4/4) mottles; strong thick platy structure; firm, sticky and plastic; few clay films within pores and on faces of peds; slightly acid.

The thickness of the solum ranges from 20 to 36 inches. The content of coarse fragments ranges from 0 to 3 percent throughout the profile. Reaction is very strongly acid to neutral in the upper part of the solum and medium acid to neutral in the lower part and in the C horizon.

The A horizon has hue of 10YR to 5Y, value of 2 to 5, and chroma of 1 or 2. It is silt loam or loam.

The B horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is mottled. It is silt loam or silty clay loam in the upper part and silty clay loam or silty clay in the lower part.

The C horizon has hue of 2.5Y or 5Y or is neutral in hue. It has value of 4 to 6. It has chroma of 0 to 2 within a depth of 30 inches and chroma of 0 to 4 below that depth. It is silty clay loam or silty clay.

Sudbury Series

Sandy, mixed, mesic Aquic Dystrochrepts

The Sudbury series consists of very deep, moderately well drained soils on outwash plains. These soils formed in loamy and sandy glaciofluvial sediments. Slopes range from 0 to 3 percent.

Sudbury soils are similar to Amostown and Deerfield soils and are adjacent to Enfield, Merrimac, and Pipestone soils. Sudbury soils have more silt and less sand in the subsoil than Deerfield soils. They have less silt and clay and more sand in the substratum than Amostown soils. Sudbury soils are mottled in the lower part of the subsoil, whereas Pipestone soils are mottled in the upper part. Enfield and Merrimac soils are not mottled.

Typical pedon of Sudbury fine sandy loam, 0 to 3 percent slopes, in an abandoned pasture; 400 feet southeast of a bike path, 0.35 mile northeast of the intersection of the bike path and Elm Street, in the town of Falmouth:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine and medium granular structure; friable; many very fine roots; about 5 percent gravel; very strongly acid; abrupt wavy boundary.

Bw1—10 to 22 inches; yellowish brown (10YR 5/6) sandy loam; weak fine and medium subangular blocky structure; friable; many very fine roots; about 5 percent gravel and 2 percent cobbles; strongly acid; clear wavy boundary.

Bw2—22 to 30 inches; yellowish brown (10YR 5/6) sandy loam; common medium distinct strong brown (7.5YR 5/6) and grayish brown (2.5Y 5/2) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; about 10 percent gravel; strongly acid; abrupt wavy boundary.

2C1—30 to 36 inches; strong brown (7.5YR 5/8) sand; many coarse distinct yellowish red (5YR 5/8) mottles; single grain; loose; about 5 percent gravel; strongly acid; abrupt wavy boundary.

2C2—36 to 39 inches; light brownish gray (2.5Y 6/2) loamy fine sand; few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid; abrupt wavy boundary.

2C3—39 to 45 inches; brownish yellow (10YR 6/6) sand; common medium distinct strong brown (7.5YR 5/8) mottles; single grain; loose; slightly acid; abrupt wavy boundary.

2C4—45 to 65 inches; light yellowish brown (10YR 6/4) gravelly coarse sand; common medium distinct strong brown (7.5YR 5/8) mottles; single grain; loose; about 25 percent gravel; slightly acid.

The thickness of the solum, or the depth to stratified sand and gravel, ranges from 18 to 36 inches. The depth to low-chroma mottles ranges from 16 to 24 inches. The content of coarse fragments ranges from 0 to 25 percent in the solum and from 5 to 45 percent in individual strata of the substratum. Unless lime has been applied, reaction is extremely acid to medium acid in the solum and very strongly acid or medium acid in the C horizon.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is fine sandy loam, sandy loam, or very fine sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 8. The upper part of this horizon is fine sandy loam or sandy loam, and the lower part is sandy loam to coarse sand.

The 2C horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 8. It is stratified sand and gravel.

Swansea Series

Sandy or sandy-skeletal, mixed, dysic, mesic Terric Medisaprists

The Swansea series consists of very deep, very poorly drained soils on glacial lake plains, moraines, and outwash plains. These soils formed in organic deposits underlain by sandy glaciofluvial sediments. Slopes are 0 to 1 percent.

Swansea soils are similar to Freetown, Ipswich, Matunuck, and Pawcatuck soils and are commonly adjacent to Berryland, Carver, Maybid, and Pipestone soils. Swansea soils formed in organic deposits 16 to 51 inches thick, whereas Freetown soils formed in organic deposits more than 51 inches thick. Swansea soils formed in a freshwater environment, whereas Ipswich, Matunuck, and Pawcatuck soils formed in a marine environment. Unlike Swansea soils, Berryland, Carver, Maybid, and Pipestone soils formed in mineral material and have an organic surface layer less than 16 inches thick.

Typical pedon of Swansea muck, in an area of Freetown and Swansea mucks, 0 to 1 percent slopes, in a wooded area; 1,800 feet northwest of the intersection of Ames Way and Route 28, in the town of Barnstable:

Oe—0 to 2 inches; muck, black (10YR 2/1) broken face and rubbed; about 60 percent fiber, 25 percent rubbed; massive; nonsticky and nonplastic; few fine roots; very strongly acid; abrupt wavy boundary.

Oa1—2 to 12 inches; muck, very dark gray (5YR 3/1) broken face and dark reddish brown (5YR 2/2) rubbed; about 40 percent fiber, 5 percent rubbed; massive; nonsticky and nonplastic; common fine roots; extremely acid; clear wavy boundary.

Oa2—12 to 28 inches; muck, black (5YR 2/1) broken face and rubbed; about 35 percent fiber, 5 percent rubbed; massive; friable, slightly sticky and nonplastic; extremely acid; abrupt wavy boundary.

2C—28 to 31 inches; dark yellowish brown (10YR 3/4) loamy sand; massive; very friable; very strongly acid; abrupt wavy boundary.

3Oa—31 to 39 inches; muck, black (10YR 2/1) broken face and rubbed; about 5 percent fiber, 1 percent rubbed; massive; friable, sticky and nonplastic; extremely acid; abrupt wavy boundary.

4C1—39 to 47 inches; very dark grayish brown (10YR 3/2) loamy sand; many coarse prominent dark grayish brown (10YR 4/2) and black (5YR 2/1) mottles; massive; very friable; very strongly acid; clear wavy boundary.

4C2—47 to 65 inches; dark yellowish brown (10YR 3/4) loamy sand; common coarse prominent dark grayish brown (10YR 4/2) and black (5YR 2/1) mottles; massive; very friable; very strongly acid.

The depth to mineral material ranges from 16 to 51 inches. Some pedons have woody fragments in some or all parts. These fragments make up as much as 25 percent of some horizons. Reaction is less than 4.5 (in 0.01 molar calcium chloride) throughout the organic material.

The surface tier is neutral in hue or has hue of 5YR to 10YR. It has value of 2 or 3 and chroma of 0 to 2. It is dominantly sapric material, but some pedons have varying proportions of both sapric and hemic material. In some areas where these soils are used for the production of cranberries, the upper 4 to 10 inches is sand or coarse sand.

The subsurface and bottom tiers above the 2C horizon are neutral in hue or have hue of 5YR to 10YR. They have value of 2 or 3 and chroma of 0 to 3. They are massive or have platy structure.

The 2C horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4. It is mottled in some pedons. It is coarse sand, sand, loamy sand, loamy fine sand, or the gravelly analogs of those textures. The content of gravel ranges from 0 to 40 percent. Reaction is strongly acid to extremely acid.

Some pedons have a layer of black (N 2/0 or 10YR 2/1) loam or silt loam that is massive and is firm or very firm. This layer is below the organic material and above the sandy material. It is as much as 5 inches thick.

Walpole Series

Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts

The Walpole series consists of very deep, poorly drained soils in areas of glacial lake deposits. These soils formed in loamy and sandy glaciolacustrine sediments underlain by silty and clayey sediments. Slopes range from 0 to 3 percent.

Walpole soils are similar to Amostown and Pipestone soils and are commonly adjacent to Belgrade, Hinesburg, Maybid, and Plymouth soils. Walpole soils are mottled in the upper part of the subsoil, whereas Amostown and Belgrade soils are mottled in the lower part. Plymouth soils are not mottled. Walpole soils have less sand and more silt and clay in the subsoil than Pipestone soils. They have more sand and less silt and clay in the subsoil than Maybid soils.

Typical pedon of Walpole sandy loam, loamy substratum, 0 to 3 percent slopes, in a shrubby area; 35 feet north of Lower Road, 560 feet west of the intersection of Lower Road and Briar Lane, in the town of Brewster:

Oi—1 inch to 0; loose, undecomposed leaves and twigs.

Ap—0 to 9 inches; black (10YR 2/1) sandy loam; moderate coarse granular structure; friable; many very fine roots; very strongly acid; abrupt wavy boundary.

Bw1—9 to 14 inches; light olive brown (2.5Y 5/4) sandy loam; many medium prominent yellowish red (5YR 4/6) and grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; common very fine roots; very strongly acid; clear wavy boundary.

Bw2—14 to 18 inches; olive brown (2.5Y 4/4) sandy loam; many coarse prominent yellowish red (5YR 4/6) and light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; common very fine roots; strongly acid; clear wavy boundary.

Bg—18 to 22 inches; olive gray (5Y 5/2) fine sandy loam; common medium distinct light olive brown (2.5Y 5/6) mottles; massive; friable; few very fine roots; strongly acid; abrupt wavy boundary.

2C—22 to 38 inches; yellowish brown (10YR 5/4) coarse sand; many coarse prominent yellowish red (5YR 4/6) and grayish brown (2.5Y 5/2) mottles; single grain; loose; medium acid; abrupt wavy boundary.

3C—38 to 65 inches; light olive brown (2.5Y 5/4) silt loam; many coarse distinct yellowish brown (10YR 5/6) and gray (5Y 6/1) mottles; massive; firm, slightly sticky and plastic; medium acid.

The thickness of the solum ranges from 18 to 36 inches. Depth to the silty substratum ranges from 20 to 40 inches. The content of coarse fragments ranges from 0 to 35 percent in the solum and substratum. Reaction is very strongly acid to medium acid throughout the profile. At least one subhorizon within a depth of 40 inches is medium acid.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or coarse sandy loam.

The B horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It is mottled. It is loamy coarse sand, loamy sand, loamy fine sand, coarse sandy loam, sandy loam, or fine sandy loam in the upper part and coarse sand, sand, or fine sand in the lower part.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It is coarse sand, sand, fine sand, loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, silt loam, silty clay loam, loam, or silty clay.

The Walpole soils in this survey area are outside the range of the series because they have loamy material within a depth of 40 inches.

Formation of the Soils

Factors of Soil Formation

Soils form through the interaction of five major factors—time, climate, parent material, topography, and plant and animal life. The relative influence of each factor varies from place to place, but the combination of all five factors normally determines the kind of soil that forms in any given area. Parent material and relief, as they relate to drainage, account for many of the differences among the soils in Barnstable County.

Time

The formation of soils is a continuous process. Generally, it takes several thousand years for significant changes to occur. The soils in Barnstable County have formed since the last period of glaciation, approximately 15,000 years ago. They are considered to be relatively young soils, exhibiting only slight alteration of the parent material and weak soil horizon development.

Climate

Climatic factors, particularly temperature, precipitation, and frost action, have had a profound influence on the soil-forming processes in the county. The kind of climate largely determines the nature of the weathering processes and the rate of chemical and physical processes. Climate directly determines the type of vegetation, which in turn affects some of the soil-forming processes.

Barnstable County is in a transitional climate zone. It has conditions characteristic of both humid-marine and humid-continental climates. Winters are mild for New England because of the moderating effect of the Atlantic Ocean. Temperature and precipitation govern the rate of chemical and physical weathering in the soils and allow for the accumulation of organic matter in the surface layer of the soils. There is sufficient moisture to leach water-soluble material downward through the soils. Cold winter temperatures promote frost action, which physically breaks apart rock fragments.

Parent Material

Parent material is the unconsolidated mineral and organic deposits in which soils form. It determines the mineral composition and largely determines the physical and chemical characteristics of the soils. The kind of parent material also influences the rate at which soil-forming processes take place.

Because of the effects of recent glaciation, insufficient time has elapsed to significantly alter glacial and marine deposits. The influence of parent material is apparent in the soils of Barnstable County. There are six different kinds of parent material in the county—glacial till, glacial outwash, glacial lake deposits, postglacial eolian silts and sands, freshwater and marine organic deposits, and sandy material on marine beaches and sand dunes.

Glacial till is dominantly unsorted and unstratified sediment transported and deposited by glacial ice. It consists of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders. Two broad groupings of glacial till have been recognized in Barnstable County. One group is loamy and has relatively few coarse fragments and a dense, firm, slowly permeable substratum, locally referred to as a hardpan. Nantucket soils are an example of soils that formed in these sediments. The second group is sandy and has a high content of coarse fragments and a loose, permeable substratum. Barnstable and Plymouth are examples of soils that formed in this material.

Glacial outwash is stratified sand and gravel deposited by glacial meltwater streams. Soils that formed in glacial outwash have a sandy or gravelly, loose and very permeable substratum. Carver, Eastchop, Hinckley, and Merrimac soils are examples.

Glacial lakebed deposits range from sands and pebbles to silts and clays. They were deposited in postglacial lakes, which have since drained. Soil patterns are complex within areas of these deposits and commonly vary dramatically, both chemically and physically, over short distances. Belgrade, Boxford, Eastchop, Hinesburg, Maybid, and Walpole soils formed in these deposits.

Postglacial eolian sediments are fine and very fine sands and silt deposited by wind after the glacial ice melted and before a permanent plant cover stabilized the newly exposed land surface. Eolian sands and silt occur as a discontinuous mantle or cap over older glacial deposits. This mantle varies in thickness. Enfield soils formed in areas where this mantle is 18 to 36 inches deep over glacial outwash. The loamy upper part of Barnstable and Merrimac soils is thought to be the result of a thin cap of eolian material mixed with the underlying material through natural processes.

Organic deposits are accumulations of plant material at varying degrees of decomposition. These deposits formed in wet areas. They are 16 or more inches thick. Freetown and Swansea soils formed in freshwater organic deposits. Ipswich and Pawcatuck soils formed in organic tidal marsh deposits.

Beaches are unvegetated, wave-washed accumulations of sand that do not meet the criteria for a soil and are mapped as a miscellaneous area. Sand dunes are windblown deposits of sand. Hooksan soils formed in areas of sand dunes.

Topography

The shape of the land surface, or its slope and position on the landscape, greatly influences soil formation. Soils that formed in similar kinds of parent material under the same climatic conditions exhibit significant differences as a result of their position on the landscape. These differences are largely a result of varying drainage conditions caused by surface runoff or the depth to a water table.

Soils that formed at the higher elevations and in sloping areas are generally excessively drained or well drained. Depth to the water table is generally more than 6 feet, and surface runoff is medium or rapid. These soils commonly are bright colored (strong brown to yellowish brown) in the upper part of the solum, which grades to a lighter, grayer, unweathered substratum.

Soils that formed at the lower elevations, such as in swales and depressions or adjacent to drainageways and bodies of water, generally receive surface runoff from the higher elevations and commonly have a seasonal high water table within a depth of 6 feet. The moderately well drained and poorly drained soils in these areas are mottled with irregular spots of brown, yellow, and gray. The very poorly drained soils in areas where the water table is at or near the surface for prolonged periods typically have a dark organic layer or an organic-rich surface layer underlain by a strongly mottled or gleyed subsoil and substratum.

Plant and Animal Life

Living organisms actively influence the processes of soil formation. These organisms include bacteria, fungi, vegetation, animals, and humans. The major influence of these organisms is the effect on the chemical and physical environment of the soils.

Most, if not all, of Barnstable County, was originally a native forest of mixed hardwoods and conifers. The mineral content of leaves and branches varies, depending on the type of forest vegetation. It influences the characteristics of the soils that form beneath the vegetation. Hardwoods characteristically take up bases (calcium, magnesium, and potassium) from the soil and return them to the surface in the form of organic litter, thus recycling soil nutrients. Conifers tend to be low in content of bases. Consequently, soils that formed beneath them tend to be more acid than other soils. Bases in areas of coniferous trees are more susceptible to leaching than those in other areas. Windthrow results in mixing of the soil material in wooded soils.

Some types of micro-organisms, such as bacteria and fungi, influence soil formation by changing the chemistry of the soils. Microbial animals decompose organic material and return the products of decomposition to the soils.

Larger animals, such as earthworms and burrowing animals, mix the soil and change its physical characteristics. They generally make the soil more permeable to air and water. Their waste products cause aggregation of the soil particles and improve soil structure.

Human activities have significantly altered many areas of natural soils in the county. The chemical and physical properties, particularly of the plow layer, have changed because of cultivation and additions of lime and fertilizer. Drainage systems and additions of fill material have altered the environment of some naturally wet soils. Of all animals, humans can have the most beneficial or the most detrimental impact on the soil-forming processes.

Soil Profile Development

The interaction of the five soil-forming factors results in the development of a soil profile. A soil profile is a vertical section of the soil from the surface to the unconsolidated underlying material at a depth of 60 inches or more. A soil horizon is a layer of soil, approximately parallel to the surface, that has distinct characteristics resulting from soil-forming processes. The physical and chemical characteristics observed within the soil profile are the basis for differentiating one soil from another.

The majority of the soils in the survey area exhibit weak profile development, mainly because they are relatively young. The depth of profile development varies among different soils. It generally averages about 30 inches in well drained soils. Profile development is generally shallower in poorly drained and very poorly drained soils. Soils that formed in recently deposited material, such as Hooksan soils, may be characterized by very weak or no profile development.

Organic material has accumulated on the surface of the soils as an O horizon, which varies in thickness and decomposition. Where natural mixing of humified organic material and the underlying mineral material has occurred, the soils have an A horizon. The amount of organic material added to the soils in the survey area varies with the kind of vegetation, the amount of available moisture, and drainage conditions. The thick, mucky deposits in which Freetown and Swansea soils formed are the result of very poorly drained conditions. The organic material accumulates in a very wet environment rather than being oxidized. In cultivated areas mixing of the organic surface layer with other material in the upper part of the solum has resulted in an Ap horizon.

The characteristics of profile development in many excessively drained, well drained, and moderately well drained soils in the survey area are the result of the movement and deposition of aluminum, iron, clay, and humified organic material within the soil. Weak, organic acids generated from the decomposition of surface organic litter are percolated downward through the soil by rainwater. Aluminum and iron in the upper part of the profile are released into solution and leached downward, along with fine particles of humified organic material and small amounts of fine clay. The light gray color in the E horizon (the mineral surface horizon below the O or A horizon) is a result of this leaching. It is more evident in the coarser textured soils and commonly does not occur in the finer textured soils.

The chemical environment of the soil changes with increasing depth. As the aluminum, iron, clay, and organic material are redeposited, a B horizon forms. The greatest concentration of leached material is deposited directly below the E horizon and commonly forms a strong brown Bhs or Bw1 horizon. Undisturbed areas of Carver, Deerfield, and Eastchop soils commonly have an E horizon underlain by a brightly colored B horizon. The characteristic dark brown to yellowish brown subsoil results mainly from iron oxide stains on the surface of sand-sized particles. The color of the subsoil generally fades with increasing depth. The unweathered parent material in the C horizon is commonly light yellowish brown or light olive brown.

Mottles form in areas where a water table fluctuates within the soil. They are a combination of gray and reddish spots produced by alternating aerated and saturated conditions, or the oxidation-reduction process, within the soil. These spots are caused principally by the migration, depletion, or concentration of iron within the soil. Gleying occurs when the soil is wet during most of the year. In gleyed soils the prolonged reducing conditions cause the removal of iron. As the iron is removed, the matrix color of the soils becomes gray or bluish gray. Mottles are common in the upper part of the solum in the poorly drained Scitico and Walpole soils and in the lower part of the solum in Boxford, Belgrade, Deerfield, and Sudbury soils. Gleying is characteristic of the very poorly drained Maybid soils. Induration of sand grains caused by the concentration of iron occurs in some areas of the very poorly drained Berryland and poorly drained Pipestone soils.

The movement of clay within some soils is evidenced by clay films on the faces of peds and within pores in the lower part of the solum and in the substratum. The degree of clay movement within the soil profile is believed to be slight in the soils of Barnstable County. The movement of clay has been observed in some areas of Boxford, Maybid, and Scitico soils.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils 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 inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	more than 5.2

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

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.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

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.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

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.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil 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 are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation tillage. A tillage and planting system in which crop residue covers at least 30 percent of the surface after planting. Where wind erosion is the main concern, the system leaves the equivalent of at least 1,000 pounds per acre of flat small-grain residue on the surface during the critical erosion period.

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.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, 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.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

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.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

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 the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

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.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

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.

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.

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.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (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, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

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 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, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon 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) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a 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 horizon. 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, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

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.

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. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having 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. Some soils are assigned to two hydrologic groups.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

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 capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches 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.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6

centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

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.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground. A ground moraine is an accumulation of till in an area that has low relief and is devoid of transverse linear elements. It formed as the till was deposited or released from the ice during ablation.

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 (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, 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.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

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.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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 about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch

Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

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.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

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.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

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.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

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:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly 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

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

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.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables). Water that is too salty for consumption by livestock.

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.

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.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

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.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

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.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

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 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

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 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 substratum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

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).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (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.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a 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."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-78 at Hyannis, Massachusetts)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	38.1	21.1	29.6	56	-3	19	3.72	2.05	5.18	7	5.4
February----	39.2	21.9	30.6	56	-1	10	3.74	2.14	5.15	6	11.2
March-------	44.9	28.6	36.8	63	8	31	3.69	2.35	4.90	8	3.5
April-------	54.7	36.3	45.5	89	18	183	3.94	2.10	5.56	7	.2
May---------	64.7	45.3	55.0	83	27	465	3.77	1.93	5.37	7	.0
June--------	74.0	55.3	64.7	91	37	741	2.82	.75	4.47	5	.0
July--------	79.4	61.4	70.4	92	45	942	2.79	1.34	4.03	5	.0
August------	78.5	60.3	69.4	90	41	911	4.15	2.06	5.96	6	.0
September---	71.9	53.4	62.7	86	31	681	3.54	1.44	5.31	5	.0
October-----	63.0	43.6	53.3	89	21	412	3.66	2.01	5.12	6	.0
November----	52.3	35.2	43.7	69	16	128	4.37	2.74	5.84	7	.1
December----	42.5	25.4	34.0	61	2	54	4.52	2.83	6.04	7	3.6
Yearly:											
Average---	58.6	40.7	49.6	---	---	---	---	---	---	---	---
Extreme---	---	---	---	94	-6	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,577	44.71	37.22	51.39	76	24.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-78 at Hyannis, Massachusetts)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 27	May 16	May 30
2 years in 10 later than--	Apr. 20	May 9	May 23
5 years in 10 later than--	Apr. 8	Apr. 26	May 8
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 21	Oct. 4	Sept. 23
2 years in 10 earlier than--	Oct. 28	Oct. 10	Sept. 29
5 years in 10 earlier than--	Nov. 9	Oct. 23	Oct. 10

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-78 at Hyannis, Massachusetts)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	182	149	123
8 years in 10	193	159	134
5 years in 10	215	180	155
2 years in 10	237	200	175
1 year in 10	248	210	186

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AmA	Amostown sandy loam, 0 to 5 percent slopes	285	0.1
BaB	Barnstable sandy loam, 3 to 8 percent slopes	468	0.2
BaC	Barnstable sandy loam, 8 to 15 percent slopes	169	*
BbB	Barnstable sandy loam, 3 to 8 percent slopes, very stony	1,251	0.5
BbC	Barnstable sandy loam, 8 to 15 percent slopes, very stony	406	0.2
BbD	Barnstable sandy loam, 15 to 25 percent slopes, very stony	173	0.1
BcC	Barnstable-Plymouth complex, rolling	3,776	1.5
BdC	Barnstable-Plymouth complex, rolling, bouldery	1,541	0.6
BeC	Barnstable-Plymouth complex, rolling, very bouldery	2,224	0.9
BfC	Barnstable-Plymouth-Nantucket complex, rolling	1,183	0.5
BgC	Barnstable-Plymouth-Nantucket complex, rolling, very bouldery	3,292	1.3
Bh	Beaches	4,738	1.9
BlB	Belgrade silt loam, 3 to 8 percent slopes	628	0.2
BmA	Berryland mucky loamy coarse sand, 0 to 2 percent slopes	1,662	0.7
BoA	Boxford silt loam, 0 to 3 percent slopes	198	0.1
BoB	Boxford silt loam, 3 to 8 percent slopes	588	0.2
CcA	Carver loamy coarse sand, 0 to 3 percent slopes	3,020	1.2
CcB	Carver loamy coarse sand, 3 to 8 percent slopes	12,888	5.0
CdA	Carver coarse sand, 0 to 3 percent slopes	16,446	6.4
CdB	Carver coarse sand, 3 to 8 percent slopes	26,175	10.3
CdC	Carver coarse sand, 8 to 15 percent slopes	22,004	8.6
CdD	Carver coarse sand, 15 to 35 percent slopes	19,251	7.5
CoB	Carver-Hinesburg loamy coarse sands, undulating	2,566	1.0
CoC	Carver-Hinesburg loamy coarse sands, rolling	673	0.3
CoD	Carver-Hinesburg loamy coarse sands, hilly	347	0.1
DeA	Deerfield loamy fine sand, 0 to 5 percent slopes	1,116	0.4
Dm	Dumps, landfill	366	0.1
Dn	Dune land	935	0.4
EaA	Eastchop loamy fine sand, 0 to 3 percent slopes	3,567	1.4
EaB	Eastchop loamy fine sand, 3 to 8 percent slopes	4,738	1.9
EaC	Eastchop loamy fine sand, 8 to 15 percent slopes	1,415	0.6
EnA	Enfield silt loam, 0 to 3 percent slopes	8,474	3.3
EnB	Enfield silt loam, 3 to 8 percent slopes	3,519	1.4
EnC	Enfield silt loam, 8 to 15 percent slopes	732	0.3
Fm	Freetown mucky peat, 0 to 1 percent slopes, ponded	1,063	0.4
Fs	Freetown and Swansea mucks, 0 to 1 percent slopes	3,537	1.4
Ft	Freetown coarse sand, 0 to 1 percent slopes	4,153	1.6
HeA	Hinckley sandy loam, 0 to 3 percent slopes	468	0.2
HeB	Hinckley sandy loam, 3 to 8 percent slopes	1,595	0.6
HkC	Hinckley gravelly sandy loam, 8 to 15 percent slopes	545	0.2
HkD	Hinckley gravelly sandy loam, 15 to 35 percent slopes	907	0.4
HnA	Hinesburg sandy loam, 0 to 3 percent slopes	233	0.1
HnB	Hinesburg sandy loam, 3 to 8 percent slopes	386	0.1
HnC	Hinesburg sandy loam, 8 to 15 percent slopes	115	*
HoC	Hooksan sand, rolling	5,787	2.3
HoD	Hooksan sand, hilly	2,325	0.9
HxC	Hooksan-Dune land complex, hilly	3,227	1.3
ImA	Ipswich, Pawcatuck, and Matunuck Peats, 0 to 1 percent slopes	14,176	5.6
MaA	Maybid silt loam, 0 to 3 percent slopes	172	0.1
MbA	Maybid Variant silty clay loam, 0 to 1 percent slopes	360	0.1
MeA	Merrimac sandy loam, 0 to 3 percent slopes	6,012	2.4
MeB	Merrimac sandy loam, 3 to 8 percent slopes	4,424	1.7
MeC	Merrimac sandy loam, 8 to 15 percent slopes	1,550	0.6
MeD	Merrimac sandy loam, 15 to 25 percent slopes	174	0.1
Mg	Merrimac-Udipsamments-Urban land complex	1,194	0.5
NaB	Nantucket sandy loam, 3 to 8 percent slopes	885	0.3
NaC	Nantucket sandy loam, 8 to 15 percent slopes	319	0.1
NsB	Nantucket sandy loam, 3 to 8 percent slopes, stony	590	0.2
NsC	Nantucket sandy loam, 8 to 15 percent slopes, stony	105	*
PeA	Pipestone loamy coarse sand, 0 to 3 percent slopes	753	0.3
Pg	Pits, sand and gravel	2,737	1.1
PmA	Plymouth loamy coarse sand, 0 to 3 percent slopes	571	0.2
PmB	Plymouth loamy coarse sand, 3 to 8 percent slopes	4,699	1.8

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
PmC	Plymouth loamy coarse sand, 8 to 15 percent slopes	1,839	0.7
PmD	Plymouth loamy coarse sand, 15 to 35 percent slopes	1,391	0.5
PsB	Plymouth loamy coarse sand, 3 to 8 percent slopes, very stony	1,442	0.6
PsC	Plymouth loamy coarse sand, 8 to 15 percent slopes, very stony	437	0.2
PsD	Plymouth loamy coarse sand, 15 to 35 percent slopes, very stony	614	0.2
PvC	Plymouth-Barnstable complex, rolling, very bouldery	2,811	1.1
PvD	Plymouth-Barnstable complex, hilly, very bouldery	2,705	1.1
PxC	Plymouth-Barnstable complex, rolling, extremely bouldery	2,761	1.1
PxD	Plymouth-Barnstable complex, hilly, extremely bouldery	8,688	3.4
PyD	Plymouth-Barnstable-Nantucket complex, hilly, very bouldery	2,168	0.8
ScA	Scitico silt loam, 0 to 3 percent slopes	320	0.1
SdA	Sudbury fine sandy loam, 0 to 3 percent slopes	121	*
Ud	Udipsamments, smoothed	4,593	1.8
Ur	Urban land	3,474	1.4
WvA	Walpole sandy loam, loamy substratum, 0 to 3 percent slopes	461	0.2
	Water	7,559	3.0
	Total	255,260	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
AmA	Amostown sandy loam, 0 to 5 percent slopes
BaB	Barnstable sandy loam, 3 to 8 percent slopes
BlB	Belgrade silt loam, 3 to 8 percent slopes
BoA	Boxford silt loam, 0 to 3 percent slopes
BoB	Boxford silt loam, 3 to 8 percent slopes
EnA	Enfield silt loam, 0 to 3 percent slopes
HnA	Hinesburg sandy loam, 0 to 3 percent slopes
HnB	Hinesburg sandy loam, 3 to 8 percent slopes
MeA	Merrimac sandy loam, 0 to 3 percent slopes
MeB	Merrimac sandy loam, 3 to 8 percent slopes
NaB	Nantucket sandy loam, 3 to 8 percent slopes
SdA	Sudbury fine sandy loam, 0 to 3 percent slopes

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn silage	Alfalfa hay	Grass-clover	Sweet corn
		Tons	Tons	AUM*	Tons
AmA: Amostown	IIw	22	4.0	6.6	5.9
BaB: Barnstable	IIs	16	3.5	4.6	---
BaC: Barnstable	IIIe	14	3.0	4.6	---
BbB, BbC, BbD: Barnstable	VIs	---	---	---	---
BcC: Barnstable-Plymouth	IIIe	12	---	4.6	---
BdC, BeC: Barnstable-Plymouth	VIs	---	---	---	---
BfC: Barnstable-Plymouth-Nantucket	IIIe	14	---	4.6	---
BgC: Barnstable-Plymouth-Nantucket	VIs	---	---	---	---
Bh**. Beaches					
BlB: Belgrade	IIe	22	4.0	7.5	6.0
BmA: Berryland	Vw	---	---	---	---
BoA: Boxford	IIw	22	---	4.8	---
BoB: Boxford	IIe	22	---	5.6	---
CcA, CcB: Carver	IVs	---	2.5	4.8	---
CdA, CdB, CdC, CdD: Carver	VIIs	---	---	---	---
CoB: Carver-Hinesburg	IVs	---	3.1	4.8	---
CoC: Carver-Hinesburg	VIIs	---	---	---	---
CoD: Carver-Hinesburg	VIIs	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Alfalfa hay	Grass-clover	Sweet corn
		Tons	Tons	AUM*	Tons
DeA------------------------ Deerfield	IIIw	16	3.5	5.8	6.0
Dm**. Dumps					
Dn**. Dune land					
EaA, EaB------------------ Eastchop	IIIs	---	---	5.5	---
EaC------------------------ Eastchop	IVs	---	---	5.5	---
EnA------------------------ Enfield	I	26	5.0	8.5	---
EnB------------------------ Enfield	IIe	26	5.0	8.5	---
EnC------------------------ Enfield	IIIe	24	4.5	7.5	---
Fm------------------------- Freetown	VIIw	---	---	---	---
Fs------------------------- Freetown and Swansea	Vw	---	---	---	---
Ft------------------------- Freetown	IVw	---	---	---	---
HeA, HeB------------------ Hinckley	IIIs	12	2.5	3.6	4.5
HkC------------------------ Hinckley	IVs	---	---	2.5	---
HkD------------------------ Hinckley	VIIs	---	---	---	---
HnA, HnB------------------ Hinesburg	IIs	16	4.0	5.6	---
HnC------------------------ Hinesburg	IIIe	14	4.0	5.6	---
HoC, HoD------------------ Hooksan	VIIs	---	---	---	---
HxC**--------------------- Hooksan-Dune land	VIIs	---	---	---	---
ImA------------------------ Ipswich, Pawcatuck, and Matunuck	VIIIw	---	---	---	---
MaA------------------------ Maybid	VIw	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Alfalfa hay	Grass-clover	Sweet corn
		Tons	Tons	AUM*	Tons
MbA: Maybid Variant	VIIIw	---	---	---	---
MeA, MeB: Merrimac	IIs	18	4	5.7	6.1
MeC: Merrimac	IIIe	16	4	5.7	6.0
MeD: Merrimac	IVe	14	3.5	4.8	---
Mg**: Merrimac-Udipsamments-Urban land	---	---	---	5.7	6.1
NaB: Nantucket	IIs	22	4.5	8.5	---
NaC: Nantucket	IIIe	20	4.5	8.5	---
NsB, NsC: Nantucket	VIs	---	---	---	---
PeA: Pipestone	IVw	12	3.5	---	---
Pg**. Pits					
PmA, PmB: Plymouth	IIIs	12	---	---	---
PmC: Plymouth	IVs	10	---	---	---
PmD: Plymouth	VIIs	---	---	---	---
PsB, PsC: Plymouth	VIs	---	---	---	---
PsD: Plymouth	VIIs	---	---	---	---
PvC, PvD: Plymouth-Barnstable	VIs	---	---	---	---
PxC, PxD: Plymouth-Barnstable	VIIs	---	---	---	---
PyD: Plymouth-Barnstable-Nantucket	VIs	---	---	---	---
ScA: Scitico	IVw	---	---	6.5	---
SdA: Sudbury	IIw	18	3.5	7.6	5.9

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Alfalfa hay	Grass-clover	Sweet corn
		Tons	Tons	AUM*	Tons
Ud. Udipsamments					
Ur**. Urban land					
WvA----------------------- Walpole	IIIw	20	---	5.5	---

* Animal-unit-month: The amount of forage or feed required to feed one Animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Wind- throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc- tivity class*	Trees to plant
AmA------------- Amostown	10A	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak---- Red maple-----------	75 70 ---	10 4 ---	Eastern white pine.
BaB, BaC-------- Barnstable	5A	Slight	Slight	Slight	Slight	Eastern white pine-- White oak----------- Black oak----------- Pitch pine----------	60 43 --- ---	5 2 --- ---	Eastern white pine, red pine.
BbB, BbC-------- Barnstable	5S	Slight	Slight	Moderate	Slight	Eastern white pine-- White oak----------- Black oak----------- Pitch pine----------	60 43 --- ---	5 2 --- ---	Eastern white pine.
BbD------------- Barnstable	5R	Slight	Moderate	Moderate	Slight	Eastern white pine-- White oak----------- Pitch pine---------- Black oak-----------	60 43 --- ---	5 2 --- ---	Eastern white pine.
BcC**:									
Barnstable-----	5A	Slight	Slight	Slight	Slight	Eastern white pine-- White oak----------- Black oak----------- Pitch pine----------	60 43 --- ---	5 2 --- ---	Eastern white pine, red pine.
Plymouth-------	4S	Slight	Slight	Severe	Slight	Eastern white pine-- White oak----------- Black oak----------- Pitch pine----------	55 43 --- ---	4 2 --- ---	Eastern white pine, red pine.
BdC**, BeC**:									
Barnstable-----	5S	Slight	Slight	Moderate	Slight	Eastern white pine-- White oak----------- Pitch oak----------- Black oak-----------	55 43 --- ---	5 2 --- ---	Eastern white pine.
Plymouth-------	4S	Slight	Slight	Severe	Slight	Eastern white pine-- White oak----------- Pitch pine---------- Black oak-----------	55 43 --- ---	4 2 --- ---	Eastern white pine, red pine.
BfC**:									
Barnstable-----	5A	Slight	Slight	Slight	Slight	Eastern white pine-- White oak----------- Black oak----------- Pitch pine----------	60 43 --- ---	5 2 --- ---	Eastern white pine, red pine.
Plymouth-------	4S	Slight	Slight	Severe	Slight	Eastern white pine-- White oak----------- Pitch pine---------- Black oak-----------	55 43 --- ---	4 2 --- ---	Eastern white pine, red pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
BfC**:									
Nantucket	9A	Slight	Slight	Slight	Slight	Eastern white pine	70	9	Eastern white pine, red pine.
						Red pine	70	8	
						Black oak	---	---	
						Pitch pine	---	---	
BgC**:									
Barnstable	5S	Slight	Slight	Moderate	Slight	Eastern white pine	60	5	Eastern white pine.
						White oak	43	2	
						Black oak	---	---	
						Pitch pine	---	---	
Plymouth	4S	Slight	Slight	Severe	Slight	Eastern white pine	55	4	Eastern white pine, red pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
Nantucket	9A	Slight	Slight	Slight	Slight	Eastern white pine	70	9	Eastern white pine, red pine.
						Red pine	70	8	
						Black oak	---	---	
						Pitch pine	---	---	
BlB: Belgrade	8A	Slight	Slight	Slight	Slight	Eastern white pine	75	8	Eastern white pine.
						Red maple	---	---	
						Pitch pine	---	---	
BmA: Berryland	4W	Slight	Severe	Severe	Slight	Red maple	---	---	---
						Tupelo	---	---	
BoA, BoB: Boxford	7A	Slight	Slight	Slight	Slight	Eastern white pine	65	7	Eastern white pine.
						Northern red oak	55	3	
						Red maple	---	---	
						Pitch pine	---	---	
CcA, CcB: Carver	4S	Slight	Slight	Severe	Slight	Eastern white pine	53	4	Red pine, eastern white pine.
						Red pine	60	4	
						Pitch pine	---	---	
						White oak	---	---	
CdA, CdB, CdC: Carver	3S	Slight	Slight	Severe	Slight	Eastern white pine	39	3	Red pine, eastern white pine.
						Red pine	48	4	
						Pitch pine	---	---	
						Black oak	---	---	
CdD: Carver	3S	Slight	Moderate	Severe	Slight	Eastern white pine	39	3	Red pine, eastern white pine.
						Red pine	48	3	
						Pitch pine	---	---	
						Black oak	---	---	
CoB**, CoC**:									
Carver	4S	Slight	Slight	Severe	Slight	Eastern white pine	53	4	Red pine, eastern white pine.
						Red pine	60	4	
						Pitch pine	---	---	
						Black oak	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
CoB**, CoC**:									
Hinesburg	8A	Slight	Slight	Moderate	Slight	Eastern white pine	65	8	Eastern white pine, red pine.
						Pitch pine	---	---	
						Black oak	---	---	
						White oak	---	---	
CoD**:									
Carver	4S	Slight	Moderate	Severe	Slight	Eastern white pine	53	4	Red pine, eastern white pine.
						Red pine	60	4	
						Pitch pine	---	---	
						Black oak	---	---	
Hinesburg	8R	Moderate	Moderate	Moderate	Slight	Eastern white pine	65	8	Eastern white pine, red pine.
						Pitch pine	---	---	
						Black oak	---	---	
						White oak	---	---	
DeA: Deerfield	8S	Slight	Slight	Moderate	Slight	Eastern white pine	65	8	Eastern white pine, red pine.
						Red maple	---	---	
						Pitch pine	---	---	
EaA, EaB, EaC: Eastchop	5S	Slight	Slight	Severe	Slight	Eastern white pine	48	6	Eastern white pine, red pine.
						Pitch pine	35	6	
						Black oak	---	---	
						White oak	---	---	
EnA, EnB: Enfield	9A	Slight	Slight	Slight	Slight	Eastern white pine	74	9	Eastern white pine.
						White oak	---	---	
						Black oak	---	---	
						Pitch pine	---	---	
EnC: Enfield	9R	Moderate	Slight	Slight	Slight	Eastern white pine	74	9	Eastern white pine.
						White oak	---	---	
						Black oak	---	---	
						Pitch pine	---	---	
Fs**:									
Freetown	2W	Slight	Severe	Severe	Severe	Red maple	50	2	---
						Atlantic white cedar	60	---	
						Tupelo	---	---	
Swansea	2W	Slight	Severe	Severe	Severe	Red maple	50	2	---
						Atlantic white cedar	60	---	
						Tupelo	---	---	
Ft: Freetown	2W	Slight	Severe	Severe	Severe	Red maple	50	2	---
						Atlantic white cedar	60	---	
						Tupelo	---	---	
HeA, HeB, HkC: Hinckley	4S	Slight	Slight	Severe	Slight	Eastern white pine	55	7	Eastern white pine.
						Red pine	58	7	
						Pitch pine	---	---	
						Black oak	---	---	
HkD: Hinckley	4S	Moderate	Moderate	Severe	Slight	Eastern white pine	55	7	Eastern white pine.
						Red pine	58	7	
						Pitch pine	---	---	
						Black oak	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
HnA, HnB, HnC--- Hinesburg	8A	Slight	Slight	Moderate	Slight	Eastern white pine-- Pitch pine---------- Black oak----------- White oak-----------	65 --- --- ---	8 --- --- ---	Eastern white pine, red pine.
HoC, HoD-------- Hooksan	1S	Moderate	Severe	Moderate	Slight	Pitch pine---------- American holly------ American beech------	30 --- ---	1 --- ---	---
HxC**:									
Hooksan--------	1S	Moderate	Severe	Moderate	Slight	Pitch pine----------	30	1	---
Dune land.									
MaA, MbA-------- Maybid, Maybid Variant	2W	Slight	Severe	Severe	Severe	Red maple----------- Tupelo--------------	55 ---	2 ---	---
MeA, MeB, MeC--- Merrimac	6S	Slight	Slight	Moderate	Slight	Eastern white pine-- Pitch pine---------- Black oak----------- White oak-----------	64 --- --- ---	6 --- --- ---	Eastern white pine, red pine.
MeD------------- Merrimac	6S	Slight	Moderate	Moderate	Slight	Eastern white pine-- Pitch pine---------- Black oak----------- White oak-----------	64 --- --- ---	6 --- --- ---	Eastern white pine, red pine.
Mg**:									
Merrimac-------	6S	Slight	Slight	Moderate	Slight	Eastern white pine-- Pitch pine----------	64 ---	6 ---	Eastern white pine, red pine.
Udipsamments.									
Urban land.									
NaB, NaC-------- Nantucket	9A	Slight	Slight	Slight	Slight	Eastern white pine-- Red pine------------ Black oak----------- Pitch pine----------	70 70 --- ---	9 8 --- ---	Eastern white pine, red pine.
NsB, NsC-------- Nantucket	9A	Slight	Slight	Slight	Slight	Eastern white pine-- Red pine------------ Black oak----------- Pitch pine----------	70 70 --- ---	9 8 --- ---	Eastern white pine, red pine.
PeA------------- Pipestone	3W	Slight	Severe	Moderate	Moderate	Red maple----------- White ash----------- Eastern white pine--	65 --- 64	3 --- 9	Eastern white pine.
PmA, PmB, PmC--- Plymouth	4S	Slight	Slight	Severe	Slight	Eastern white pine-- Red pine------------ Pitch pine----------	55 65 ---	4 4 ---	Eastern white pine, red pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
PmD: Plymouth	4S	Slight	Moderate	Severe	Slight	White oak	43	2	Eastern white pine, red pine.
						Eastern white pine	55	4	
						Pitch pine	---	---	
						Black oak	---	---	
						White oak	43	2	
PsB, PsC: Plymouth	4S	Slight	Slight	Severe	Slight	Eastern white pine	55	4	Eastern white pine, red pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
PsD: Plymouth	4S	Slight	Moderate	Severe	Slight	Eastern white pine	55	4	Eastern white pine, red pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
PvC**:									
Plymouth	4S	Slight	Slight	Severe	Slight	Eastern white pine	55	4	Eastern white pine, red pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
Barnstable	5S	Slight	Slight	Moderate	Slight	Eastern white pine	60	5	Eastern white pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
PvD**:									
Plymouth	4S	Slight	Moderate	Severe	Slight	Eastern white pine	55	4	Eastern white pine, red pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
Barnstable	5R	Slight	Moderate	Moderate	Slight	Eastern white pine	60	5	Eastern white pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
PxC**, PxD**:									
Plymouth	4X	Slight	Moderate	Severe	Slight	Eastern white pine	55	4	Eastern white pine, red pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
Barnstable	5X	Slight	Moderate	Moderate	Slight	Eastern white pine	60	5	Eastern white pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
PyD**:									
Plymouth	4S	Slight	Moderate	Severe	Slight	Eastern white pine	55	4	Eastern white pine, red pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	
Barnstable	5R	Slight	Moderate	Moderate	Slight	Eastern white pine	60	5	Eastern white pine.
						White oak	43	2	
						Pitch pine	---	---	
						Black oak	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Common trees	Site index	Produc-tivity class*	
PyD**:									
Nantucket------	9R	Moderate	Moderate	Slight	Slight	Eastern white pine--	70	9	Eastern white pine, red pine.
						Black oak-----------	---	---	
						Pitch pine----------	---	---	
						Red pine------------	70	8	
ScA------------- Scitico	2W	Slight	Severe	Moderate	Severe	Red maple-----------	55	2	Eastern white pine.
						Tupelo--------------	---	---	
						Pitch pine----------	---	---	
SdA------------- Sudbury	7A	Slight	Slight	Slight	Slight	Eastern white pine--	65	7	Eastern white pine, red pine.
						Northern red oak----	45	2	
						Red maple-----------	---	---	
						Pitch pine----------	---	---	
WvA------------- Walpole	7W	Slight	Severe	Severe	Severe	Eastern white pine--	66	7	Eastern white pine.
						Red maple-----------	75	3	
						Tupelo--------------	---	---	
						Pitch pine----------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AmA------------------- Amostown	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
BaB------------------- Barnstable	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: droughty.
BaC------------------- Barnstable	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: droughty, slope.
BbB------------------- Barnstable	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Slight----------	Moderate: large stones, droughty.
BbC------------------- Barnstable	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: large stones, droughty, slope.
BbD------------------- Barnstable	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
BcC*:					
Barnstable-----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: droughty, slope.
Plymouth-------------	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight----------	Moderate: too sandy.
BdC*, BeC*:					
Barnstable-----------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: large stones, droughty, slope.
Plymouth-------------	Moderate: slope, too sandy, large stones.	Moderate: slope, too sandy, large stones.	Severe: large stones, slope, too sandy.	Moderate: large stones, too sandy.	Moderate: large stones, droughty, slope.
BfC*:					
Barnstable-----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: droughty, slope.
Plymouth-------------	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight----------	Moderate: too sandy.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BfC*:					
Nantucket	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
BgC*:					
Barnstable	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: large stones, droughty, slope.
Plymouth	Moderate: slope, too sandy, large stones.	Moderate: slope, too sandy, large stones.	Severe: large stones, slope, too sandy.	Moderate: large stones, too sandy.	Moderate: large stones, droughty, slope.
Nantucket	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight	Moderate: slope, large stones.
Bh*. Beaches					
BlB Belgrade	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Severe: erodes easily.	Moderate: wetness.
BmA Berryland	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Severe: wetness, too sandy.
BoA, BoB Boxford	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
CcA Carver	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Severe: droughty.
CcB Carver	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Severe: droughty.
CdA, CdB Carver	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty, too sandy.
CdC Carver	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, too sandy.
CdD Carver	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: droughty, slope, too sandy.
CoB*:					
Carver	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Severe: droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CoB*:					
Hinesburg	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness, droughty.
CoC*:					
Carver	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Severe: droughty.
Hinesburg	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, droughty, slope.
CoD*:					
Carver	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too sandy.	Severe: droughty, slope.
Hinesburg	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: wetness, slope.	Severe: slope.
DeA Deerfield	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Moderate: wetness.
Dm*. Dumps					
Dn*. Dune land					
EaA Eastchop	Moderate: too sandy.	Moderate: too sandy.	Moderate: small stones.	Too sandy	Moderate: droughty.
EaB Eastchop	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Too sandy	Moderate: droughty.
EaC Eastchop	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Too sandy	Moderate: droughty, slope.
EnA Enfield	Slight	Slight	Slight	Severe: erodes easily.	Slight.
EnB Enfield	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
EnC Enfield	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Fm Freetown	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Fs*:					
Freetown	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Swansea	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Ft Freetown	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.
HeA Hinckley	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
HeB Hinckley	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
HkC Hinckley	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Severe: droughty.
HkD Hinckley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
HnA Hinesburg	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
HnB Hinesburg	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
HnC Hinesburg	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
HoC Hooksan	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
HoD Hooksan	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
HxC*:					
Hooksan	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
Dune land.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ImA*:					
Ipswich	Severe: ponding, flooding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: ponding, flooding, excess humus.	Severe: ponding, excess humus.	Severe: excess salt, excess sulfUr, ponding.
Pawcatuck	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess salt, excess sulfUr, ponding.
Matunuck	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess salt, excess sulfUr, ponding.
MaA Maybid	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
MbA Maybid Variant	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
MeA Merrimac	Slight	Slight	Moderate: small stones.	Slight	Slight.
MeB Merrimac	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MeC Merrimac	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MeD Merrimac	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Mg*:					
Merrimac	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Udipsamments.					
Urban land.					
NaB Nantucket	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
NaC Nantucket	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
NsB Nantucket	Moderate: wetness.	Moderate: wetness.	Moderate: large stones.	Slight	Slight.
NsC Nantucket	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: large stones, slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PeA-------------------- Pipestone	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pg*. Pits					
PmA, PmB-------------- Plymouth	Slight----------	Slight----------	Severe: small stones.	Slight----------	Moderate: too sandy.
PmC-------------------- Plymouth	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight----------	Moderate: too sandy.
PmD-------------------- Plymouth	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
PsB-------------------- Plymouth	Moderate: too sandy, large stones.	Moderate: too sandy, large stones.	Severe: large stones.	Severe: too sandy.	Severe: droughty.
PsC-------------------- Plymouth	Moderate: slope, too sandy, large stones.	Moderate: slope, too sandy, large stones.	Severe: slope, large stones.	Severe: too sandy.	Severe: droughty.
PsD-------------------- Plymouth	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope, too sandy.	Severe: slope, droughty.
PvC*:					
Plymouth-------------	Moderate: slope, too sandy, large stones.	Moderate: slope, too sandy, large stones.	Severe: large stones, slope, too sandy.	Moderate: large stones, too sandy.	Moderate: large stones, droughty, slope.
Barnstable-----------	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: large stones, droughty, slope.
PvD*:					
Plymouth-------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, too sandy.	Moderate: large stones, slope, too sandy.	Severe: slope.
Barnstable-----------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
PxC*:					
Plymouth-------------	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, too sandy.	Moderate: large stones, too sandy.	Moderate: large stones, droughty, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PxC*:					
Barnstable	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: large stones, droughty, slope.
PxD*:					
Plymouth	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, too sandy.	Moderate: large stones, slope, too sandy.	Severe: slope.
Barnstable	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
PyD*:					
Plymouth	Severe: slope.	Severe: slope.	Severe: large stones, slope, too sandy.	Moderate: large stones, slope, too sandy.	Severe: slope.
Barnstable	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
Nantucket	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
ScA Scitico	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
SdA Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, small stones.	Slight	Slight.
Ud. Udipsamments					
Ur*. Urban land					
WvA Walpole	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AmA: Amostown	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BaB, BaC: Barnstable	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BbB: Barnstable	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
BbC, BbD: Barnstable	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
BcC*:										
Barnstable	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
BdC*, BeC*:										
Barnstable	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
BfC*:										
Barnstable	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Nantucket	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BgC*:										
Barnstable	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Nantucket	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Bh*. Beaches										
BlB: Belgrade	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BmA: Berryland	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
BoA----------------- Boxford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BoB----------------- Boxford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CcA, CcB----------- Carver	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CdA, CdB, CdC, CdD- Carver	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CoB*:										
Carver-------------	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hinesburg----------	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
CoC*, CoD*:										
Carver-------------	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Hinesburg----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
DeA----------------- Deerfield	Poor	Fair	Fair	Poor	Poor	Poor	Poor	Fair	Poor	Poor.
Dm*. Dumps										
Dn*. Dune land										
EaA, EaB, EaC------ Eastchop	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
EnA----------------- Enfield	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EnB----------------- Enfield	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EnC----------------- Enfield	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Fm------------------ Freetown	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Fs*:										
Freetown-----------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Swansea------------	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ft------------------ Freetown	Very poor.	Poor	Poor	Poor	Poor	Poor	Good	Poor	Poor	Fair.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
HeA, HeB, HkC------ Hinckley	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HkD---------------- Hinckley	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HnA, HnB----------- Hinesburg	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
HnC---------------- Hinesburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HoC, HoD----------- Hooksan	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
HxC*:										
Hooksan-----------	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Dune land.										
ImA*:										
Ipswich-----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Pawcatuck---------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Matunuck----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
MaA---------------- Maybid	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
MbA---------------- Maybid Variant	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Good	Fair	Very poor.	Very poor.	Fair.
MeA, MeB, MeC------ Merrimac	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MeD---------------- Merrimac	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Mg*:										
Merrimac----------	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Udipsamments.										
Urban land.										
NaB---------------- Nantucket	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NaC---------------- Nantucket	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NsB---------------- Nantucket	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
NsC----------------- Nantucket	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
PeA----------------- Pipestone	Poor	Fair	Fair	Good	Good	Fair	Very poor.	Poor	Good	Poor.
Pg*. Pits										
PmA----------------- Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
PmB----------------- Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
PmC----------------- Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
PmD, PsB, PsC, PsD- Plymouth	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
PvC*, PvD*:										
Plymouth-----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Barnstable---------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PxC*, PxD*:										
Plymouth-----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Barnstable---------	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PyD*:										
Plymouth-----------	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Barnstable---------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Nantucket----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
ScA----------------- Scitico	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
SdA----------------- Sudbury	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ud. Udipsamments										
Ur*. Urban land										
WvA----------------- Walpole	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AmA: Amostown	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.
BaB: Barnstable	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
BaC: Barnstable	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
BbB: Barnstable	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
BbC: Barnstable	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
BbD: Barnstable	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BcC*:						
Barnstable	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Plymouth	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: too sandy.
BdC*, BeC*:						
Barnstable	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
Plymouth	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
BfC*:						
Barnstable	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Plymouth	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: too sandy.
Nantucket	Moderate: slope, wetness.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BgC*:						
Barnstable	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
Plymouth	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
Nantucket	Moderate: slope, wetness, large stones.	Moderate: slope, large stones.	Moderate: slope, wetness, large stones.	Severe: slope.	Moderate: slope, large stones.	Moderate: slope, large stones.
Bh*. Beaches						
BlB Belgrade	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
BmA Berryland	Severe: wetness, cutbanks cave.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: wetness, too sandy.
BoA, BoB Boxford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
CcA Carver	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
CcB Carver	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
CdA Carver	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty, too sandy.
CdB Carver	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty, too sandy.
CdC Carver	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty, too sandy.
CdD Carver	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope, too sandy.
CoB*:						
Carver	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
Hinesburg	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: wetness, droughty.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CoC*:						
Carver-----------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
Hinesburg--------	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: wetness, droughty, slope.
CoD*:						
Carver-----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Hinesburg--------	Severe: cutbanks cave, wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
DeA--------------- Deerfield	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
Dm*. Dumps						
Dn*. Dune land						
EaA--------------- Eastchop	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
EaB--------------- Eastchop	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
EaC--------------- Eastchop	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
EnA--------------- Enfield	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
EnB--------------- Enfield	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
EnC--------------- Enfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Fm---------------- Freetown	Severe: ponding, excess humus.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength, frost action.	Severe: ponding, excess humus.
Fs*:						
Freetown---------	Severe: wetness, excess humus.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, excess humus.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Fs*:						
Swansea	Severe: wetness, excess humus, cutbanks cave.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, excess humus.
Ft Freetown	Severe: wetness, excess humus.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, too sandy.
HeA Hinckley	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
HeB Hinckley	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
HkC Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
HkD Hinckley	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
HnA Hinesburg	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness.
HnB Hinesburg	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: wetness.
HnC Hinesburg	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: wetness, slope.
HoC Hooksan	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
HoD Hooksan	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
HxC*:						
Hooksan	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Dune land.						
ImA*:						
Ipswich	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: low strength, ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
Pawcatuck	Severe: cutbanks cave, excess humus, wetness.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding.	Severe: excess salt, excess sulfur, ponding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ImA*:						
Matunuck---------	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: excess salt, excess sulfur, ponding.
MaA--------------- Maybid	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, low strength, frost action.	Severe: ponding.
MbA--------------- Maybid Variant	Severe: excess humus, wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: low strength, frost action.	Moderate: wetness.
MeA--------------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
MeB--------------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
MeC--------------- Merrimac	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
MeD--------------- Merrimac	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mg*:						
Merrimac---------	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
Udipsamments.						
Urban land.						
NaB--------------- Nantucket	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: wetness.	Slight.
NaC--------------- Nantucket	Moderate: slope, wetness.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: slope.
NsB--------------- Nantucket	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: large stones.
NsC--------------- Nantucket	Moderate: slope, wetness.	Moderate: wetness, slope.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: slope, large stones.
PeA--------------- Pipestone	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Pg*. Pits						
PmA--------------- Plymouth	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: too sandy.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PmB--------------- Plymouth	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: too sandy.
PmC--------------- Plymouth	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: too sandy.
PmD--------------- Plymouth	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PsB--------------- Plymouth	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
PsC--------------- Plymouth	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
PsD--------------- Plymouth	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, droughty.
PvC*:						
Plymouth---------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
Barnstable-------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
PvD*:						
Plymouth---------	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Barnstable-------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PxC*:						
Plymouth---------	Severe: cutbanks cave.	Moderate: slope, large stones.	Moderate: slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
Barnstable-------	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: large stones, droughty, slope.
PxD*:						
Plymouth---------	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Barnstable-------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PyD*:						
Plymouth	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Barnstable	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Nantucket	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ScA: Scitico	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
SdA: Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Slight.
Ud. Udipsamments						
Ur*. Urban land						
WvA: Walpole	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AmA----------------- Amostown	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness, seepage.	Fair: wetness.
BaB----------------- Barnstable	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
BaC----------------- Barnstable	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
BbB----------------- Barnstable	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
BbC----------------- Barnstable	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
BbD----------------- Barnstable	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
BcC*:					
Barnstable---------	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Plymouth-----------	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, thin layer.
BdC*, BeC*:					
Barnstable---------	Severe: poor filter.	Severe: seepage, slope, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: seepage, too sandy, large stones.
Plymouth-----------	Severe: poor filter.	Severe: slope, seepage, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, seepage, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BfC*:					
Barnstable	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Plymouth	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, thin layer.
Nantucket	Severe: percs slowly.	Severe: slope, seepage.	Moderate: wetness, slope.	Moderate: slope, wetness.	Fair: slope, wetness.
BgC*:					
Barnstable	Severe: poor filter.	Severe: seepage, slope, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: seepage, too sandy, large stones.
Plymouth	Severe: poor filter.	Severe: slope, seepage, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, seepage, thin layer.
Nantucket	Severe: percs slowly.	Severe: seepage, slope, large stones.	Moderate: slope, wetness, large stones.	Moderate: slope, wetness.	Fair: slope, wetness, large stones.
Bh*. Beaches					
BlB: Belgrade	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness, thin layer.
BmA: Berryland	Severe: wetness, flooding, poor filter.	Severe: wetness, seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness, seepage.	Poor: wetness, too sandy.
BoA: Boxford	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
BoB: Boxford	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
CcA, CcB, CdA, CdB: Carver	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
CdC: Carver	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CdD: Carver	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: seepage, slope, too sandy.	Severe: slope, seepage.	Poor: seepage, too sandy, slope.
CoB*:					
Carver	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Hinesburg	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage.	Fair: too clayey, wetness.
CoC*:					
Carver	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Hinesburg	Severe: wetness, percs slowly, poor filter.	Severe: seepage, slope, wetness.	Severe: wetness.	Severe: seepage.	Fair: too clayey, slope, wetness.
CoD*:					
Carver	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: seepage, slope, too sandy.	Severe: slope, seepage.	Poor: seepage, too sandy, slope.
Hinesburg	Severe: wetness, percs slowly, poor filter.	Severe: seepage, slope, wetness.	Severe: wetness, slope.	Severe: seepage, slope.	Poor: slope.
DeA: Deerfield	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
Dm*. Dumps					
Dn*. Dune land					
EaA, EaB: Eastchop	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
EaC: Eastchop	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
EnA, EnB: Enfield	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EnC: Enfield	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Fm: Freetown	Severe: ponding.	Severe: ponding, excess humus, seepage.	Severe: ponding, excess humus, seepage.	Severe: ponding, seepage.	Poor: ponding, excess humus.
Fs*:					
Freetown	Severe: wetness.	Severe: wetness, excess humus, seepage.	Severe: wetness, excess humus, seepage.	Severe: wetness, seepage.	Poor: excess humus, wetness.
Swansea	Severe: wetness, poor filter.	Severe: wetness, excess humus, seepage.	Severe: wetness, too sandy, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus, seepage.
Ft: Freetown	Severe: wetness.	Severe: wetness, excess humus, seepage.	Severe: wetness, excess humus, seepage.	Severe: wetness, seepage.	Poor: excess humus, wetness.
HeA, HeB: Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
HkC: Hinckley	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
HkD: Hinckley	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, too sandy, slope.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
HnA, HnB: Hinesburg	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage.	Fair: too clayey, wetness.
HnC: Hinesburg	Severe: wetness, percs slowly, poor filter.	Severe: seepage, slope, wetness.	Severe: wetness.	Severe: seepage.	Fair: too clayey, slope, wetness.
HoC: Hooksan	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
HoD: Hooksan	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HxC*:					
Hooksan	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Dune land.					
ImA*:					
Ipswich	Severe: flooding, ponding.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus, excess salt.
Pawcatuck	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus, excess salt.
Matunuck	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
MaA: Maybid	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: ponding, too clayey.
MbA: Maybid Variant	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, excess humus.	Severe: seepage, wetness.	Poor: hard to pack, wetness.
MeA, MeB: Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MeC: Merrimac	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MeD: Merrimac	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.
Mg*:					
Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Udipsamments.					
Urban land.					
NaB: Nantucket	Severe: percs slowly.	Severe: seepage.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NaC------------------ Nantucket	Severe: percs slowly.	Severe: slope, seepage.	Moderate: wetness, slope.	Moderate: slope, wetness.	Fair: slope, wetness.
NsB------------------ Nantucket	Severe: percs slowly.	Severe: seepage.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
NsC------------------ Nantucket	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope, wetness.	Moderate: slope, wetness.	Fair: slope, wetness.
PeA------------------ Pipestone	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Pg*. Pits					
PmA, PmB------------ Plymouth	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, thin layer.
PmC------------------ Plymouth	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, thin layer.
PmD------------------ Plymouth	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.
PsB------------------ Plymouth	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, thin layer.
PsC------------------ Plymouth	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, thin layer.
PsD------------------ Plymouth	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.
PvC*: Plymouth-----------	Severe: poor filter.	Severe: slope, seepage, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, seepage, thin layer.
Barnstable---------	Severe: poor filter.	Severe: seepage, slope, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: seepage, too sandy, large stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PvD*:					
Plymouth	Severe: slope, poor filter.	Severe: slope, seepage, large stones.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.
Barnstable	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, large stones.
PxC*:					
Plymouth	Severe: poor filter.	Severe: slope, seepage, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: too sandy, seepage, thin layer.
Barnstable	Severe: poor filter.	Severe: seepage, slope, large stones.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: seepage, too sandy, large stones.
PxD*:					
Plymouth	Severe: slope, poor filter.	Severe: slope, seepage, large stones.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.
Barnstable	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, large stones.
PyD*:					
Plymouth	Severe: slope, poor filter.	Severe: slope, seepage, large stones.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.
Barnstable	Severe: poor filter, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, large stones.
Nantucket	Severe: percs slowly, slope.	Severe: seepage, slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope, large stones.
ScA: Scitico	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
SdA: Sudbury	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
Ud. Udipsamments					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ur*. Urban land					
WvA------------------ Walpole	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AmA: Amostown	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
BaB, BaC, BbB, BbC: Barnstable	Good	Probable	Probable	Poor: small stones, area reclaim.
BbD: Barnstable	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
BcC*:				
Barnstable	Good	Probable	Probable	Poor: small stones, area reclaim.
Plymouth	Good	Probable	Probable	Poor: small stones, area reclaim.
BdC*, BeC*:				
Barnstable	Good	Probable	Probable	Poor: large stones, area reclaim.
Plymouth	Good	Probable	Probable	Poor: too sandy, large stones, area reclaim.
BfC*:				
Barnstable	Good	Probable	Probable	Poor: small stones, area reclaim.
Plymouth	Good	Probable	Probable	Poor: small stones, area reclaim.
Nantucket	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
BgC*:				
Barnstable	Good	Probable	Probable	Poor: small stones, area reclaim.
Plymouth	Good	Probable	Probable	Poor: too sandy, large stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BgC*:				
Nantucket	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
Bh*. Beaches				
BlB Belgrade	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, area reclaim.
BmA Berryland	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
BoA, BoB Boxford	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CcA, CcB Carver	Good	Probable	Improbable: too sandy.	Poor: small stones, too sandy.
CdA, CdB, CdC Carver	Good	Probable	Improbable: too sandy.	Poor: too sandy.
CdD Carver	Poor: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
CoB*:				
Carver	Good	Probable	Improbable: too sandy.	Poor: small stones, too sandy.
Hinesburg	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
CoC*:				
Carver	Good	Probable	Improbable: too sandy.	Poor: small stones, slope, too sandy.
Hinesburg	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
CoD*:				
Carver	Fair: slope.	Probable	Improbable: too sandy.	Poor: slope.
Hinesburg	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, slope.
DeA Deerfield	Fair: wetness.	Probable	Improbable: excess fines.	Poor: too sandy.
Dm*. Dumps				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Dn*. Dune land				
EaA, EaB: Eastchop	Good	Probable	Improbable: too sandy.	Poor: too sandy.
EaC: Eastchop	Good	Probable	Improbable: too sandy.	Poor: too sandy.
EnA, EnB, EnC: Enfield	Good	Probable	Probable	Fair: area reclaim.
Fm: Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Fs*:				
Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Swansea	Poor: wetness.	Probable	Improbable: excess fines.	Poor: wetness, excess humus.
Ft: Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, wetness.
HeA, HeB: Hinckley	Good	Probable	Probable	Poor: too sandy, area reclaim, small stones.
HkC: Hinckley	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
HkD: Hinckley	Poor: slope.	Probable	Probable	Poor: too sandy, small stones, slope.
HnA, HnB, HnC: Hinesburg	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
HoC: Hooksan	Poor	Probable	Improbable: too sandy.	Poor: too sandy.
HoD: Hooksan	Poor	Probable	Improbable: too sandy.	Poor: too sandy, slope.
HxC*:				
Hooksan	Poor	Probable	Improbable: too sandy.	Poor: too sandy, slope.
Dune land.				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ImA*:				
Ipswich	Poor: low strength, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, excess salt, wetness.
Pawcatuck	Poor: wetness.	Probable	Improbable: excess fines.	Poor: excess humus, excess salt, wetness.
Matunuck	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, excess salt, wetness.
MaA Maybid	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
MbA Maybid Variant	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
MeA, MeB, MeC Merrimac	Good	Probable	Probable	Poor: small stones, area reclaim.
MeD Merrimac	Fair: slope.	Probable	Probable	Poor: slope, small stones, area reclaim.
Mg*:				
Merrimac	Good	Probable	Probable	Poor: small stones, area reclaim.
Udipsamments.				
Urban land.				
NaB Nantucket	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
NaC Nantucket	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
NsB Nantucket	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
NsC Nantucket	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
PeA Pipestone	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Pg*. Pits				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PmA, PmB, PmC: Plymouth	Good	Probable	Probable	Poor: small stones, area reclaim.
PmD: Plymouth	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim.
PsB, PsC: Plymouth	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
PsD: Plymouth	Poor: slope.	Probable	Probable	Poor: slope, too sandy, area reclaim.
PvC*:				
Plymouth	Good	Probable	Probable	Poor: too sandy, large stones, area reclaim.
Barnstable	Good	Probable	Probable	Poor: large stones, area reclaim.
PvD*:				
Plymouth	Fair: slope.	Probable	Probable	Poor: slope, too sandy, area reclaim.
Barnstable	Fair: slope.	Probable	Probable	Poor: large stones, area reclaim, slope.
PxC*:				
Plymouth	Good	Probable	Probable	Poor: too sandy, large stones, area reclaim.
Barnstable	Good	Probable	Probable	Poor: large stones, area reclaim.
PxD*:				
Plymouth	Fair: slope.	Probable	Probable	Poor: slope, too sandy, area reclaim.
Barnstable	Fair: slope.	Probable	Probable	Poor: large stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PyD*:				
Plymouth	Fair: slope.	Probable	Probable	Poor: slope, too sandy, area reclaim.
Barnstable	Fair: slope.	Probable	Probable	Poor: large stones, area reclaim, slope.
Nantucket	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ScA Scitico	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
SdA Sudbury	Fair: wetness.	Probable	Probable	Poor: small stones, too sandy, area reclaim.
Ud. Udipsamments				
Ur*. Urban land				
WvA Walpole	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Irrigation
AmA--------------- Amostown	Slight---------	Severe: piping.	Severe: slow refill.	Percs slowly---	Erodes easily, wetness, percs slowly.	Wetness, percs slowly.
BaB--------------- Barnstable	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Large stones, too sandy.	Slope, droughty.
BaC--------------- Barnstable	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.
BbB--------------- Barnstable	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Large stones, too sandy.	Slope, droughty.
BbC, BbD---------- Barnstable	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.
BcC*:						
Barnstable-------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.
Plymouth---------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Droughty, fast intake, slope.
BdC*, BeC*:						
Barnstable-------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.
Plymouth---------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, large stones.	Droughty, fast intake, slope.
BfC*:						
Barnstable-------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.
Plymouth---------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Droughty, fast intake, slope.
Nantucket--------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, wetness, percs slowly.
BgC*:						
Barnstable-------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Irrigation
BgC*:						
Plymouth	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, large stones.	Droughty, fast intake, slope.
Nantucket	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, wetness, percs slowly.
Bh*. Beaches						
BlB Belgrade	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Frost action, slope, cutbanks cave.	Erodes easily, wetness.	Slope, wetness, percs slowly.
BmA Berryland	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Wetness, cutbanks cave.	Not needed	Wetness, droughty.
BoA Boxford	Slight	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, percs slowly.
BoB Boxford	Moderate: slope.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Erodes easily, wetness, percs slowly.	Slope, wetness, percs slowly.
CcA Carver	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty, fast intake.
CcB Carver	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty, fast intake, slope.
CdA Carver	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty, fast intake.
CdB Carver	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty, fast intake, slope.
CdC, CdD Carver	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Droughty, fast intake, slope.
CoB*:						
Carver	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty, fast intake, slope.
Hinesburg	Severe: seepage.	Severe: piping.	Severe: no water.	Slope	Erodes easily, wetness.	Slope.
CoC*, CoD*:						
Carver	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Droughty, fast intake, slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Irrigation
CoC*, CoD*:						
Hinesburg	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope.
DeA Deerfield	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, too sandy.	Fast intake, wetness, droughty.
Dm*. Dumps						
Dn*. Dune land						
EaA Eastchop	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty.
EaB Eastchop	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty, slope.
EaC Eastchop	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Droughty, slope.
EnA Enfield	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Erodes easily, too sandy.	Erodes easily.
EnB Enfield	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Erodes easily, too sandy.	Slope, erodes easily.
EnC Enfield	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, erodes easily, too sandy.	Slope, erodes easily.
Fm Freetown	Severe: seepage.	Severe: excess humus, ponding.	Slight	Frost action, ponding.	Ponding	Ponding.
Fs*:						
Freetown	Severe: seepage.	Severe: excess humus, wetness.	Slight	Frost action	Wetness	Wetness.
Swansea	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Wetness, too sandy.	Wetness.
Ft Freetown	Severe: seepage.	Severe: excess humus, wetness.	Slight	Frost action	Wetness	Wetness, fast intake.
HeA Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, too sandy.	Droughty.
HeB Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, too sandy.	Slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Irrigation
HkC, HkD---------- Hinckley	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.
HnA--------------- Hinesburg	Severe: seepage.	Severe: piping.	Severe: no water.	Favorable------	Erodes easily, wetness.	Favorable.
HnB--------------- Hinesburg	Severe: seepage.	Severe: piping.	Severe: no water.	Slope----------	Erodes easily, wetness.	Slope.
HnC--------------- Hinesburg	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Slope----------	Slope, erodes easily, wetness.	Slope.
HoC, HoD---------- Hooksan	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Droughty, fast intake, slope.
HxC*: Hooksan----------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Droughty, fast intake, slope.
Dune land.						
ImA*: Ipswich----------	Severe: seepage.	Severe: excess humus, ponding, excess salt.	Severe: salty water.	Ponding, flooding, excess salt.	Ponding--------	Ponding, flooding, excess salt.
Pawcatuck--------	Severe: seepage.	Severe: excess humus, ponding, excess salt.	Severe: salty water, cutbanks cave.	Flooding, excess sulfur, excess salt.	Ponding--------	Ponding, flooding, excess salt.
Matunuck---------	Severe: seepage.	Severe: seepage, ponding, excess salt.	Severe: salty water, cutbanks cave.	Ponding, flooding, cutbanks cave.	Ponding, too sandy.	Ponding, flooding, excess salt.
MaA--------------- Maybid	Slight---------	Severe: ponding.	Severe: slow refill.	Percs slowly, ponding, frost action.	Ponding, erodes easily, percs slowly.	Ponding, percs slowly.
MbA--------------- Maybid Variant	Severe: seepage.	Severe: excess humus, hard to pack, wetness.	Slight---------	Frost action---	Wetness--------	Wetness.
MeA--------------- Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy------	Favorable.
MeB--------------- Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy------	Slope.
MeC, MeD---------- Merrimac	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Irrigation
Mg*:						
Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy	Favorable.
Udipsamments.						
Urban land.						
NaB Nantucket	Severe: seepage.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly.	Slope, percs slowly, wetness.
NaC Nantucket	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, percs slowly, wetness.
NsB Nantucket	Severe: seepage.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly.	Slope, percs slowly, wetness.
NsC Nantucket	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, percs slowly, wetness.
PeA Pipestone	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, too sandy, soil blowing.	Wetness, droughty, fast intake.
Pg*. Pits						
PmA Plymouth	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty.
PmB Plymouth	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Droughty, slope.
PmC, PmD Plymouth	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Droughty, slope.
PsB Plymouth	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, large stones.	Droughty, slope.
PsC, PsD Plymouth	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, large stones.	Droughty, slope.
PvC*, PvD*, PxC*, PxD*:						
Plymouth	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, large stones.	Droughty, slope.
Barnstable	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Irrigation
PyD*:						
Plymouth	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, large stones.	Droughty, slope.
Barnstable	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Slope, droughty.
Nantucket	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, perces slowly, wetness.
ScA Scitico	Slight	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action, poor outlets.	Erodes easily, wetness, percs slowly.	Wetness, percs slowly, erodes easily.
SdA Sudbury	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Too sandy, wetness.	Wetness.
Ud. Udipsamments						
Ur*. Urban land						
WvA Walpole	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill.	Frost action	Erodes easily, wetness.	Wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AmA-------------- Amostown	0-7	Sandy loam-------	SM, ML	A-2, A-4	0	95-100	90-100	55-95	30-70	<20	NP-3
	7-33	Fine sandy loam, sandy loam.	SM, ML	A-2, A-4	0	90-100	85-100	50-95	25-65	<20	NP-3
	33-65	Stratified silt, silt loam, very fine sandy loam.	ML, SM, CL-ML, SC-SM	A-4, A-2	0	100	100	65-100	25-90	<25	NP-10
BaB, BaC--------- Barnstable	0-1	Sandy loam-------	SM	A-1, A-2-4	0-5	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, gravelly fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
BbB, BbC, BbD---- Barnstable	0-1	Very stony sandy loam.	SM	A-1, A-2-4	5-10	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
BcC*:											
Barnstable------	0-1	Sandy loam-------	SM	A-1, A-2-4	0-5	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, gravelly fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
Plymouth--------	0-3	Loamy coarse sand	SM, SP	A-1, A-2, A-3	0-5	65-100	60-95	35-65	2-30	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP	A-1, A-2, A-3	0-5	65-100	60-95	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, gravelly sand.	SW, GW, SP, GP	A-1	0-5	40-80	35-75	20-50	2-10	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
BdC*, BeC*:											
Barnstable------	0-1	Very bouldery sandy loam.	SM	A-1, A-2-4	5-10	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
Plymouth--------	0-3	Very bouldery loamy coarse sand.	SM, SP-SM	A-1, A-2	5-15	80-90	65-85	35-65	3-35	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2	0-15	75-95	65-90	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, gravelly sand.	SW, GW, SP, GP	A-1	0-15	45-80	35-75	20-50	2-10	---	NP
BfC*:											
Barnstable------	0-1	Sandy loam-------	SM	A-1, A-2-4	0-5	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, gravelly fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
Plymouth--------	0-3	Loamy coarse sand	SM, SP	A-1, A-2, A-3	0-5	65-100	60-95	35-65	2-30	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP	A-1, A-2, A-3	0-5	65-100	60-95	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, gravelly sand.	SW, GW, SP, GP	A-1	0-5	40-80	35-75	20-50	2-10	---	NP
Nantucket-------	0-5	Sandy loam-------	SM, ML	A-1, A-2-4, A-4	0-10	95-100	85-100	40-85	15-55	<15	NP-3
	5-27	Sandy loam, fine sandy loam, loamy sand.	SM, ML	A-2-4, A-4, A-1	0-20	95-100	85-100	40-85	15-55	<15	NP-3
	27-65	Sandy clay loam, loam, sandy loam.	SM, SC, CL, ML	A-2-4, A-4	0-20	95-100	85-100	50-95	25-75	<21	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
BgC*:											
Barnstable	0-1	Very bouldery sandy loam.	SM	A-1, A-2-4	5-10	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
Plymouth	0-3	Very bouldery loamy coarse sand.	SM, SP-SM	A-1, A-2	5-15	80-90	65-85	35-65	3-35	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2	0-15	75-95	65-90	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, gravelly sand.	SW, GW, SP, GP	A-1	0-15	45-80	35-75	20-50	2-10	---	NP
Nantucket	0-5	Very bouldery sandy loam.	SM, ML	A-2, A-4, A-1-b	15-25	95-100	85-100	40-85	15-55	<15	NP-3
	5-27	Sandy loam, fine sandy loam.	SM, ML	A-2, A-4, A-1-b	0-20	95-100	85-100	40-85	15-55	<15	NP-3
	27-65	Sandy clay loam, loam, sandy loam.	SM, SC, ML, CL	A-2, A-4	0-20	95-100	85-100	50-95	25-75	<21	NP-8
Bh*. Beaches											
BlB Belgrade	0-9	Silt loam	ML	A-4	0	100	95-100	90-100	60-95	<35	NP-8
	9-41	Silt loam, very fine sandy loam, loamy very fine sand.	ML	A-4	0	100	95-100	85-100	50-90	<35	NP-8
	41-65	Silt loam, loamy very fine sand, sand and gravel.	ML, SM	A-1, A-2, A-4	0	75-100	55-100	35-100	15-90	<35	NP-8
BmA Berryland	0-12	Mucky loamy coarse sand.	SM	A-2	0-5	85-95	75-90	45-75	25-50	---	NP
	12-23	Sand, loamy coarse sand, gravelly loamy coarse sand.	SP, SM, SC-SM, SP-SM, GP-GM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	---	NP
	23-65	Stratified gravelly coarse sand, loamy coarse sand, sand.	SW, GW, SP-SM, SP	A-1, A-2, A-3, A-4	0-20	50-95	30-85	15-70	2-30	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BoA, BoB--------- Boxford	0-9	Silt loam--------	ML	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	35-50	5-15
	9-20	Silt loam, silty clay loam.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	30-45	5-18
	20-26	Silty clay loam, silty clay.	ML, CL	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	85-95	30-45	5-18
	26-65	Silty clay loam, silty clay, clay.	CL, ML	A-4, A-5, A-6, A-7	0	98-100	95-100	90-100	80-95	30-45	8-18
CcA, CcB--------- Carver	0-7	Loamy coarse sand	SM	A-2	0-5	85-100	75-100	50-65	10-30	---	NP
	7-17	Coarse sand, loamy sand, loamy coarse sand.	SM, SP-SM	A-2, A-1, A-3	0-5	80-100	75-100	35-60	5-25	---	NP
	17-65	Coarse sand------	SP, SP-SM	A-2, A-1	0-5	80-100	75-100	35-50	0-10	---	NP
CdA, CdB, CdC, CdD------------- Carver	0-7	Coarse sand------	SM	A-2	0-5	85-100	75-100	50-65	10-30	---	NP
	7-17	Coarse sand, loamy sand, loamy coarse sand.	SM, SP-SM	A-2, A-1, A-3	0-5	80-100	75-100	35-60	5-25	---	NP
	17-65	Coarse sand------	SP, SP-SM	A-2, A-1	0-5	80-100	75-100	35-50	0-10	---	NP
CoB*, CoC*, CoD*: Carver----------	0-7	Loamy coarse sand	SM	A-2	0-5	85-100	75-100	50-65	10-30	---	NP
	7-17	Coarse sand, loamy sand, loamy coarse sand.	SM, SP-SM	A-2, A-1, A-3	0-5	80-100	75-100	35-60	5-25	---	NP
	17-65	Coarse sand------	SP, SP-SM	A-2, A-1	0-5	80-100	75-100	35-50	0-10	---	NP
Hinesburg-------	0-10	Loamy coarse sand	SM	A-2	0-5	95-100	85-100	50-80	15-30	---	NP
	10-32	Loamy coarse sand, loamy sand, sand.	SP-SM, SM	A-2, A-3	0-5	95-100	85-100	50-80	5-30	---	NP
	32-65	Fine sandy loam, silt loam, sandy clay loam.	ML	A-4	0	95-100	90-100	75-90	55-80	<30	NP-5
DeA-------------- Deerfield	0-10	Loamy fine sand	SP-SM, SM	A-1, A-2, A-3, A-4	0	95-100	80-100	40-75	5-40	---	NP
	10-29	Loamy sand, fine sand, coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	80-100	40-80	5-40	---	NP
	29-65	Sand, fine sand, gravelly sand.	SP, SM	A-1, A-2, A-3	0	95-100	65-100	30-75	3-30	---	NP
Dm*. Dumps											
Dn*. Dune land											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
EaA------------- Eastchop	0-6	Loamy fine sand	SM, SP-SM	A-1-b, A-2-4, A-3	0-10	90-100	80-100	40-80	10-35	---	NP
	6-10	Fine sand, loamy fine sand, loamy sand.	SM, SP-SM	A-1-b, A-2-4, A-3	0-20	85-100	75-100	35-80	10-35	---	NP
	10-25	Loamy fine sand, fine sand, sand.	SM, SP, SP-SM	A-1-b, A-2-4, A-3	0-20	90-100	80-100	40-80	4-35	---	NP
	25-65	Very fine sand, loamy sand, coarse sand.	SM, SP, SP-SM	A-1-b, A-2-4, A-3, A-4	10-20	90-100	80-100	30-90	0-50	---	NP
EaB, EaC--------- Eastchop	0-6	Fine sand, loamy fine sand.	SM, SP-SM	A-1-b, A-2-4, A-3	0-10	90-100	80-100	40-80	10-35	---	NP
	6-10	Fine sand, loamy fine sand, loamy sand.	SM, SP-SM	A-1-b, A-2-4, A-3	0-20	85-100	75-100	35-80	10-35	---	NP
	10-25	Loamy fine sand, fine sand, sand.	SM, SP, SP-SM	A-1-b, A-2-4, A-3	0-20	90-100	80-100	40-80	4-35	---	NP
	25-65	Very fine sand, loamy sand, coarse sand.	SM, SP, SP-SM	A-1-b, A-2-4, A-3, A-4	10-20	90-100	80-100	30-90	0-50	---	NP
EnA, EnB, EnC---- Enfield	0-12	Silt loam--------	ML	A-4	0	95-100	95-100	85-100	70-95	<35	NP-7
	12-31	Silt loam, very fine sandy loam.	ML	A-4	0	95-100	95-100	85-100	65-95	<35	NP-5
	31-65	Gravelly loamy coarse sand, gravelly loamy sand, sand.	SP, GP, SM, GM	A-1, A-3	0-35	30-100	20-100	15-70	0-25	---	NP
Fm--------------- Freetown	0-65	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
Fs*:											
Freetown--------	0-65	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
Swansea---------	0-12	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
	12-28	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
	28-65	Sand, loamy sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	55-100	45-100	30-70	5-30	---	NP
Ft--------------- Freetown	0-10	Coarse sand------	SP, SM, SP-SM	A-1, A-4, A-3	0	100	95-100	30-70	0-15	---	NP
	10-65	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HeA, HeB--------- Hinckley	0-2	Sandy loam-------	SM	A-2, A-4	0-5	85-95	75-90	45-75	25-50	---	NP
	2-17	Gravelly sandy loam, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	---	NP
	17-65	Stratified very gravelly loamy fine sand, very gravelly coarse sand, cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	5-25	50-65	30-50	10-40	0-20	---	NP
HkC, HkD--------- Hinckley	0-2	Gravelly sandy loam.	SM, GM	A-1, A-2, A-4	0-10	60-85	50-75	30-65	15-40	---	NP
	2-17	Gravelly sandy loam, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	---	NP
	17-65	Stratified very gravelly loamy fine sand, very gravelly coarse sand, cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	5-25	50-65	30-50	10-40	0-20	---	NP
HnA, HnB, HnC---- Hinesburg	0-10	Sandy loam-------	SM	A-2, A-4	0-5	95-100	85-100	60-85	25-45	---	NP
	10-32	Loamy coarse sand, loamy sand, sand.	SP-SM, SM	A-2, A-3	0-5	95-100	85-100	50-80	5-30	---	NP
	32-65	Fine sandy loam, silt loam, sandy clay loam.	ML	A-4	0	95-100	90-100	75-90	55-80	<30	NP-5
HoC, HoD--------- Hooksan	0-20	Sand-------------	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
	20-65	Fine sand, sand, coarse sand.	SP, SP-SM	A-3	0	95-100	85-100	65-99	0-5	---	NP
HxC*:											
Hooksan---------	0-20	Sand-------------	SP, SP-SM	A-3	0	100	98-100	85-99	0-5	---	NP
	20-65	Fine sand, sand, coarse sand.	SP, SP-SM	A-3	0	95-100	85-100	65-99	0-5	---	NP
Dune land.											
ImA*:											
Ipswich---------	0-7	Fibric material	PT	A-8	0	---	---	---	---	---	NP
	7-25	Hemic material, fibric material.	PT	A-8	0	---	---	---	---	---	NP
	25-65	Sapric material, hemic material.	PT	A-8	0	---	---	---	---	---	NP
Pawcatuck-------	0-22	Fibric material	PT	A-8	0	---	---	---	---	---	NP
	22-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP, SW	A-1, A-2, A-3	0	80-100	60-100	35-75	0-30	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
ImA*:											
Matunuck	0-13	Fibric material	PT	A-8	0	---	---	---	---	---	NP
	13-65	Coarse sandy loam, loamy sand, coarse sand.	SM, SP, SW	A-2, A-3	0	95-100	85-100	35-70	0-25	---	NP
MaA Maybid	0-7	Silt loam	ML, CL, CH	A-4, A-6, A-7	0	100	100	90-100	75-95	30-52	4-26
	7-20	Silty clay, silty clay loam.	CL, CH	A-6, A-7	0	100	100	95-100	85-95	30-52	10-26
	20-65	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	100	100	95-100	85-95	30-52	10-26
MbA Maybid Variant	0-12	Silty clay loam	ML, OL, MH, CH	A-7	0	100	100	95-100	80-95	40-70	15-35
	12-25	Silty clay loam, silt loam.	ML, OL, MH, CH	A-4, A-5, A-6, A-7	0	100	100	95-100	80-95	30-60	5-30
	25-65	Loam, clay loam, silty clay loam.	ML, CL, OL, MH	A-4, A-5, A-6, A-7	0	100	100	95-100	80-95	25-55	5-25
MeA, MeB, MeC, MeD Merrimac	0-3	Sandy loam	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	---	NP
	3-24	Sandy loam	SM	A-2	0	75-95	70-90	40-60	20-35	---	NP
	24-65	Stratified sand, coarse sand, very gravelly coarse sand.	GP, SP, SP-SM, GP-GM	A-1	5-25	40-65	30-60	15-40	0-10	---	NP
Mg*:											
Merrimac	0-3	Sandy loam	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	---	NP
	3-24	Sandy loam	SM	A-2	0	75-95	70-90	40-60	20-35	---	NP
	24-65	Stratified sand, coarse sand, very gravelly coarse sand.	GP, SP, SP-SM, GP-GM	A-1	5-25	40-65	30-60	15-40	0-10	---	NP
Udipsamments.											
Urban land.											
NaB, NaC Nantucket	0-5	Sandy loam	SM, ML	A-1, A-2-4, A-4	0-10	95-100	85-100	40-85	15-55	<15	NP-3
	5-27	Sandy loam, fine sandy loam, loamy sand.	SM, ML	A-2-4, A-4, A-1	0-20	95-100	85-100	40-85	15-55	<15	NP-3
	27-65	Sandy clay loam, loam, sandy loam.	SM, SC, CL, ML	A-2-4, A-4	0-20	95-100	85-100	50-95	25-75	<21	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
NsB, NsC--------- Nantucket	0-5	Stony sandy loam	SM, ML	A-2, A-4, A-2-4, A-1-b	15-25	90-100	85-95	40-85	15-55	<15	NP-3
	5-27	Sandy loam, fine sandy loam, loam.	SM, ML	A-2, A-4, A-1-b	0-20	95-100	85-100	40-85	15-55	<15	NP-3
	27-65	Sandy clay loam, loam, sandy loam.	SM, SC, ML, CL	A-2, A-4	0-20	95-100	85-100	50-95	25-75	<21	NP-8
PeA-------------- Pipestone	0-18	Loamy coarse sand	SM, SP-SM	A-2-4, A-1-b, A-4	0	95-100	85-100	40-90	10-40	---	NP
	18-37	Sand, loamy sand, loamy coarse sand, coarse sand.	SP-SM, SM	A-2-4, A-3, A-1-b	0	95-100	85-100	40-90	5-30	---	NP
	37-65	Loamy coarse sand, coarse sand, very gravelly coarse sand.	SP-SM, SM	A-3, A-2-4, A-1-b	0	95-100	85-100	40-90	5-30	---	NP
Pg*. Pits											
PmA, PmB, PmC, PmD------------- Plymouth	0-3	Loamy coarse sand	SM, SP	A-1, A-2, A-3	0-5	65-100	60-95	35-65	2-30	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP	A-1, A-2, A-3	0-5	65-100	60-95	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, very gravelly sand.	SW, GW, SP, GP	A-1	0-5	40-80	35-75	20-50	2-10	---	NP
PsB, PsC, PsD---- Plymouth	0-3	Stony loamy coarse sand.	SM, SP	A-1, A-2, A-3	5-10	80-95	70-85	35-65	3-35	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2	0-10	65-100	60-95	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, very gravelly sand.	SW, GW, SP, GP	A-1	0-15	45-80	35-75	20-50	2-10	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
PvC*:											
Plymouth--------	0-3	Very bouldery loamy coarse sand.	SM, SP-SM	A-1, A-2	5-15	80-90	65-85	35-65	3-35	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2	0-15	75-95	65-90	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, very gravelly sand.	SW, GW, SP, GP	A-1	0-15	45-80	35-75	20-50	2-10	---	NP
Barnstable------	0-1	Very bouldery sandy loam.	SM	A-1, A-2-4	5-10	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
PvD*:											
Plymouth--------	0-3	Very bouldery loamy coarse sand.	SM, SP-SM	A-1, A-2	5-15	80-90	65-85	35-65	3-35	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2	0-15	75-95	65-90	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, very gravelly sand.	SW, GW, SP, GP	A-1	0-15	45-80	35-75	20-50	2-10	---	NP
Barnstable------	0-1	Very bouldery sandy loam.	SM	A-1, A-2-4	5-10	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
PxC*, PxD*:											
Plymouth--------	0-3	Extremely bouldery loamy coarse sand.	SM, SP-SM	A-1, A-2	10-30	75-90	60-85	30-65	3-35	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2	0-15	75-95	65-90	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, very gravelly sand.	SW, GW, SP, GP	A-1	0-15	45-80	35-75	20-50	2-10	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
PxC*, PxD*:											
Barnstable------	0-1	Extremely bouldery sandy loam.	SM	A-1, A-2-4	10-25	75-95	65-90	35-75	15-35	---	NP
	1-23	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
PyD*:											
Plymouth--------	0-3	Very bouldery loamy coarse sand.	SM, SP-SM	A-1, A-2	5-15	80-90	65-85	35-65	3-35	---	NP
	3-29	Loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SM, SP-SM	A-1, A-2	0-15	75-95	65-90	35-65	2-30	---	NP
	29-65	Coarse sand, gravelly coarse sand, very gravelly sand.	SW, GW, SP, GP	A-1	0-15	45-80	35-75	20-50	2-10	---	NP
Barnstable------	0-1	Very bouldery sandy loam.	SM	A-1, A-2-4	5-10	80-95	70-90	40-75	20-35	---	NP
	1-23	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-1, A-2-4	0-20	75-95	65-90	35-75	15-35	---	NP
	23-65	Loamy sand, loamy coarse sand, coarse sand.	SM, SP-SM, SP	A-1, A-2-4, A-3	0-25	65-100	50-95	20-70	3-30	---	NP
Nantucket-------	0-5	Very bouldery sandy loam.	SM, ML	A-2, A-4, A-1-b	15-25	95-100	85-100	40-85	15-55	<15	NP-3
	5-27	Sandy loam, fine sandy loam.	SM, ML	A-2, A-4, A-1-b	0-20	95-100	85-100	40-85	15-55	<15	NP-3
	27-65	Sandy clay loam, loam, sandy loam.	SM, SC, ML, CL	A-2, A-4	0-20	95-100	85-100	50-95	25-75	<21	NP-8
ScA-------------- Scitico	0-2	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	70-95	20-50	5-20
	2-23	Silt loam, silty clay loam, silty clay.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	75-100	20-50	5-25
	23-65	Silty clay loam, silty clay.	CL, CL-ML	A-6, A-7	0	100	95-100	90-100	80-100	30-50	12-25

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
SdA-------------- Sudbury	0-10	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	85-100	70-100	40-90	20-55	---	NP
	10-30	Sandy loam, fine sandy loam, loamy sand.	SM	A-2, A-4, A-1	0-5	85-100	60-100	40-80	20-50	---	NP
	30-45	Gravelly coarse sand, loamy fine sand, sand.	SM, SP-SM	A-1, A-2, A-3	0-5	70-100	60-100	30-70	5-35	---	NP
	45-65	Stratified sand, gravelly sand, very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	10-40	35-70	25-65	15-45	0-10	26-65	NP
Ud. Udipsamments											
Ur*. Urban land											
WvA-------------- Walpole	0-9	Sandy loam-------	SM	A-2, A-4	0	100	90-100	60-85	30-50	---	NP
	9-38	Fine sandy loam, sandy loam, coarse sand.	SM	A-2, A-4	0	100	90-100	60-85	30-50	---	NP
	38-65	Silt, silt loam	ML	A-4	0	100	100	90-100	70-100	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AmA--------------- Amostown	0-7	4-10	1.00-1.20	2.0-6.0	0.11-0.18	4.5-6.0	Low-----------	0.28	3	---	2-5
	7-33	1-5	1.20-1.40	2.0-6.0	0.10-0.15	4.5-6.0	Low-----------	0.28			
	33-65	1-3	1.30-1.50	0.06-0.6	0.15-0.21	5.1-7.3	Low-----------	0.64			
BaB, BaC---------- Barnstable	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.24	3	3	2-5
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	3.6-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
BbB, BbC, BbD----- Barnstable	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.20	3	8	---
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	3.6-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
BcC*:											
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.24	3	3	2-5
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	3.6-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
Plymouth---------	0-3	1-5	1.10-1.40	6.0-20	0.04-0.08	3.6-5.5	Low-----------	0.17	2	---	2-4
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.07	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.03	4.5-5.5	Low-----------	0.17			
BdC*, BeC*:											
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.20	3	8	---
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	4.5-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
Plymouth---------	0-3	1-5	1.00-1.30	6.0-20	0.04-0.10	3.6-5.0	Low-----------	0.17	2	---	---
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.08	4.5-5.0	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.05	4.5-5.5	Low-----------	0.17			
BfC*:											
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.24	3	3	2-5
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	3.6-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
Plymouth---------	0-3	1-5	1.10-1.40	6.0-20	0.04-0.08	3.6-5.5	Low-----------	0.17	2	---	2-4
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.07	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.03	4.5-5.5	Low-----------	0.17			
Nantucket--------	0-5	2-7	1.10-1.20	0.6-6.0	0.10-0.23	4.5-5.5	Low-----------	0.24	3	3	2-5
	5-27	2-7	1.20-1.40	0.6-6.0	0.08-0.18	4.5-5.5	Low-----------	0.24			
	27-65	10-25	1.60-1.80	0.06-0.6	0.03-0.05	4.5-5.5	Low-----------	0.28			
BgC*:											
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.20	3	8	---
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	4.5-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
Plymouth---------	0-3	1-5	1.00-1.30	6.0-20	0.04-0.10	3.6-5.5	Low-----------	0.17	2	---	---
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.08	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.05	4.5-5.5	Low-----------	0.17			
Nantucket--------	0-5	2-7	1.00-1.20	0.6-6.0	0.10-0.17	4.5-5.5	Low-----------	0.20	3	---	2-5
	5-27	2-7	1.20-1.40	0.6-6.0	0.08-0.18	4.5-5.5	Low-----------	0.24			
	27-65	10-25	1.60-1.80	0.06-0.6	0.03-0.05	4.5-5.5	Low-----------	0.28			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
Bh*. Beaches											
BlB-------------- Belgrade	0-9	4-15	0.95-1.15	0.6-2.0	0.18-0.25	5.1-7.3	Low----------	0.49	3	---	1-5
	9-41	4-15	1.10-1.40	0.6-2.0	0.16-0.20	5.1-7.3	Low----------	0.64			
	41-65	2-20	1.20-1.40	0.06-6.0	0.06-0.20	5.6-7.3	Low----------	0.64			
BmA-------------- Berryland	0-12	1-5	1.30-1.45	6.0-20	0.06-0.08	3.6-4.4	Low----------	0.17	2	---	4-8
	12-23	3-10	1.50-1.60	2.0-20	0.04-0.14	4.5-5.0	Low----------	0.17			
	23-65	3-10	1.50-1.60	2.0-20	0.04-0.14	4.5-5.0	Low----------	0.28			
BoA, BoB--------- Boxford	0-9	20-40	1.05-1.25	0.2-0.6	0.16-0.24	4.5-6.5	Low----------	0.32	3	---	2-6
	9-20	25-50	1.20-1.45	0.06-0.2	0.15-0.22	4.5-6.5	Low----------	0.49			
	20-26	35-50	1.40-1.60	0.06-0.2	0.13-0.15	5.1-7.3	Moderate-----	0.49			
	26-65	35-50	1.40-1.60	<0.2	0.11-0.15	5.1-7.3	Moderate-----	0.49			
CcA, CcB, CdA, CdB, CdC, CdD--- Carver	0-7	1-5	1.00-1.30	>20	0.05-0.12	3.6-5.5	Low----------	0.10	5	---	1-3
	7-17	1-5	1.30-1.50	>20	0.03-0.10	3.6-5.5	Low----------	0.10			
	17-65	0-2	1.45-1.55	>20	0.03-0.04	3.6-5.5	Low----------	0.10			
CoB*, CoC*, CoD*:											
Carver----------	0-7	1-5	1.00-1.30	>20	0.05-0.12	3.6-5.5	Low----------	0.10	5	---	1-3
	7-17	1-5	1.30-1.50	>20	0.03-0.10	3.6-5.5	Low----------	0.10			
	17-65	0-2	1.45-1.55	>20	0.03-0.04	3.6-5.5	Low----------	0.10			
Hinesburg-------	0-10	1-5	1.20-1.50	6.0-20	0.08-0.12	5.6-6.5	Low----------	0.24	3	---	3-6
	10-32	1-5	1.30-1.50	6.0-20	0.04-0.10	5.6-6.5	Low----------	0.24			
	32-65	3-16	1.30-1.70	0.2-0.6	0.18-0.22	5.1-7.3	Low----------	0.43			
DeA-------------- Deerfield	0-10	2-7	1.00-1.20	6.0-20	0.07-0.13	3.6-6.5	Low----------	0.17	5	---	1-4
	10-29	1-7	1.20-1.45	6.0-20	0.01-0.13	4.5-6.5	Low----------	0.17			
	29-65	0-5	1.40-1.50	>20	0.01-0.08	4.5-6.5	Low----------	0.17			
Dm*. Dumps											
Dn*. Dune land											
EaA, EaB, EaC---- Eastchop	0-6	1-4	1.10-1.50	6.0-20	0.07-0.12	3.6-5.5	Low----------	0.17	5	---	1-2
	6-10	3-6	1.20-1.40	6.0-20	0.05-0.10	3.6-5.5	Low----------	0.17			
	10-25	3-6	1.30-1.50	6.0-20	0.05-0.10	3.6-5.5	Low----------	0.17			
	25-65	1-5	1.30-1.60	6.0-20	0.03-0.10	4.5-5.5	Low----------	0.17			
EnA, EnB, EnC---- Enfield	0-12	3-12	1.00-1.25	0.6-2.0	0.20-0.30	4.5-6.0	Low----------	0.49	3	---	2-6
	12-31	3-12	1.30-1.60	0.6-2.0	0.18-0.28	4.5-6.0	Low----------	0.64			
	31-65	0-2	1.40-1.65	>6.0	0.01-0.08	4.5-6.0	Low----------	0.10			
Fm--------------- Freetown	0-65	---	0.10-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---	---	>50
Fs*:											
Freetown--------	0-65	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---	---	>50
Swansea---------	0-12	1-5	1.10-1.35	6.0-20	0.03-0.08	3.6-4.4	Low----------	----	---	---	>50
	12-28	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----			
	28-65	1-5	1.15-1.40	>20	0.01-0.08	3.6-5.5	Low----------	0.10			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
Ft-----------------	0-10	1-5	1.10-1.35	6.0-20	0.03-0.08	3.6-4.4	Low-----------	----	---	---	1-2
Freetown	10-65	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low-----------	----			
HeA, HeB---------	0-2	4-8	0.90-1.10	6.0-20	0.11-0.18	3.6-6.0	Low-----------	0.20	3	3	2-7
Hinckley	2-17	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low-----------	0.17			
	17-65	0-3	1.30-1.50	>20	0.01-0.06	4.5-6.0	Low-----------	0.10			
HkC, HkD---------	0-2	4-8	0.90-1.10	6.0-20	0.08-0.14	3.6-6.0	Low-----------	0.20	3	8	2-7
Hinckley	2-17	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low-----------	0.17			
	17-65	0-3	1.30-1.50	>20	0.01-0.06	4.5-6.0	Low-----------	0.10			
HnA, HnB, HnC----	0-10	1-5	1.20-1.50	6.0-20	0.10-0.16	5.6-6.5	Low-----------	0.24	3	---	3-6
Hinesburg	10-32	1-5	1.30-1.50	6.0-20	0.04-0.10	5.6-6.5	Low-----------	0.24			
	32-65	3-16	1.30-1.70	0.2-0.6	0.18-0.22	5.1-7.3	Low-----------	0.43			
HoC, HoD---------	0-20	1-5	1.30-1.70	6.0-20	0.02-0.08	5.1-7.8	Low-----------	0.10	5	1	<1
Hooksan	20-65	1-5	1.30-1.70	6.0-20	0.01-0.03	5.1-7.8	Low-----------	0.10			
HxC*:											
Hooksan----------	0-20	1-5	1.30-1.70	6.0-20	0.02-0.08	5.1-7.8	Low-----------	0.10	5	1	<1
	20-65	1-5	1.30-1.70	6.0-20	0.01-0.03	5.6-7.8	Low-----------	0.10			
Dune land.											
ImA*:											
Ipswich----------	0-7	---	0.10-0.30	0.6-20	0.18-0.35	5.6-7.3	--------------	----	---	---	---
	7-25	---	0.10-0.30	0.6-20	0.18-0.35	5.6-7.3	--------------	----			
	25-65	---	0.10-0.30	0.6-20	0.18-0.35	5.6-7.3	--------------	----			
Pawcatuck--------	0-22	---	0.10-0.70	0.6-20	0.18-0.36	5.1-7.3	Low-----------	----	---	---	20-90
	22-65	0-2	1.45-1.70	>20	0.02-0.13	5.1-7.3	Low-----------	0.10			
Matunuck---------	0-13	---	0.30-0.80	6.0-20	0.18-0.35	5.1-7.3	--------------	----	---	---	20-90
	13-65	0-2	1.45-1.70	>20	0.02-0.13	5.1-7.3	Low-----------	0.17			
MaA----------------	0-7	20-35	1.00-1.30	0.2-0.6	0.12-0.30	5.1-6.0	Low-----------	0.32	5	---	3-10
Maybid	7-20	20-55	1.40-1.60	<0.2	0.09-0.17	5.1-7.3	Moderate------	0.43			
	20-65	35-55	1.40-1.60	<0.2	0.09-0.18	5.1-7.3	Moderate------	0.49			
MbA----------------	0-12	20-35	0.70-1.10	0.06-2.0	0.20-0.30	3.6-5.0	Moderate------	0.24	3	---	---
Maybid Variant	12-25	20-35	0.70-1.10	0.06-2.0	0.20-0.30	3.6-5.0	Moderate------	0.24			
	25-65	20-35	0.70-1.10	0.2-0.06	0.18-0.25	6.1-7.8	Moderate------	0.24			
MeA, MeB, MeC, MeD---------------	0-3	3-7	1.10-1.20	2.0-6.0	0.14-0.19	3.6-6.0	Low-----------	0.24	3	---	1-5
Merrimac	3-24	1-4	1.20-1.40	2.0-6.0	0.14-0.17	3.6-6.0	Low-----------	0.24			
	24-65	0-3	1.30-1.50	6.0-20	0.01-0.06	3.6-6.0	Low-----------	0.10			
Mg*:											
Merrimac---------	0-3	3-7	1.10-1.20	2.0-6.0	0.14-0.19	3.6-6.0	Low-----------	0.24	3	---	1-5
	3-24	1-4	1.20-1.40	2.0-6.0	0.14-0.17	3.6-6.0	Low-----------	0.24			
	24-65	0-3	1.30-1.50	6.0-20	0.01-0.06	3.6-6.0	Low-----------	0.10			
Udipsamments.											
Urban land.											
NaB, NaC---------	0-5	2-7	1.10-1.20	0.6-6.0	0.10-0.23	4.5-5.5	Low-----------	0.24	3	3	2-5
Nantucket	5-27	2-7	1.20-1.40	0.6-6.0	0.08-0.18	4.5-5.5	Low-----------	0.24			
	27-65	10-25	1.60-1.80	0.06-0.6	0.03-0.05	4.5-5.5	Low-----------	0.28			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
NsB, NsC---------- Nantucket	0-5	2-7	1.00-1.20	0.6-6.0	0.10-0.17	4.5-5.5	Low-----------	0.20	3	---	2-5
	5-27	2-7	1.20-1.40	0.6-6.0	0.08-0.18	4.5-5.5	Low-----------	0.24			
	27-65	10-25	1.60-1.80	0.06-0.6	0.03-0.05	4.5-5.5	Low-----------	0.28			
PeA--------------- Pipestone	0-18	2-12	1.30-1.70	6.0-20	0.09-0.12	3.6-6.5	Low-----------	0.17	5	2	3-4
	18-37	2-12	1.40-1.70	6.0-20	0.06-0.09	4.5-6.5	Low-----------	0.15			
	37-65	2-12	1.40-1.65	6.0-20	0.05-0.07	5.1-6.5	Low-----------	0.15			
Pg*. Pits											
PmA, PmB, PmC, PmD-------------- Plymouth	0-3	1-5	1.10-1.40	6.0-20	0.04-0.08	3.6-5.5	Low-----------	0.17	2	---	2-4
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.07	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.03	4.5-5.5	Low-----------	0.17			
PsB, PsC, PsD----- Plymouth	0-3	1-5	1.10-1.40	6.0-20	0.04-0.10	3.6-5.5	Low-----------	0.17	2	---	2-4
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.08	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.05	4.5-5.5	Low-----------	0.17			
PvC*: Plymouth---------	0-3	1-5	1.00-1.30	6.0-20	0.04-0.10	3.6-5.5	Low-----------	0.17	2	---	---
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.08	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.05	4.5-5.5	Low-----------	0.17			
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.20	3	8	---
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	4.5-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
PvD*: Plymouth---------	0-3	1-5	1.00-1.30	6.0-20	0.04-0.10	3.6-5.5	Low-----------	0.17	2	---	---
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.08	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.05	4.5-5.5	Low-----------	0.17			
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.20	3	8	---
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	4.5-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
PxC*, PxD*: Plymouth---------	0-3	1-5	1.00-1.30	6.0-20	0.03-0.10	3.6-5.5	Low-----------	0.17	2	---	---
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.08	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.05	4.5-5.5	Low-----------	0.17			
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.20	3	8	---
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	4.5-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
PyD*: Plymouth---------	0-3	1-5	1.00-1.30	6.0-20	0.04-0.10	3.6-5.5	Low-----------	0.17	2	---	---
	3-29	1-5	1.25-1.55	6.0-20	0.03-0.08	4.5-5.5	Low-----------	0.17			
	29-65	1-5	1.45-1.65	>20	0.02-0.05	4.5-5.5	Low-----------	0.17			
Barnstable-------	0-1	2-6	0.90-1.20	2.0-6.0	0.09-0.18	3.6-5.0	Low-----------	0.20	3	8	---
	1-23	2-6	1.20-1.50	2.0-6.0	0.06-0.12	4.5-5.0	Low-----------	0.20			
	23-65	0-3	1.30-1.60	>6.0	0.02-0.08	4.5-6.0	Low-----------	0.17			
Nantucket--------	0-5	2-7	1.00-1.20	0.6-6.0	0.10-0.17	4.5-5.5	Low-----------	0.20	3	---	2-5
	5-27	2-7	1.20-1.40	0.6-6.0	0.08-0.18	4.5-5.5	Low-----------	0.24			
	27-65	10-25	1.60-1.80	0.06-0.6	0.03-0.05	4.5-5.5	Low-----------	0.28			

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
ScA: Scitico	0-2	10-40	1.05-1.25	0.2-2.0	0.15-0.25	4.5-7.3	Low	0.49	3	---	2-7
	2-23	20-55	1.40-1.70	0.06-0.6	0.12-0.22	5.1-7.3	Moderate	0.49			
	23-65	35-60	1.50-1.75	<0.2	0.09-0.15	5.6-7.3	Moderate	0.43			
SdA: Sudbury	0-10	2-6	1.10-1.40	2.0-6.0	0.10-0.25	3.6-6.0	Low	0.24	3	---	2-6
	10-30	2-7	1.15-1.45	2.0-6.0	0.07-0.18	3.6-6.0	Low	0.24			
	30-45	0-4	1.25-1.45	2.0-20	0.01-0.15	4.5-6.0	Low	0.17			
	45-65	0-3	1.30-1.45	6.0-20	0.01-0.06	4.5-6.0	Low	0.10			
Ud. Udipsamments											
Ur*. Urban land											
WvA: Walpole	0-9	2-10	1.35-1.45	2.0-6.0	0.15-0.23	4.5-6.0	Low	0.28	3	---	1-3
	9-38	2-10	1.30-1.45	2.0-6.0	0.13-0.18	4.5-6.0	Low	0.28			
	38-65	1-8	1.45-1.55	0.2-0.6	0.14-0.26	5.1-6.0	Low	0.49			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
AmA--------------- Amostown	C	None---------	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate----	Moderate	Moderate.
BaB, BaC, BbB, BbC, BbD--------- Barnstable	B	None---------	---	---	>6.0	---	---	Low---------	Low------	High.
BcC*, BdC*, BeC*:										
Barnstable-------	B	None---------	---	---	>6.0	---	---	Low---------	Low------	High.
Plymouth---------	A	None---------	---	---	>6.0	---	---	Low---------	Low------	High.
BfC*, BgC*:										
Barnstable-------	B	None---------	---	---	>6.0	---	---	Low---------	Low------	High.
Plymouth---------	A	None---------	---	---	>6.0	---	---	Low---------	Low------	High.
Nantucket--------	C	None---------	---	---	2.0-2.5	Perched	Mar-Apr	Low---------	Low------	High.
Bh*. Beaches										
BlB--------------- Belgrade	B	None---------	---	---	1.5-3.5	Apparent	Nov-Apr	High--------	Moderate	Moderate.
BmA--------------- Berryland	B/D	Rare---------	Brief-----	Mar-Jun	+.5-0.5	Apparent	Oct-Jun	Low---------	High-----	High.
BoA, BoB---------- Boxford	C	None---------	---	---	1.0-3.0	Apparent	Nov-Apr	High--------	High-----	Moderate.
CcA, CcB, CdA, CdB, CdC, CdD---- Carver	A	None---------	---	---	>6.0	---	---	Low---------	Low------	High.
CoB*, CoC*, CoD*:										
Carver-----------	A	None---------	---	---	>6.0	---	---	Low---------	Low------	High.
Hinesburg--------	C	None---------	---	---	1.5-2.5	Perched	Nov-May	Moderate----	Low------	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
DeA: Deerfield	B	None	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	Low	High.
Dm*. Dumps										
Dn*. Dune land										
EaA, EaB, EaC: Eastchop	A	None	---	---	>6.0	---	---	Low	Low	High.
EnA, EnB, EnC: Enfield	B	None	---	---	>6.0	---	---	Moderate	Low	Moderate.
Fm: Freetown	D	None	---	---	+3-0	Apparent	Jan-Dec	High	High	High.
Fs*:										
Freetown	D	None	---	---	0-1.0	Apparent	Jan-Dec	High	High	High.
Swansea	D	None	---	---	0-1.0	Apparent	Jan-Dec	High	High	High.
Ft: Freetown	D	None	---	---	0-1.0	Apparent	Jan-Dec	High	High	High.
HeA, HeB, HkC, HkD: Hinckley	A	None	---	---	>6.0	---	---	Low	Low	High.
HnA, HnB, HnC: Hinesburg	C	None	---	---	1.5-2.5	Perched	Nov-May	Moderate	Low	Moderate.
HoC, HoD: Hooksan	A	None	---	---	>6.0	---	---	---	Low	Low.
HxC*:										
Hooksan	A	None	---	---	>6.0	---	---	---	Low	Low.
Dune land.										
ImA*:										
Ipswich	D	Frequent	Very brief	Jan-Dec	+1-0	Apparent	Jan-Dec	---	High	High.
Pawcatuck	D	Frequent	Very brief	Jan-Dec	+1-0	Apparent	Jan-Dec	---	High	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
ImA*:										
Matunuck----------	D	Frequent----	Very brief	Jan-Dec	+1-0	Apparent	Jan-Dec	---	High-----	High.
MaA---------------- Maybid	D	None---------	---	---	+1-0.5	Apparent	Oct-Aug	High---------	High-----	Moderate.
MbA---------------- Maybid Variant	D	None---------	---	---	1.0-1.5	Apparent	Jan-Dec	High---------	High-----	High.
MeA, MeB, MeC, MeD-------------- Merrimac	A	None---------	---	---	>6.0	---	---	Low----------	Low------	High.
Mg*:										
Merrimac----------	A	None---------	---	---	>6.0	---	---	Low----------	Low------	High.
Udipsamments.										
Urban land.										
NaB, NaC, NsB, NsC--------------- Nantucket	C	None---------	---	---	2.0-2.5	Perched	Mar-Apr	Low----------	Low------	High.
PeA---------------- Pipestone	B	None---------	---	---	0.5-1.5	Apparent	Oct-Jun	Moderate----	Low------	Moderate.
Pg*. Pits										
PmA, PmB, PmC, PmD, PsB, PsC, PsD-------------- Plymouth	A	None---------	---	---	>6.0	---	---	Low----------	Low------	High.
PvC*, PvD*, PxC*, PxD*:										
Plymouth---------	A	None---------	---	---	>6.0	---	---	Low----------	Low------	High.
Barnstable------	B	None---------	---	---	>6.0	---	---	Low----------	Low------	High.
PyD*:										
Plymouth----------	A	None---------	---	---	>6.0	---	---	Low----------	Low------	High.
Barnstable--------	B	None---------	---	---	>6.0	---	---	Low----------	Low------	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
PyD*:										
Nantucket	C	None	---	---	2.0-2.5	Perched	Mar-Apr	Low	Low	High.
ScA Scitico	C	None	---	---	0-1.0	Apparent	Oct-Jun	High	High	Moderate.
SdA Sudbury	B	None	---	---	1.5-3.0	Apparent	Dec-Apr	Moderate	Low	High.
Ud. Udipsamments										
Ur*. Urban land										
WvA Walpole	C	None	---	---	0-1.0	Apparent	Nov-Jun	High	High	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Amostown	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Barnstable	Sandy, mixed, mesic Typic Dystrochrepts
Belgrade	Coarse-silty, mixed, mesic Aquic Dystric Eutrochrepts
Berryland	Sandy, siliceous, mesic Typic Haplaquods
Boxford	Fine, mixed, mesic Aquic Dystric Eutrochrepts
Carver	Mesic, uncoated Typic Quartzipsamments
Deerfield	Mixed, mesic Aquic Udipsamments
Eastchop	Siliceous, mesic Typic Udipsamments
Enfield	Coarse-silty over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
Freetown	Dysic, mesic Typic Medisaprists
Hinckley	Sandy-skeletal, mixed, mesic Typic Udorthents
Hinesburg	Sandy over loamy, mixed, nonacid, mesic Typic Udorthents
Hooksan	Mesic, uncoated Typic Quartzipsamments
Ipswich	Euic, mesic Typic Sulfihemists
Matunuck	Sandy, mixed, mesic Typic Sulfaquents
Maybid	Fine, illitic, nonacid, mesic Typic Humaquepts
Maybid Variant	Fine-silty, mixed, acid, mesic Sulfic Haplaquepts
Merrimac	Sandy, mixed, mesic Typic Dystrochrepts
Nantucket	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Pawcatuck	Sandy or sandy-skeletal, mixed, euic, mesic Terric Sulfihemists
Pipestone	Sandy, mixed, mesic Entic Haplaquods
Plymouth	Mesic, coated Typic Quartzipsamments
Scitico	Fine, illitic, nonacid, mesic Typic Haplaquepts
Sudbury	Sandy, mixed, mesic Aquic Dystrochrepts
Swansea	Sandy or sandy-skeletal, mixed, dysic, mesic Terric MeDisaprists
Udipsamments	Udipsamments
Walpole	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts

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