Series 1944, No. 11 Issued June 1959

SOIL SURVEY

East Millard Area Utah

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UTAH AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SURVEY of the East Millard Area, Utah, will help you plan the kind of agriculture that will protect your soils and provide good yields. It describes the soils, shows their location on a map, and tells what they will do under different kinds of management.

The fieldwork for this survey was completed in 1944. Unless otherwise specified, information presented in this report refers to conditions at the time of the survey.

Find Your Farm or Ranch on the Map

In using this survey, start with the soil map, which consists of 27 map sheets bound in the back of this report. These sheets, if laid together, make a large map of the Area. You can see roads, rivers, towns, important buildings, and other landmarks on this map.

To find your farm or ranch on the large map, use the Index to Map Sheets. This is a small map of the surveyed Area on which numbered rectangles have been drawn to show where each sheet of the large map is located.

Each kind of soil mapped in the Area is identified on the soil map by a symbol. Suppose you have found on your farm or ranch an area marked with the symbol Ef. You learn the name of the soil this symbol represents by looking at the map legend. The symbol Ef identifies Ebbs loam, 0 to 2 percent slopes.

Learn About Your Soils

Ebbs loam, 0 to 2 percent slopes, and all the other soils mapped are described in the section, Descriptions of Soils. Soil scientists described and mapped the soils. They dug holes and examined surface soils and subsoils; measured slopes with a hand level; noted differences in growth of crops, weeds, brush, or trees; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming.

After they mapped and studied the soils, the scientists talked with farmers and studied experimental data; then they placed each soil in a management group. A management group is a group of similar soils that need and respond to about the same kind of management.

Ebbs loam, 0 to 2 percent slopes, is in management group 1, subgroup A. Turn to the section, Use and Management of Soils, and read what is said about the soils of group 1. You will want to study table 3 which tells you how much you can expect to harvest from Ebbs loam, 0 to 2 percent slopes.

Make a Farm Plan

Compare the yields you are getting and the management practices you are using with those described in the report. Look at your fields for signs of runoff and erosion. Then decide whether or not you need to change your methods. The choice, of course, must be yours. This survey will aid you in planning new methods, but it is not a plan of management for any particular farm or ranch.

If you find that you need help in planning, consult the county agricultural agent or the local representative of the Soil Conservation Service. Members of the staff of your State agricultural experiment station will also be glad to help you.

Wilson, Le Moyne, 1900–

Soil survey, East Millard area, Utah [by Le Moyne Wilson and others. Correlation by W. G. Harper. Washington, U. S. Govt. Print. Off.,] 1958.

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SOIL SURVEY OF EAST MILLARD AREA, UTAH

By LEMOYNE WILSON, in Charge, R. G. RICKENBACH, R. GOURLEY, and G. NIELSON, Utah Agricultural Experiment Station; and O. F. BARTHOLOMEW, Soil Survey,[1] United States Department of Agriculture

Correlation by W. G. HARPER, United States Department of Agriculture

United States Department of Agriculture in cooperation with the Utah Agricultural Experiment Station

General Nature of the Area

The East Millard Area consists of the eastern part of Millard County. It is in the west-central part of Utah, west of the Pavant and Canyon Mountains (fig. 1).

The Area contains 479,684 acres, or approximately 750 square miles. Fillmore, the county seat, is 125 miles south of Salt Lake City.

Physiography, Relief, and Drainage

The East Millard Area is entirely within the Great Basin physiographic province.[2] Most of it is below the highest shoreline of prehistoric Lake Bonneville.

The northern part of the Area consists of a series of smooth, sloping lake terraces, locally called benches. The general slope is toward the southwest. The elevation is about 5,000 feet at the foot of the Canyon Mountains, which border the Area on the east, and about 4,700 feet at the western edge of the Area. The southern part of the Area, known as Pavant Valley, is a long and rather narrow depression between the Pavant Mountains on the east and a line of low volcanic cones, buttes, and lava flows on the west. In the southern and eastern parts of the valley there are some smooth alluvial fans, some older than prehistoric Lake Bonneville and others more recent. The fans cover the old shoreline and extend below it.

Elevations range from about 4,600, the lowest point in the Pavant Valley, to 10,082 feet at the summit of Mt. Catherine in the Pavant Mountains. Scipio Peak, the highest point in the southern part of the Canyon Mountains, has an elevation of 9,719 feet. The highest shoreline of prehistoric Lake Bonneville is at an approximate elevation of 5,200 feet.

Fillmore is at an elevation of 5,250 feet.The elevations of other towns in the Area are: Lynndyl, 4,796 feet; Leamington, 4,738 feet; Oak City, about 5,200 feet; Meadow and Kanosh, about 5,100 feet.

The terraces in the northern part of the Area are drained by the Sevier River and by intermittent drainageways that disappear on the terraces soon after leaving the alluvial fans. The Pavant Valley has no drainage outlet. The streams that flow into the Pavant Valley have made deep cuts in the alluvial fans near the base of the mountains, but they become shallow toward the base of the fans. The smaller streams disappear on the alluvial fans, but a few of the larger ones reach the lowest part of the valley and flow into sloughs or intermittent lakes.

Climate

The climate of the East Millard Area is continental. It is temperate and arid to semiarid. The weather is predominantly sunny. Daily and annual temperatures vary widely.

Table 1 shows normal monthly, seasonal, and annual temperature and precipitation recorded at the United States Weather Bureau Station at Fillmore.

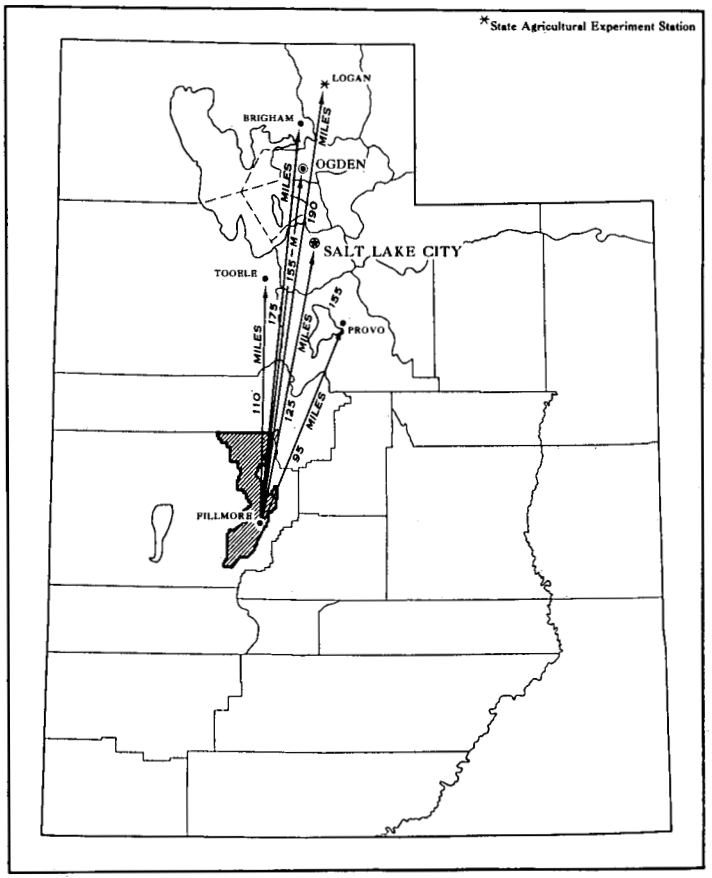

Figure 1.—Location of the East Millard Area in Utah.

[1] Fieldwork for this survey was done when Soil Survey was part of the former Bureau of Plant Industry, Soils, and Agricultural Engineering. Soil Survey was transferred to the Soil Conservation Service on November 15, 1952

[2] FENNEMAN, N. M. PHYSIOGRAPHY OF WESTERN UNITED STATES. 534 pp., illus. New York and London. 1931.

TABLE 1.—*Temperature and precipitation at Fillmore, Millard County, Utah*

[Elevation, 5,250 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1934)	Wettest year (1906)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	30. 6	70	−20	1. 24	0. 70	0. 63	13. 6
January	28. 9	65	−23	1. 20	1. 00	. 72	15. 7
February	34. 1	72	−21	1. 42	1. 46	1. 16	12. 9
Winter	31. 2	72	−23	3. 86	3. 16	2. 51	42. 2
March	41. 6	78	−1	1. 86	. 32	3. 88	14. 7
April	50. 2	88	10	1. 60	. 86	4. 38	6. 2
May	58. 8	94	24	1. 43	[3]	2. 18	1. 3
Spring	50. 2	94	−1	4. 89	1. 18	10. 44	22. 2
June	68. 3	106	31	. 68	. 17	. 40	0
July	76. 4	107	34	. 82	. 23	1. 27	0
August	74. 9	105	38	. 85	. 11	1. 20	[3]
Summer	73. 2	107	31	2. 35	. 51	2. 87	0
September	65. 6	99	25	. 88	. 05	2. 38	0
October	53. 3	88	15	1. 28	. 24	. 15	2. 2
November	40. 9	79	−3	1. 13	1. 58	2. 93	8. 9
Fall	53. 2	99	−3	3. 29	1. 87	5. 46	11. 1
Year	52. 0	107	−23	14. 39	6. 72	21. 28	75. 5

[1] Average temperature based on a 62-year record, through 1955; highest and lowest temperatures on a 34-year record, through 1952.
[2] Average precipitation based on a 63-year record, through 1955; wettest and driest years based on a 64-year record, in the period 1892–1955; snowfall based on a 36-year record, through 1952.
[3] Trace.

The average length of the growing season at Fillmore is 132 days. The average date of the last frost in spring is May 18. The latest frost recorded was on July 2. The average date of the first frost in fall is September 27. The earliest recorded was on August 23.

The precipitation is fairly well distributed throughout the year but is relatively low in summer. From place to place the annual precipitation varies. It is greatest near the mountains that border the Area on the east and decreases steadily with distance from the mountains. Much more snow falls near the mountains than in the lower parts of the Area.

From October through April most of the precipitation is in the form of snow. In spring and in fall, rains are gentle; summer rainfall consists largely of sudden short downpours, accompanied by lightning and thunder. Summer storms tend to follow the base of the mountains and are generally more severe near the mountains.

In spring, strong winds from the southwest are common. The buttes and lava flows at the western edge of the Area break the force of these winds and protect the southern part of the Area, but in the northern part the winds are likely to cause severe erosion.

Hail storms are frequent in the summer but are rarely damaging. Tornadoes are unknown.

Frost damage is less likely to occur along the foot slopes of the mountains, where air drainage is good. "Frost pockets" occur where ridges or hills prevent the cold air from circulating freely, as at Flowell. The growing season is shorter in those localities.

Subzero weather is common in winter, but it does not harm fall-sown crops. Severe winters kill some of the insects—grasshoppers and Mormon crickets—and rodents that damage crops.

Water Supply

On most farms shallow wells supply water for domestic use. Water is piped to each town from mountain springs or creeks. Along the foot slopes of the mountains, springs supply water for stock. In the lower valleys, pumped wells and flowing wells have been developed.

The main sources of irrigation water are the streams that originate in the Canyon Mountains and the Pavant Mountains. The supply is limited. Generally, there is sufficient water to irrigate all areas below the irrigation ditches during the spring runoff. After June, however, stream flow decreases, and by midsummer a severe shortage of water exists. In a number of localities, water is pumped from large wells to supplement the natural flow of streams.

Vegetation

The native vegetation of the area has been altered by cultivation, overgrazing, and burning. The popular and scientific names of the common trees and plants of the East Millard Area are given in the following list.

GRASSES

Scientific name	*Common name*
Agropyron cristatum	Crested wheatgrass.
A. elongatum	Tall wheatgrass.
A. intermedium	Intermediate wheatgrass.
A. pauciflorum (also known as *trachycaulum*).	Slender wheatgrass.
A. trichophorum	Stiffhair wheatgrass.
Bromus tectorum	Downy chess (also known as downy brome).
Distichlis stricta	Saltgrass.
Festuca arundinacea	Alta fescue.
Hilaria jamesii [1]	Galletagrass.
Oryzopsis hymenoides [1]	Indian ricegrass.
Sitanion hystrix [1]	Squirreltail.
Sporobolus airoides	Alkali sacaton.
Stipa comata	Needle-and-thread.

TREES

Acer glabrum	Maple (Rocky Mountain).
Cercocarpus spp.	Mountain-mahogany.
Juniperus utahensis	Juniper (Utah).
Populus spp.	Cottonwood.
Quercus spp.	Oak brush.

OTHER PLANTS

Abronia fragrans [1]	None (in some localities known as sandverbena).
Allenrolfea occidentalis [1]	Pickleweed.
Artemisia spinescens	Bud sage.
A. tridentata	Big sagebrush.
Atriplex canescens	Fourwing saltbush.
A. confertifolia	Shadscale.
A. nuttallii	Saltbush.
Bassia hyssopifolia	Alkali weed (also known as fivehook bassia).

[1] Identified by A. Holmgreen, Curator, Intermountain Herbarium.

OTHER PLANTS—Continued

Scientific name	*Common name*
Carex spp.	Sedges.
Castilleja spp.[1]	Indian paintbrush.
Chrysothamnus greenei var. *filifolins.*[1]	Rabbitbrush.
C. nauseosus	Rabbitbrush.
Euphorbia serpyllifolia [1]	None.
Eurotia lanata [1]	Winterfat.
Ephedra spp.	Mormon-tea.
Franseria acanthicarpa [1]	None.
Gutierrezia sarothrae	Snakeweed (also known as broom snakeweed).
Crayia spinosa [1]	Hopsage.
Juncus spp.	Rushes.
Kochia vestita	White sage (also known as gray molly and gray summer-cypress).
Purshia tridentata	Bitterbrush.
Psoralea lanceolata [1]	Wild alfalfa (also known as lemon scurf-pea).
Salicornia rubra	Red samphire.
Salsola kali var. *tenuifolia*	Russian-thistle.
Sarcobatus vermiculatus	Greasewood.
Suaeda spp.	Seepweed.
Tetradymia spinosa [1]	Horsebrush.
T. glabrata	Horsebrush.
Thelypodium integrifolium [1]	None.

[1] Identified by A. Holmgreen, Curator, Intermountain Herbarium.

Bunchgrass and flax once grew abundantly in association with sagebrush,[3] but they have been killed by overgrazing. Russian-thistle, downy chess (also known as downy brome), and snakeweed have invaded burned-over areas and abandoned cropland.

Oak brush, sagebrush, and juniper are common on the mountain slopes, and maple and cottonwood on the bottom lands. Dense stands of sagebrush or of juniper and sagebrush grow on the alluvial fans at the base of the mountains.

On the sandy, wind-modified soils near the upper levels of prehistoric Lake Bonneville, the common plants are Russian-thistle, wild alfalfa, and the following species that have no local common name: *Abronia fragrans* (in some places known as sandverbena), *Euphorbia serphyllifolia*, and *Franseria acanthicarpia*. These plants help to stabilize the sand dunes. Sagebrush and greasewood grow luxuriantly at the base of many dunes and hummocks. Galletagrass is common on the more stable sandy soils; Indian ricegrass and needle-and-thread are also common but are not so widely distributed.

The vegetation on the lower part of the bed of Lake Bonneville consists mainly of salt-tolerant plants. Horsebrush is common on sandy soils in the lower parts of the Area. One species of horsebrush, *Tetradymia glabrata*, poisons sheep; it causes a disease called "bighead."

Shadscale and greasewood are the most abundant and widespread of the desert shrubs. On saline-alkali soils, gray molly (also known as white sage) and bud sage grow in association with shadscale. Winterfat and hopsage grow on the coarse-textured desert soils. Winterfat is quickly killed by overgrazing.

The Oasis, Woodrow, and Abbott soils support dense growths of greasewood. The Kanosh, Deseret, and other gypsiferous soils support growths of tall rabbitbrush, greasewood, saltgrass, and alkali sacaton. In low-lying areas that are strongly saline, pickleweed, saltbrush, samphire, and seepweed are common. Saline areas that are or have been cultivated have been invaded by alkali weed.

[3] STEWART, G. HISTORIC RECORDS BEARING ON AGRICULTURAL AND GRAZING ECOLOGY IN UTAH. Jour. of Forestry 39: 362–375, illus 1941.

Early Settlement and Population

The first white man to explore the East Millard Area was Father Escalante, who traversed the Area in the fall of 1776.[4] In 1850 the Area was thoroughly explored by settlers from the Salt Lake Valley. During the intervening years it was visited by fur traders and trappers.

The first white settlement in the Area was established in 1851 at the site of the present town of Fillmore. Other towns were founded soon afterward.

Millard County was organized in 1852 as one of the original counties of the State of Deseret, which later became the Utah Territory. Fillmore was designated as the capital of the Territory, and the legislature met there from 1855 to 1858.

Most of the early settlers were members of the Church of Jesus Christ of Latter-day Saints (Mormon Church). Most of the present inhabitants are descendants of these pioneer families. The settlements were largely community enterprises of the Mormon Church and were under its leadership. They were located along the larger streams. The farmers lived in the villages and traveled to and from the fields.

In 1950, Fillmore, the county seat and the largest town in the Area, had a population of 1,890. Besides Fillmore, the principal towns, all centers of farming communities, are Kanosh (population 476), Meadow (378), Holden (476), Oak City (334), and Leamington (214). Hatton, Flowell, and Pavant are small farming communities. Lynndyl (population 241) is an important railroad junction. Edwards, Greenwood, McCornick, Harding, and Cline are only sidings on the railroad.

Transportation

The main line of the Union Pacific Railroad between Salt Lake City and Los Angeles crosses the extreme northwestern part of the Area. A branch line runs from Lynndyl to Leamington and continues to Salt Lake City. Another branch line runs from Fillmore to Delta, which is just west of the Area.

Facilities for loading livestock are maintained at Fillmore and other towns. Other classes of freight are also handled at these points. There are accommodations for handling ore at Lynndyl and Fillmore.

United States Highway No. 91 traverses the eastern side of the Area and passes through Holden,Fillmore,Meadow, and Kanosh. United States Highway No. 6 parallels the main line of the railroad through the northwestern part of the Area. These two highways are connected by State Highway No. 26, which runs from Holden to Delta. The Area is served adequately by commercial truck and bus lines. The main roads are seldom blocked by winter storms.

Churches and Schools

Mormon churches, which are the cultural and social centers of the communities, are located at Kanosh,

[4] WARRUM, N. UTAH SINCE STATEHOOD. Vol. 1 (pp. 1–821), illus. Chicago and Salt Lake. 1919.

Meadow, Flowell, Fillmore, Holden, Oak City, Leamington, and Lynndyl. Elementary schools are located in the same towns. The Millard County High School is at Fillmore. Pupils are transported to the high school by bus.

Business and Employment

Except for railroad maintenance and railroad shopwork, the tourist trade is the only nonagricultural business of any significance. Many sportsmen come to the Area to hunt ducks and geese along the Sevier River, or to hunt deer or to fish for trout in the nearby mountains.

Farm and Home Facilities

Most of the farmers live in town and travel each day to their farms. Originally, the town blocks were divided into fourths, and farmers had their barns and corrals in town, but later building developments destroyed this pattern.

Most of the farms are well kept. Houses are well built and comfortable and are generally equipped with modern conveniences.

Each town has telephone service, electric lights, and a modern water system. Flowell and other rural communities also have telephones and electricity.

Agriculture

The Area supported a rather large Indian population before it was settled by whites. The Indians were hunters, fishermen, and trappers. They planted no crops except melons and gourds.

Early farming was largely of a subsistence nature. Some cattle were driven to outside markets, but until the completion of railways and improved highways, other products were not sold outside the Area.

Crops

The production of feed crops is the chief agricultural enterprise of the Area. Wheat, alfalfa for hay and seed, barley, and corn are the most important crops on the basis of acreage.

In 1944 crops were harvested from 44,995 acres. This is about 10 percent of the Area. There were 14,720 acres of winter wheat; 13,922 acres of alfalfa for hay and 2,975 acres of alfalfa for seed; 3,977 acres of barley; 1,204 acres of all-purpose corn and 93 acres of corn harvested for grain; 700 acres of threshed oats; 516 acres of potatoes; and 193 acres of spring wheat.

On irrigated land, barley is the most important grain crop. Near Flowell, potatoes are a major crop. Small amounts of fruits and vegetables are also produced in the Area. Most farmers have vegetable gardens and berry bushes; some have a few fruit trees of the hardier varieties. In Oak City and Kanosh some peaches are raised for sale, but not enough to supply the local markets.

The major part of the Area is in unimproved range. The vegetation is sagebrush, shadscale, greasewood, juniper, and other native plants. The wetter areas are generally saline and support a thick growth of saltgrass and other salt-tolerant plants. The quality of the forage is not high, and the carrying capacity of the range is low.

Livestock and Livestock Products

In 1945 there were 18,599 head of cattle, 1,487 horses, 49 mules, 2,593 swine, and 51,909 chickens on the farms in the Area. In the same year 24,986 turkeys were raised and 1,421 cows and heifers were milked.

The total number of range livestock in the Area is fairly constant, because the Federal Government limits the number that can be grazed on public lands.

Nearly all the range cattle are Herefords. There are a few purebred cows, and nearly all bulls are registered or are eligible for registry. The sheep are crossbred, fine-wooled ewes and Hampshire, Rambouillet, or Merino bucks.

Most farms have at least one span of draft animals, and many have more. Nearly every farm has one or more saddle horses. A few race horses are owned by local sportsmen. The work animals are of good quality but are a mixture of many breeds. Replacements are raised locally but not always on the same farm. Little feed is purchased for work stock, but hay and grain are bought by many range stockmen for winter feed.

Agricultural Markets

There is a small packinghouse in Fillmore, but most of the beef cattle are sent to distant markets. Milk is sent to creameries in Delta or Beaver. Wool is purchased at the local shearing sheds for shipment to distant markets.

Agricultural Practices

Both general irrigated farming and dryland farming are practiced in the Area. Alfalfa is the most important irrigated crop. Barley and other grains are next in importance. In some areas potatoes and corn are grown.

It is common practice to seed alfalfa in spring, with grain for a nurse crop. The soil is left in alfalfa as long as the stand remains fairly good. When the stand begins to deteriorate, it is plowed under in fall, and then grain is grown for several years before a new stand of alfalfa is seeded. On some farms corn silage is grown after the alfalfa is plowed under. In Flowell and on some farms near Fillmore, potatoes are grown instead of corn.

Alfalfa seed is an important crop in some localities. Normally, after the first crop of alfalfa is cut for hay, irrigation is stopped and the second crop is threshed to remove the seed. The crop residue is used for feed.

If wheat is grown without irrigation, the soil is plowed late in spring and left fallow through the summer. The crop is planted in fall. Harvesting usually starts in July.

Commercial fertilizers are used to a limited extent within the Area. Many farmers apply barnyard manure to their potato fields.

Irrigation

Irrigation in the Area started when Fillmore was founded in 1851. Irrigation projects were established in other communities soon after. In 1917 the Central Utah Canal was finished. The irrigation wells near Flowell were developed in the early twenties.

Water for irrigation comes from three sources: The Sevier River, from which water is diverted to Leamington and to the Central Utah Canal; the various streams issuing from the Pavant Mountains and the Canyon Mountains, which supply water to Kanosh, Meadow, Fillmore, Holden, and Oak City; and artesian wells, which supply Flowell and Pavant. The diversion systems are privately owned by local water companies. Water is usually abundant in the early part of the growing season, but scarce in the later part. In midsummer there is generally little or no water available for irrigation. To get a sufficient head for satisfactory irrigation, water is stored in ponds or the flow from several wells is collected into one stream.

Some of the Indian land northwest of Kanosh is irrigated from Corn Creek through a covered pipeline and an open, masonry-lined ditch, both of which were constructed by the Indians.

The amount of water furnished an individual is based on the number of "shares" he owns or rents. Owning shares does not guarantee a definite amount of water, but only a proportionate share of the water available. Title to land and title to water are independently transferable.

Water is delivered under two systems: The demand system, and the rotation system. Under the demand system, which is used by the operators of the Central Utah Canal, each farmer obtains water when he needs it. Under the rotation system, which is used on most of the smaller streams issuing from the Pavant and Canyon Mountains, each farmer may use water for a definite length of time at regular intervals. The interval between water turns varies from about 10 days to 3 weeks. If there are reservoirs to store water, the demand system is advantageous, because farmers can irrigate as often as the soil and the crop require.

Farm Tenure

Most farms in the Area are operated by owners and their families. Some rent additional land, usually on a share basis. The rent is determined by the type of land, the accessibility of water, and the amount of equipment furnished by the landlord. The landlord's share of the harvest varies from one-fourth to one-half.

The supply of farm labor is adequate except for local shortages during potato harvesting. Many of the farmers trade work and employ high-school students during harvesttime.

Farm Investments

Most farms in the Area are equipped with tractors. The wheat farms are equipped with large tractors and combines. Plows, seeders, harrows, cultivators, and haying equipment are kept on most farms. A few hay balers are used, but on most farms hay is stacked by hand. Hayforks and harpoons are used on homemade derricks to lift the hay into barns and large stacks.

Use and Management of Soils

The soils of the East Millard Area resemble other soils of the arid and semiarid regions of the Western United States. They are rich in soluble minerals and generally abound in calcium carbonate. Many soils of this Area contain excessive amounts of soluble salts, and some contain a great deal of gypsum. Most of these soils are alkaline, but a few have a neutral or nearly neutral surface layer. Not much of the phosphorus in the soils is readily available to plants, because the soils are alkaline and high in lime.

Over a large part of the Area, the climate is arid and crops grow only under irrigation.

Along the western front of the Pavant Mountains, where the climate is semiarid, some of the soils are suited to dry-farmed winter wheat. Because they receive more rainfall, these soils contain more organic matter than the soils of the arid regions, and they have a fairly well defined granular structure.

Along the western front of the Canyon Mountains, the amount of rain is intermediate between the amount that falls in the desert and the amount that falls along the western front of the Pavant Mountains. Dry farming is hazardous in this part of the Area. In years of above-normal rainfall yields are good, but in dry years crop failures are common.

Management Groups of Soils

The 319 soils of the East Millard Area have been arranged into 13 groups, which are described in the following pages. General management practices for farming under irrigation and for dry farming are discussed in separate sections that follow the descriptions of the groups.

Management group 1

The soils in management group 1 are dominantly deep and medium textured and have no layers that interfere with drainage and root growth. They occur on alluvial plains and fans where drainage is generally good. The natural fertility and the water-holding capacity are good. These soils are permeable to air and water. Generally, they are free from harmful concentrations of salts and alkali.

Group 1 is divided into two subgroups. The soils in subgroup A are fairly well suited to dry farming. Those in subgroup B are poorly suited to dry farming, even in years of above-normal rainfall.

The soils of subgroup A of group 1 are the following:

Calita fine sandy loam, 2 to 5 percent slopes.
Calita loam, 0 to 2 percent slopes.
Calita loam, 2 to 5 percent slopes.
Calita loam, 5 to 10 percent slopes.
Calita silty clay loam, 0 to 5 percent slopes.
Ebbs fine sandy loam, 0 to 2 percent slopes.
Ebbs fine sandy loam, 2 to 5 percent slopes.
Ebbs fine sandy loam, 5 to 10 percent slopes.
Ebbs fine sandy loam, eroded, 5 to 20 percent slopes.
Ebbs fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.
Ebbs loam, 0 to 2 percent slopes.
Ebbs loam, 2 to 5 percent slopes.
Ebbs loam, 5 to 10 percent slopes.
Ebbs loam, eroded, 10 to 20 percent slopes.
Ebbs loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.
Ebbs loam, deep, over gravel, 0 to 2 percent slopes.
Ebbs loam, deep, over gravel, 2 to 5 percent slopes.
Ebbs loamy fine sand, 2 to 5 percent slopes.
Ebbs silty clay loam, 0 to 2 percent slopes.
Ebbs silty clay loam, 2 to 5 percent slopes.

Ebbs silty clay loam, 5 to 10 percent slopes.
Ebbs silty clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.
Ebbs silty clay loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes.
Ebbs silty clay loam, moderately deep, over Woodrow soil material, 2 to 5 percent slopes.
Highland loam, 5 to 10 percent slopes.
Red Rock clay loam, 0 to 2 percent slopes.
Red Rock clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.
Red Rock fine sandy loam, 2 to 5 percent slopes.
Red Rock loam, 0 to 2 percent slopes.
Red Rock loam, 2 to 5 percent slopes.
Red Rock loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.
Red Rock loam, moderately deep, over Boxelder soil material, 2 to 5 percent slopes.
Sunset fine sandy loam, 0 to 2 percent slopes.
Sunset loam, 0 to 2 percent slopes.
Sunset loam, poorly drained, 0 to 2 percent slopes.
Sunset silty clay loam, 0 to 2 percent slopes.
Sunset silty clay loam, imperfectly drained, 0 to 2 percent slopes.

The soils of subgroup B of group 1 are the following:

Bullion loam, 0 to 2 percent slopes.
Bullion silty clay loam, 0 to 2 percent slopes.
Fruita fine sandy loam, 0 to 2 percent slopes.
Genola clay loam, 0 to 2 percent slopes.
Genola clay loam, 2 to 5 percent slopes.
Genola clay loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.
Genola fine sandy loam, 0 to 2 percent slopes.
Genola fine sandy loam, 2 to 5 percent slopes.
Genola fine sandy loam, 5 to 10 percent slopes.
Genola fine sandy loam, eroded, 5 to 20 percent slopes.
Genola fine sandy loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.
Genola fine sandy loam, deep, over sand, 2 to 5 percent slopes.
Genola fine sandy loam, deep, over sand, 5 to 10 percent slopes.
Genola fine sandy loam, deep, over gravel, 0 to 2 percent slopes.
Genola fine sandy loam, deep, over gravel, 2 to 5 percent slopes.
Genola fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes.
Genola fine sandy loam, deep, over Sanpete soil material, 2 to 5 percent slopes.
Genola loam, 0 to 2 percent slopes.
Genola loam, 2 to 5 percent slopes.
Genola loam, 5 to 10 percent slopes.
Genola loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.
Genola loam, deep, over gravel, 0 to 2 percent slopes.
Genola loam, deep, over gravel, 2 to 5 percent slopes.
Genola loamy fine sand, 0 to 2 percent slopes.
Genola loamy fine sand, 2 to 5 percent slopes.
Genola loamy fine sand, 5 to 10 percent slopes.
Genola loamy fine sand, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.
Naples fine sandy loam, 0 to 2 percent slopes.
Naples fine sandy loam, deep, over gravel, 2 to 5 percent slopes.
Naples loam, 0 to 2 percent slopes.
Naples loam, 2 to 5 percent slopes.
Palisade clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes.
Palisade fine sandy loam, 0 to 2 percent slopes.
Palisade fine sandy loam, eroded, 0 to 2 percent slopes.
Palisade fine sandy loam, 2 to 5 percent slopes.
Palisade fine sandy loam, eroded, 2 to 5 percent slopes.
Palisade fine sandy loam, 5 to 10 percent slopes.
Palisade fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes.
Palisade fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes.
Palisade loam, 0 to 2 percent slopes.
Palisade loam, 2 to 5 percent slopes.
Palisade loam, deep, over Boxelder soil material, 0 to 2 percent slopes.
Palisade loam, deep, over Boxelder soil material, 2 to 5 percent slopes.
Palisade loamy fine sand, 2 to 5 percent slopes.
Palisade loamy fine sand, eroded, 2 to 5 percent slopes.
Palisade loamy fine sand, 5 to 10 percent slopes.
Palisade loamy fine sand, deep, over Boxelder soil material, 0 to 2 percent slopes.

Management group 2

The soils in management group 2 are dominantly shallow and moderately deep over gravel or cobbles or both. They occur on alluvial fans in the upland near the mountains. Their water-holding capacity is moderate to low.

Group 2 is divided into two subgroups. The soils in subgroup A, except the stony ones, are fairly well suited to dry-farmed winter wheat. The stony soils are not suited to dry farming. The soils in subgroup B generally receive insufficient rainfall for successful dry farming.

The soils of subgroup A of group 2 are the following:

Ivie gravelly loam, 0 to 2 percent slopes.
Ivie gravelly loam, 2 to 5 percent slopes.
Ivie gravelly loam, 5 to 20 percent slopes.
Ivie loam, 0 to 2 percent slopes.
Ivie loam, 2 to 5 percent slopes.
Ivie loam, 5 to 10 percent slopes.
Ivie stony loam, 2 to 5 percent slopes.
Millard clay loam, 0 to 2 percent slopes.
Millard fine sandy loam, 2 to 5 percent slopes.
Millard gravelly loam, 0 to 2 percent slopes.
Millard gravelly loam, 2 to 5 percent slopes.
Millard loam, 0 to 2 percent slopes.
Millard loam, 2 to 5 percent slopes.
Millard stony loam, 0 to 2 percent slopes.
Millard stony loam, 2 to 5 percent slopes.
Millard stony sandy loam, 5 to 10 percent slopes.
Pharo gravelly loam, 0 to 2 percent slopes.
Pharo gravelly loam, 2 to 5 percent slopes.
Pharo gravelly loam, 5 to 10 percent slopes.
Pharo loam, 0 to 2 percent slopes.
Pharo loam, 2 to 5 percent slopes.

The soils of subgroup B of group 2 are the following:

Sanpete fine sandy loam, 0 to 2 percent slopes.
Sanpete fine sandy loam, moderately deep, 2 to 5 percent slopes.
Sanpete fine sandy loam, shallow, 2 to 5 percent slopes.
Sanpete fine sandy loam, shallow, 5 to 10 percent slopes.
Sanpete gravelly sandy loam, 0 to 2 percent slopes.
Sanpete gravelly sandy loam, 2 to 5 percent slopes.
Sanpete gravelly sandy loam, 5 to 10 percent slopes.
Sanpete loam, 0 to 2 percent slopes.
Sanpete loam, 2 to 5 percent slopes.
Sanpete loam, 5 to 10 percent slopes.
Sanpete stony sandy loam, 2 to 5 percent slopes.
Sanpete stony sandy loam, 5 to 20 percent slopes.
Sanpete stony sandy loam, eroded, 5 to 20 percent slopes.
Sigurd fine sandy loam, 0 to 2 percent slopes.
Sigurd fine sandy loam, 2 to 5 percent slopes.
Sigurd gravelly loamy sand, 2 to 5 percent slopes.
Sigurd gravelly sandy loam, 0 to 2 percent slopes.
Sigurd gravelly sandy loam, 2 to 5 percent slopes.
Sigurd gravelly sandy loam, 5 to 10 percent slopes.
Sigurd gravelly sandy loam, moderately deep, over Boxelder soil material, 0 to 5 percent slopes.
Sigurd loam, 0 to 2 percent slopes.
Sigurd loam, 2 to 5 percent slopes.
Sigurd stony sandy loam, 2 to 5 percent slopes.
Sigurd stony sandy loam, 5 to 10 percent slopes.
Sigurd stony sandy loam, eroded, 2 to 5 percent slopes.

Management group 3

The soils in management group 3 are dominantly shallow to moderately deep over lime-cemented hardpans. They occur on old alluvial fans at the base of steep mountains.

The soils of group 3 are poorly suited to irrigated farming. Some are used for dry farming.

Group 3 contains gravel-free and stone-free soils as well as gravelly and stony soils. The gravel-free and stone-free soils are shallow to moderately deep over lime-cemented hardpans, and their water-holding capacity is somewhat better than that of the gravelly and stony soils. On the gravel-free and stone-free soils of the Flowell and Pavant series dry farming is fairly successful, but on the gravel-free and stone-free Neola soils dry farming is not successful because there is too little rainfall. The gravelly soils are very shallow and droughty. They are better suited to range than to farming. The stony soils and the very shallow and droughty soils are not suited to crops; they can be used only for range.

The soils of group 3 are the following:

Flowell clay loam, 2 to 5 percent slopes.
Flowell gravelly loam, 10 to 20 percent slopes.
Flowell loam, 2 to 5 percent slopes.
Flowell loam, 5 to 10 percent slopes.
Flowell stony loam, 5 to 10 percent slopes.
Flowell stony loam, 10 to 20 percent slopes.
Neola gravelly loamy sand, 5 to 10 percent slopes.
Neola gravelly sandy loam, 2 to 5 percent slopes.
Neola gravelly sandy loam, 5 to 10 percent slopes.
Neola loam, 2 to 5 percent slopes.
Neola loam, 5 to 20 percent slopes.
Neola loamy sand, 2 to 10 percent slopes.
Neola sandy loam, 0 to 2 percent slopes.
Neola sandy loam, 2 to 5 percent slopes.
Neola sandy loam, 5 to 10 percent slopes.
Neola stony loamy sand, 5 to 10 percent slopes.
Neola stony sandy loam, 2 to 5 percent slopes.
Neola stony sandy loam, 10 to 20 percent slopes.
Neola stony sandy loam, eroded, 5 to 20 percent slopes.
Pavant gravelly sandy loam, 0 to 2 percent slopes.
Pavant gravelly sandy loam, 2 to 5 percent slopes.
Pavant gravelly sandy loam, 5 to 10 percent slopes.
Pavant gravelly sandy loam, 10 to 20 percent slopes.
Pavant loam, 0 to 2 percent slopes.
Pavant loam, 2 to 5 percent slopes.
Pavant loam, 5 to 10 percent slopes.
Pavant loam, 10 to 20 percent slopes.
Pavant sandy loam, 2 to 5 percent slopes.
Pavant stony sandy loam, 2 to 5 percent slopes.
Pavant stony sandy loam, 5 to 10 percent slopes.
Pavant stony sandy loam, 10 to 20 percent slopes.

Management group 4

The soils in management group 4 are dominantly deep and medium textured or moderately fine textured. Generally, they occur some distance from the mountains on old lake terraces in the central parts of the valleys. Internal drainage ranges from slow to very rapid. The water-holding capacity ranges from high to low. Most virgin areas of these soils are saline, and some are alkali.

If irrigated, these soils should be carefully leveled so that the salts and alkali will be leached. In many places artificial drains are needed to remove the soluble salts from the leached areas and to prevent the formation of a high water table.

The soils of group 4 are the following:

Oasis fine sandy loam, 0 to 2 percent slopes.
Oasis fine sandy loam, eroded, 0 to 2 percent slopes.
Oasis fine sandy loam, 2 to 5 percent slopes.
Oasis fine sandy loam, eroded, 2 to 5 percent slopes.
Oasis fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.
Oasis fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes.
Oasis fine sandy loam, deep, over Escalante soil material, 0 to 2 percent slopes.
Oasis fine sandy loam, deep, over Woodrow soil material, 0 to 2 percent slopes.
Oasis fine sandy loam, deep, over Woodrow soil material, 2 to 5 percent slopes.
Oasis loam, 0 to 2 percent slopes.
Oasis loam, eroded, 0 to 2 percent slopes.
Oasis loam, 2 to 5 percent slopes.
Oasis loam, imperfectly drained, 0 to 2 percent slopes.
Oasis loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.
Oasis loam, deep, over gravel, 0 to 2 percent slopes.
Oasis loam, deep, over Hardy soil material, 0 to 2 percent slopes.
Oasis loam, deep, over Woodrow soil material, 0 to 2 percent slopes.
Oasis loam, deep, over Woodrow soil material, 2 to 5 percent slopes.
Oasis loamy fine sand, 0 to 2 percent slopes.
Oasis loamy fine sand, eroded, 0 to 2 percent slopes.
Oasis loamy sand, moderately deep, over Boxelder soil material, 2 to 5 percent slopes.
Oasis silty clay, 0 to 2 percent slopes.
Oasis silty clay, imperfectly drained, 0 to 2 percent slopes.
Oasis silty clay loam, 0 to 2 percent slopes.
Oasis silty clay loam, 5 to 10 percent slopes.
Oasis silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes.
Oasis silty clay loam, deep, over Woodrow soil material, 0 to 5 percent slopes.
Taylorsflat loam, 0 to 2 percent slopes.
Taylorsflat sandy loam, 0 to 2 percent slopes.
Taylorsflat sandy loam, imperfectly drained, 0 to 2 percent slopes.
Taylorsflat silty clay loam, 0 to 2 percent slopes.
Woodrow fine sandy loam, 0 to 2 percent slopes.
Woodrow fine sandy loam, deep, over Hardy soil material, 0 to 2 percent slopes.
Woodrow fine sandy loam, deep, over Oasis soil material, 0 to 2 percent slopes.
Woodrow loam, 0 to 2 percent slopes.
Woodrow loam, 2 to 5 percent slopes.
Woodrow loam, eroded, 2 to 5 percent slopes.
Woodrow loam, deep, over Oasis soil material, 0 to 2 percent slopes.
Woodrow silty clay, 0 to 2 percent slopes.
Woodrow silty clay loam, 0 to 2 percent slopes.
Woodrow silty clay loam, eroded, 2 to 5 percent slopes.
Woodrow silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes.
Woodrow silty clay loam, deep, over Oasis soil material, 0 to 2 percent slopes.

Management group 5

The soils in management group 5 occur on low terraces of prehistoric Lake Bonneville. They are underlain by marl or by lime hardpans. Textures below the surface soil range from medium to moderately fine. Permeability in the marl or the hardpan is generally somewhat restricted. The water-holding capacity ranges from high to low. In virgin areas the substratum contains soluble salts that can be removed easily by leaching.

The soils of group 5 are the following:

Boxelder clay loam, 0 to 2 percent slopes.
Boxelder clay loam, 2 to 5 percent slopes.
Boxelder clay loam, moderately deep and deep, over gravel, 0 to 2 percent slopes.
Boxelder fine sandy loam, 0 to 2 percent slopes.
Boxelder fine sandy loam, 2 to 5 percent slopes.
Boxelder loam, 0 to 2 percent slopes.
Boxelder loam, 2 to 5 percent slopes.
Boxelder loam, eroded, 0 to 5 percent slopes.
Boxelder loam, moderately deep and deep, over gravel, 0 to 2 percent slopes.
Boxelder loam, deep, over Pavant soil material, 0 to 2 percent slopes.
Escalante loam, 0 to 2 percent slopes.

Escalante loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes.
Escalante loam, deep, over Boxelder soil material, 0 to 2 percent slopes.
Escalante loamy sand, 0 to 2 percent slopes.
Escalante loamy sand, 2 to 5 percent slopes.
Escalante sandy loam, 0 to 2 percent slopes.
Escalante sandy loam, eroded, 0 to 5 percent slopes.
Hardy clay loam, 0 to 2 percent slopes.
Hardy loam, 0 to 2 percent slopes.
Hardy loam, poorly drained, 0 to 2 percent slopes.
Hardy sandy loam, 0 to 2 percent slopes.
Hardy sandy loam, eroded, 0 to 2 percent slopes.
Hardy sandy loam, imperfectly drained, 0 to 2 percent slopes.
McCornick clay loam, 0 to 2 percent slopes.
McCornick fine sandy loam, 0 to 2 percent slopes.
McCornick fine sandy loam, eroded, 0 to 2 percent slopes.
McCornick fine sandy loam, 2 to 5 percent slopes.
McCornick loam, 0 to 2 percent slopes.
McCornick loam, eroded, 0 to 2 percent slopes.
McCornick loamy fine sand, eroded, 2 to 5 percent slopes.

Management group 6

The soils in management group 6 are deep and have no layers that interfere with drainage and root growth. They contain strong concentrations of gypsum and other soluble salts. They occur on low lake terraces near the center of Pavant Valley. The water-holding capacity is moderate to high. Drainage is somewhat restricted.

Areas that have adequate outlets could be reclaimed by leveling, leaching, and draining. Sinkholes and depressions may develop. If this should happen, releveling would be required.

The soils of group 6 are the following:

Deseret loam, 0 to 2 percent slopes.
Deseret loam, 2 to 5 percent slopes.
Deseret sandy loam, 0 to 2 percent slopes.
Deseret sandy loam, imperfectly drained, 0 to 2 percent slopes.
Deseret silty clay loam, 0 to 2 percent slopes.
Deseret silty clay loam, eroded, 0 to 2 percent slopes.
Deseret silty clay loam, imperfectly drained, 0 to 2 percent slopes.
Kanosh loam, 0 to 2 percent slopes.
Kanosh loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes.
Kanosh loam, poorly drained, 0 to 2 percent slopes.
Kanosh sandy loam, 0 to 2 percent slopes.
Kanosh sandy loam, eroded, 0 to 2 percent slopes.
Kanosh sandy loam, 2 to 5 percent slopes.
Kanosh sandy loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes.
Kanosh sandy loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes.
Kanosh sandy loam, poorly drained, 0 to 2 percent slopes.

Management group 7

The soils in management group 7 are deep, droughty, dominantly coarse textured and gravelly soils. They occur on high lake terraces and beaches. Their water-holding capacity is low.

The soils of this group are generally unsuited to or very poorly suited to dry farming. The water supply is generally not adequate for irrigated farming. If these soils are irrigated, specially designed irrigation systems are needed.

The soils of group 7 are the following:

Holden gravelly loamy sand, 0 to 2 percent slopes.
Holden gravelly sandy loam, 2 to 5 percent slopes.
Holden gravelly sandy loam, 5 to 20 percent slopes.
Holden sandy loam, 0 to 5 percent slopes.
Lynndyl loam, 0 to 2 percent slopes.
Lynndyl loamy sand, 0 to 2 percent slopes.
Lynndyl loamy sand, eroded, 0 to 2 percent slopes.
Lynndyl loamy sand, 2 to 5 percent slopes.
Lynndyl loamy sand, 5 to 20 percent slopes.
Lynndyl sandy loam, 0 to 2 percent slopes.
Lynndyl sandy loam, 2 to 5 percent slopes.
Lynndyl sandy loam, 5 to 10 percent slopes.
Orem loamy fine sand, 2 to 5 percent slopes.
Orem loamy fine sand, 5 to 10 percent slopes.
Santaquin fine sandy loam, moderately deep, over Pavant soil material, 5 to 10 percent slopes.
Santaquin fine sandy loam, moderately deep, over Pharo soil material, 2 to 5 percent slopes.
Santaquin loamy fine sand, 2 to 5 percent slopes.
Santaquin loamy fine sand, 5 to 10 percent slopes.
Santaquin sandy loam, 0 to 2 percent slopes.
Santaquin sandy loam, 2 to 5 percent slopes.

Management group 8

The soils in management group 8 occur on comparatively smooth lake terraces, mainly in the northern part of the Area. They are characterized by a fine-textured subsoil of distinct columnar or prismatic structure that underlies a very thin surface soil. These soils are generally strongly alkaline and moderately to strongly saline. Internal drainage and runoff are predominantly very slow.

The soils of group 8 are used only for winter range. Their carrying capacity is very low. Reclaiming these soils would be difficult and expensive. It would require prolonged deep leaching, drainage, and the addition of soil amendments.

The soils of group 8 are the following:

Harding loam, 0 to 2 percent slopes.
Harding loam, eroded, 0 to 2 percent slopes.
Harding loam, 2 to 5 percent slopes.
Harding sandy loam, 0 to 2 percent slopes.
Harding sandy loam, eroded, 0 to 2 percent slopes.
Harding silty clay, moderately deep, over Kanosh soil material, 0 to 2 percent slopes.
Harding silty clay loam, 0 to 2 percent slopes.
Harding silty clay loam, eroded, 0 to 2 percent slopes.
Mellor fine sandy loam, 0 to 2 percent slopes.
Mellor fine sandy loam, eroded, 0 to 2 percent slopes.
Mellor loam, 0 to 2 percent slopes.
Mellor loam, eroded, 0 to 2 percent slopes.
Mellor loam, 2 to 5 percent slopes.
Mellor loamy fine sand, eroded, 0 to 2 percent slopes.
Mellor silty clay loam, 0 to 2 percent slopes.
Mellor silty clay loam, eroded, 0 to 2 percent slopes.
Mellor silty clay loam, 2 to 5 percent slopes.

Management group 9

The soils in management group 9 occur on intermediate lake terraces, mainly in the northeastern part of the Area. They are characterized by hummocks and dunes ranging in height from 1 to 12 feet or more. The water-holding capacity is low.

The soils of this group are not suited to farming. Their value for range is very low.

The soils of group 9 are the following:

Preston fine sand, duny.
Preston fine sand, hummocky.
Preston fine sand, moderately deep, over Boxelder soil material, 1 to 5 percent slopes.
Preston and Escalante soils and sand dunes.
Preston and Lynndyl soils, 0 to 2 percent slopes.
Preston and Lynndyl soils, 2 to 5 percent slopes.
Preston and Taylorsflat soils and sand dunes.
Sand dunes.

Management group 10

The soils in management group 10 are deep soils that formed on ancient lake bottoms. They are fine textured

and moderately fine textured and occur in comparatively low positions. Internal drainage is slow to very slow, and runoff is very slow to ponded. The soils are dominantly saline. The concentrations of soluble salt range from slight to strong. Many areas are also affected by alkali.

The soils of group 10 are poorly suited to irrigated farming. Reclamation would be difficult and expensive. Some areas lack adequate drainage outlets. If these soils are irrigated, they should be planted to salt-tolerant and alkali-tolerant grasses.

The soils of group 10 are the following:

Abbott silty clay, 0 to 2 percent slopes.
Abbott silty clay loam, 0 to 2 percent slopes.
Lahontan loam, deep, over Hardy soil material, 0 to 2 percent slopes.
Lahontan silty clay, 0 to 2 percent slopes.
Lahontan silty clay, poorly drained, 0 to 2 percent slopes.
Lahontan silty clay, imperfectly drained, 0 to 2 percent slopes.
Lahontan silty clay loam, 0 to 2 percent slopes.
Lahontan silty clay loam, eroded, 0 to 5 percent slopes.

Management group 11

The only mapping unit in this group is Poganeab soils, undifferentiated, poorly drained, 0 to 2 percent slopes. It occurs on low river terraces or first bottoms near the Sevier River. It is moderately saline and poorly drained.

This mapping unit generally is not suited to farming. It is suited only to range.

Management group 12

Management group 12 consists of dominantly stony and steep miscellaneous land types. They occur on steep mountains and are largely barren rocky land.

These areas are not suited to farming. They provide a limited amount of grazing.

The land types in group 12 are the following:

Lava flows.
Rough stony land.
Scabland.
Smooth stony land.
Terrace escarpments.

Management group 13

Management group 13 consists of nonstony miscellaneous land types and very shallow soils that occur mainly in valley bottoms. Generally, they are strongly saline or saline-alkali. Drainage is poor. Their grazing value is limited.

The mapping units in group 13 are the following:

Clay dunes.
Kanosh loam, very shallow, 0 to 2 percent slopes.
Kanosh loam, very shallow, poorly drained, 0 to 2 percent slopes.
Kanosh loam, very shallow, 2 to 10 percent slopes.
Kanosh silty clay loam, very shallow, 0 to 2 percent slopes.
Playas.
Riverwash.
Rough gullied land, Ebbs soil material.
Rough gullied land, Sigurd soil material.
Rough gullied land, Woodrow soil material.

Management of Irrigated Land

The irrigated soils in the East Millard Area are farmed under several methods of irrigation. The most common methods are described briefly in this section.

Detailed information and assistance in planning an irrigation system for a particular farm or ranch can be obtained from the County Agricultural Agent, the Utah Agricultural Experiment Station, or the Soil Conservation Service.

Irrigation methods

A system of irrigation that will distribute water uniformly over a field is very important, because irregular applications of water result in either overirrigation or underirrigation. Overirrigation leaches out valuable plant nutrients and may waterlog the soil. Underirrigation provides insufficient moisture for crops. To select the best method for irrigating a particular field, several factors must be considered. Of these, soil, slope, and the available head of water are the most important.

In the East Millard Area the following methods of irrigation are used: Border, corrugation, furrow, flooding, and sprinkler.

The border method.—This method provides uniform, efficient, and rapid application of water. It is suitable for most level soils, but not for fine-textured soils that crust easily and that need to be irrigated when crops are emerging. If the soil crusts, corrugations should be made within the borders to make sure that crops emerge. The border method is excellent for leaching salts out of the soil. It should not be used for alfalfa and small grains if the slope is more than 1 percent nor for permanent pasture if the slope is more than 3 percent. Border irrigation is not suitable for complex or irregular slopes.

The corrugation method.—If the border method is not suitable, the corrugation method is commonly used. It can be used to advantage if the available head of water is small. It works well on fine-textured and medium-textured soils, but not on coarse-textured, rapidly permeable soils. It can be used on slopes of up to 6 percent and on complex slopes of not more than 5 percent. This method is suitable for close-growing crops but not for pasture.

The furrow method.—This method is suitable for row crops and bare orchards. It can be applied to a fairly wide range of soil textures. A wide range of water heads can be used, depending on the slope and the size of the furrows. The maximum slope for which it is suitable is about 5 percent, and the maximum furrow grade is about 3 percent, depending on the depth and size of the furrow and on the texture of the soil. If slopes are steeper than 5 percent, contour furrows should be used to irrigate orchards.

The flooding method.—This method should not be used if another method can be used. In this method, head ditches are placed approximately on the contour and all irrigation is directly down the slope. On slopes of more than 5 percent the flooding method can be used to irrigate close-growing crops.

The sprinkler method.—This method is best for very sandy soils that have rapidly permeable subsoils and require frequent, light irrigations. It is also suitable for soils on uneven slopes that cannot be leveled. This method may be used on a wide range of surface textures.

Tillage and erosion control

The texture of the surface layer is of primary importance in determining what tillage methods are suitable and what measures are needed to control erosion.

Medium-textured soils.—The medium-textured soils, that is, the loams and silt loams, are subject to wind erosion. During the windy season they need to be protected by a growing crop or by a rough surface. They can be plowed either in spring or in fall. Fall plowing allows natural settling and produces a firmer seedbed, which is desirable if alfalfa, clover, grasses, or other small-seeded crops are planted. To keep wind erosion at a minimum the surface soil should be left rough after fall plowing. If these soils are plowed or cultivated when too wet, they will puddle. If a tillage pan forms, it can be broken up by occasional deep tillage.

Coarse-textured soils.—The coarse-textured, or sandy, soils are very likely to be wind eroded. They should have a protective cover of plants or plant residues. If alfalfa and other crops are seeded in fall, the plants should be able to withstand the windy spring season. Exposed surface soil should be left rough and trashy. A good supply of organic matter is very important. Barnyard manure and green-manure crops are needed to maintain the organic-matter content.

Fine-textured soils.—The fine-textured soils, that is, the clay loams, silty clay loams, and clays, are difficult to till if they are either too wet or too dry. They are frequently referred to as the "three-minute soils," because the period in spring during which the soils can be plowed is so short. A better seedbed can be prepared if these soils are plowed in the fall. The content of organic matter should be maintained and increased if possible, because that will improve the structure of the soil and increase its resistance to erosion. Barnyard manure, green-manure crops, and crop residues should be used as sources of organic matter.

Fertilizers

Because of the arid or semiarid climate that prevails in the area, native vegetation is sparse, and consequently the soils are low in organic matter. Applying barnyard manure and plowing under green-manure crops and other plant residues will add organic matter.

Field tests and soil analyses indicate that the soils are generally low in available phosphorus and that some crops, especially alfalfa and sugar beets, benefit if phosphate is applied in some readily available form, such as superphosphate. According to the soil tests, the soils are not deficient in potassium.

Information on different grades of fertilizer and rates and methods of application can be obtained from the County Extension Agent or from the Utah Agricultural Experiment Station.

Salt and alkali

About a third of the total acreage of the East Millard Area is affected by salt concentrations of more than 0.15 percent. The salts and alkali in the soils came from a number of sources. Streams carry soluble salts from outside the Area and deposit them in low-lying areas. The water of prehistoric Lake Bonneville was salty, and the lake sediments were impregnated with the salt. In parts of the Area artesian pressure forces ground water to the surface, where it evaporates and leaves soluble salts.

The saline soils contain enough salt to interfere with the growth of most crops. The saline-alkali areas have a combination of harmful quantities of salts and a high degree of alkalinity, a high exchangeable-sodium content, or both.

Four grades of salt concentration have been defined. Three of these are identified on the soil map by letter symbols in blue. The different grades were determined by field observation of the type and quality of native vegetation, the appearance of field crops, the color and structure of the soil, the presence of salt crusts, and by use of the electrolytic bridge.

Salt concentrations of less than 0.15 percent are not injurious to the common field crops and are not identified on the map.

Slight concentrations of salt or alkali, or both—0.15 to 0.35 percent in the uppermost 12 inches or as an average to a depth of 6 feet—are marked on the map with a letter "S" in blue. Slight concentrations of salt affect general farm crops slightly to moderately and affect salt-tolerant crops slightly. About 34,481 acres have slight concentrations of soluble salts.

Moderate concentrations of salt or alkali, or both—0.35 to 0.65 percent—are marked with a letter "M" in blue. Moderate concentrations have a distinctly harmful effect; most crops will be stunted and yellow. About 21,631 acres have moderate concentrations of soluble salts.

Strong concentrations of salt or alkali or both—more than 0.65 percent—are marked with a letter "A" in blue on the soil map. Such areas produce only greasewood, saltgrass, and other salt-tolerant or alkali-tolerant vegetation. They are practically useless for crops. About 92,209 acres have strong concentrations of soluble salts.

Table 2 shows the soil series that are saline or saline-alkali, the texture of the surface soil of each series, and the relative ease or difficulty of reclaiming the soils for irrigated farming.

Management of Dry-Farmed Land

Most of the dry-farmed acreage in the East Millard Area is near the western front of the Pavant and Canyon Mountains. The system of alternating wheat with clean fallow has reduced productivity and caused serious soil erosion. Practices that will check erosion and improve productivity are discussed in the following paragraphs.

Tillage and erosion control

Erosion can be controlled to a large degree by contour stripcropping and proper methods of tillage. Contour stripcropping means alternating strips of stubble-mulch fallow with strips of cropped land. On slopes of up to 2 percent the contour strips are 400 to 600 feet wide; on slopes of 2 to 5 percent the contour strips are 200 to 400 feet wide; on slopes of 5 to 10 percent the strips are 200 feet wide or less.

A stubble-mulch fallow is better for these soils than a clean fallow, because it reduces runoff, discourages the growth of weeds, and builds up the organic-matter content of the soils.

Abandoned dryland areas present a particularly severe erosion hazard. They can be planted to crested wheatgrass, which will protect the soil and provide forage.

Fertilizer and crop rotation

Dry-farmed soils are likely to be deficient in nitrogen. A wheat-fallow rotation reduces the organic-matter content, on which the supply of nitrogen depends. A rotation that includes 2 years of sweetclover, following 5 years of alternating wheat and fallow, will help to supply organic

TABLE 2.—*Soil series that are saline or saline-alkali, the texture of the surface soil, and the relative ease or difficulty of reclamation*

Series	Texture of the surface layer	Saline-alkali status	Reclaimability
Harding	Moderately coarse to fine	Saline-alkali	Very difficult to reclaim.
Mellor	Coarse to moderately fine	Saline-alkali	Very difficult to reclaim but somewhat easier than Harding.
Lahontan	Medium to fine	Saline and saline-alkali	Difficult to reclaim because of fine texture of subsoil and position.
Abbott	Moderately fine to fine	Saline	Difficult to reclaim because of fine texture and position.
Taylorsflat	Moderately coarse to moderately fine	Saline	Fine-textured areas somewhat difficult to reclaim. Position favorable.
Woodrow	Moderately coarse to fine	Saline and saline-alkali	Reclamation usually feasible.
Boxelder	Moderately coarse to moderately fine	Saline	Reclamation usually feasible.
McCornick	Coarse to moderately fine	Saline	More difficult to reclaim than Boxelder, because hardpan may cause some local drainage trouble.
Kanosh	Moderately coarse to moderately fine	Saline	Position somewhat unfavorable.
Hardy	Moderately fine to moderately coarse	Saline	Hardpan usually causes some drainage trouble.
Deseret	Moderately coarse to moderately fine	Saline	Generally reclaimed by good management.
Oasis	Coarse to fine	Saline	Generally reclaimed by good management.
Genola [1]	Moderately fine	Saline	Generally reclaimed by good management.

[1] Only the following mapping units: Genola clay loam, 0 to 2 percent slopes; Genola clay loam, 2 to 5 percent slopes; and Genola clay loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.

matter and nitrogen. Commercial nitrogen fertilizers should be applied with caution. They may result in a heavy growth of straw and in lodging.

A rotation suitable for combined livestock and grain farming consists of 6 years of alternating grain and stubble-mulch fallow, followed by 4 to 6 years of alfalfa mixed with crested wheatgrass.

Management of Rangeland

Because of the scarcity of water, a large part of the East Millard Area is suited only to range. Misuse and overuse of rangeland has depleted the native vegetation and has reduced the grazing capacity. Generally, rangeland can be improved by regulating grazing, reseeding, and developing supplies of water for stock.

Under moderate grazing it is possible to double or triple forage yields in 6 to 7 years and, in a much shorter time, to increase the yields of the most valuable forage plants. Much rangeland is not suited to reseeding and can be improved only through control of grazing.

Reseeding is costly and should be attempted only if the chances of success are good. Abandoned dry farms are usually well suited to reseeding, as are areas covered with sagebrush or sagebrush and greasewood. Sandy or gravelly soils and those covered with shadscale are not suited to reseeding.

Ranges should be reseeded early in spring, after the seedbed has been prepared in fall. Crested wheatgrass, tall wheatgrass, intermediate wheatgrass, and stiffhair wheatgrass are suitable range plants. After a range is reseeded, grazing should be regulated to keep up the quality and quantity of the forage.

Water for stock should be distributed as uniformly as possible over the range. If there is no water, it may have to be hauled. Good range management is not effective unless the water supply is well managed.

Estimated Yields

Table 3 shows the average acre yields of the principal crops that may be expected over a period of years under each of two levels of management. Estimated yields of permanent pasture and range are in terms of the number of days an acre will provide grazing for a grown cow without injury to the pasture.

The estimates for crops are based primarily on information obtained from field observations and by interviewing farmers, county agricultural agents, and others who have had experience in the agriculture of the Area.

In the "A" columns are estimated average acre yields under prevailing management. In the "B" columns are estimated average acre yields under improved management.

Soil Survey Methods and Definitions

The scientist who makes a soil survey examines soils in the field, classifies them in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

In the East Millard Area, two methods of surveying were used. Most of the Area was surveyed in detail. Those parts where the soils are not fit for crops were surveyed by reconnaissance methods, that is, they were surveyed in less detail.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are spaced irregularly according to the lay of the land. Usually they are not more than a quarter of a mile apart, and sometimes they are much closer. In most soils, each boring or hole reveals several distinct layers, called horizons, which collectively are known as the soil profile. The profile is studied to see how the horizons differ from one

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*

[Yields in columns A are to be expected under common management; those in columns B, under improved managment, including irrigation. Dotted lines indicate crop ordinarily is not grown on the soil and is not considered suitable for it under the level of management specified]

Soil	Dry-farmed winter wheat		Irrigated crops						Irrigated pasture	Range
			Wheat		Barley		Alfalfa			
	A	B	A	B	A	B	A	B		
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Abbott silty clay, 0 to 2 percent slopes										15
Abbott silty clay loam, 0 to 2 percent slopes										17
Boxelder loam, 0 to 2 percent slopes				35		50		3. 5	200	12
Boxelder loam, 2 to 5 percent slopes				30		45		3. 0	200	12
Boxelder loam, eroded, 0 to 5 percent slopes										6
Boxelder loam, deep, over Pavant soil material, 0 to 2 percent slopes				30		45		3. 0	200	12
Boxelder loam, moderately deep and deep, over gravel, 0 to 2 percent slopes				30		50		3. 0	200	12
Boxelder fine sandy loam, 0 to 2 percent slopes				35		50		3. 5		12
Boxelder fine sandy loam, 2 to 5 percent slopes				30		45		3. 0	200	12
Boxelder clay loam, 0 to 2 percent slopes				35		55		3. 5	225	12
Boxelder clay loam, moderately deep and deep, over gravel, 0 to 2 percent slopes				30		50		3. 0	200	12
Boxelder clay loam, 2 to 5 percent slopes				30		50		3. 0	200	12
Bullion silty clay loam, 0 to 2 percent slopes				40		70		3. 5	225	9
Bullion loam, 0 to 2 percent slopes				50		80		4. 0	250	10
Calita loam, 2 to 5 percent slopes	25	30	40	45	65	75	3. 0	4. 0	250	18
Calita loam, 0 to 2 percent slopes	25	30	45	50	70	80	3. 0	4. 0	250	18
Calita loam, 5 to 10 percent slopes	20	25	35	40	55	65	2. 5	3. 5	200	18
Calita fine sandy loam, 2 to 5 percent slopes	23	27	40	45	65	75	3. 0	4. 0	225	17
Calita silty clay loam, 0 to 5 percent slopes	25	30	45	50	70	80	3. 0	4. 0	250	18
Clay dunes										5
Deseret silty clay loam, 0 to 2 percent slopes										9
Deseret silty clay loam, imperfectly drained, 0 to 2 percent slopes										25
Deseret silty clay loam, eroded, 0 to 2 percent slopes										6
Deseret loam, 0 to 2 percent slopes										9
Deseret loam, 2 to 5 percent slopes										9
Deseret sandy loam, 0 to 2 percent slopes										8
Deseret sandy loam, imperfectly drained, 0 to 2 percent slopes										25
Ebbs loam, 0 to 2 percent slopes	25	35	45	50	70	80	3. 0	4. 0	250	18
Ebbs loam, 2 to 5 percent slopes	25	32	40	45	65	75	3. 0	4. 0	250	18
Ebbs loam, 5 to 10 percent slopes	20	25	35	40	55	65	2. 5	3. 5	200	18
Ebbs loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	25	30	40	45	65	75	3. 0	4. 0	225	16
Ebbs loam, deep, over gravel, 0 to 2 percent slopes	25	30	40	45	65	75	3. 0	4. 0	225	16
Ebbs loam, deep, over gravel, 2 to 5 percent slopes	25	30	35	40	60	70	2. 5	3. 5	200	16
Ebbs loam, eroded, 10 to 20 percent slopes										8
Ebbs silty clay loam, 0 to 2 percent slopes	27	32	45	50	70	80	3. 0	4. 0	250	18
Ebbs silty clay loam, 2 to 5 percent slopes	25	30	40	45	65	75	3. 0	4. 0	250	18
Ebbs silty clay loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes	25	30	40	45	65	75	3. 0	4. 0	225	16
Ebbs silty clay loam, moderately deep, over Woodrow soil material, 2 to 5 percent slopes	23	28	35	40	60	70	2. 5	3. 5	225	16
Ebbs silty clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	25	30	40	45	65	75	3. 0	4. 0	225	16
Ebbs silty clay loam, 5 to 10 percent slopes	20	25	30	35	50	60	2. 5	3. 5	200	15
Ebbs fine sandy loam, 0 to 2 percent slopes	20	25	40	45	65	75	3. 0	4. 0	225	15
Ebbs fine sandy loam, 2 to 5 percent slopes	20	25	35	40	55	65	2. 5	3. 5	200	15
Ebbs fine sandy loam, 5 to 10 percent slopes	17	25	30	35	45	55	2. 0	3. 0	175	14
Ebbs fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	20	25	40	45	65	75	3. 0	4. 0	225	15
Ebbs fine sandy loam, eroded, 5 to 20 percent slopes										8
Ebbs loamy fine sand, 2 to 5 percent slopes										16
Escalante sandy loam, 0 to 2 percent slopes			35	40	60	70	2. 5	3. 5	225	8
Escalante sandy loam, eroded, 0 to 5 percent slopes										5
Escalante loam, 0 to 2 percent slopes			40	45	65	75	3. 0	4. 0	225	8
Escalante loam, deep, over Boxelder soil material, 0 to 2 percent slopes			35	40	60	70	2. 5	3. 5	225	8

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Dry-farmed winter wheat		Irrigated crops						Irrigated pasture	Range
			Wheat		Barley		Alfalfa			
	A	B	A	B	A	B	A	B		
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Escalante loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes										7
Escalante loamy sand, 0 to 2 percent slopes										6
Escalante loamy sand, 2 to 5 percent slopes										6
Flowell loam, 2 to 5 percent slopes	20	25		40		55		3. 5	200	14
Flowell loam, 5 to 10 percent slopes	15	20		35		50		3. 0	185	14
Flowell stony loam, 5 to 10 percent slopes										12
Flowell stony loam, 10 to 20 percent slopes										10
Flowell clay loam, 2 to 5 percent slopes	15	20		35		50		3. 0	185	12
Flowell gravelly loam, 10 to 20 percent slopes										11
Fruita fine sandy loam, 0 to 2 percent slopes				45		75		4. 0	250	10
Genola fine sandy loam, 0 to 2 percent slopes				45		75		4. 0	225	10
Genola fine sandy loam, 2 to 5 percent slopes				40		65		3. 5	200	10
Genola fine sandy loam, 5 to 10 percent slopes				35		55		3. 0	175	9
Genola fine sandy loam, deep, over sand, 2 to 5 percent slopes				35		55		3. 0	175	9
Genola fine sandy loam, deep, over sand, 5 to 10 percent slopes				30		50		2. 5	165	8
Genola fine sandy loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes				35		70		4. 0	225	12
Genola fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes				40		65		3. 5	200	10
Genola fine sandy loam, deep, over Sanpete soil material, 2 to 5 percent slopes				35		55		3. 0	175	9
Genola fine sandy loam, eroded, 5 to 20 percent slopes										5
Genola fine sandy loam, deep, over gravel, 0 to 2 percent slopes				40		65		3. 5	200	10
Genola fine sandy loam, deep, over gravel, 2 to 5 percent slopes				35		55		3. 0	175	9
Genola loam, 0 to 2 percent slopes				50		80	2. 5	4. 0	250	12
Genola loam, 2 to 5 percent slopes				45		70	2. 5	3. 5	225	11
Genola loam, deep, over gravel, 0 to 2 percent slopes				40		65		3. 5	200	10
Genola loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes				40		65		3. 5	200	10
Genola loam, deep, over gravel, 2 to 5 percent slopes				35		60		3. 0	200	10
Genola loam, 5 to 10 percent slopes				40		65	2. 0	3. 0	200	10
Genola clay loam, 0 to 2 percent slopes				50		80		4. 0	250	12
Genola clay loam, 2 to 5 percent slopes				45		75		4. 0	250	12
Genola clay loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes				40		65		3. 5	225	10
Genola loamy fine sand, 2 to 5 percent slopes										6
Genola loamy fine sand, 5 to 10 percent slopes										5
Genola loamy fine sand, 0 to 2 percent slopes										6
Genola loamy fine sand, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes										10
Harding silty clay loam, 0 to 2 percent slopes										5
Harding silty clay loam, eroded, 0 to 2 percent slopes										3
Harding loam, 0 to 2 percent slopes										5
Harding loam, eroded, 0 to 2 percent slopes										5
Harding loam, 2 to 5 percent slopes										5
Harding sandy loam, 0 to 2 percent slopes										5
Harding sandy loam, eroded, 0 to 2 percent slopes										3
Harding silty clay, moderately deep, over Kanosh soil material, 0 to 2 percent slopes										5
Hardy loam, 0 to 2 percent slopes				35		60		3. 0		7
Hardy loam, poorly drained, 0 to 2 percent slopes										40
Hardy sandy loam, 0 to 2 percent slopes				35		60		3. 0	200	7
Hardy sandy loam, eroded, 0 to 2 percent slopes										2
Hardy sandy loam, imperfectly drained, 0 to 2 percent slopes										40
Hardy clay loam, 0 to 2 percent slopes				35		60		3. 0		7
Highland loam, 5 to 10 percent slopes	20	25		40		65		3. 5	200	20
Holden gravelly sandy loam, 2 to 5 percent slopes										8
Holden gravelly sandy loam, 5 to 20 percent slopes										7
Holden gravelly loamy sand, 0 to 2 percent slopes										8
Holden sandy loam, 0 to 5 percent slopes										8

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Dry-farmed winter wheat		Irrigated crops						Irrigated pasture	Range
			Wheat		Barley		Alfalfa			
	A	B	A	B	A	B	A	B		
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Ivie loam, 0 to 2 percent slopes	15	18	------	35	------	50	------	3. 0	200	12
Ivie loam, 2 to 5 percent slopes	15	18	------	35	------	50	------	3. 0	200	12
Ivie loam, 5 to 10 percent slopes	10	12	------	25	------	40	------	2. 5	175	10
Ivie gravelly loam, 0 to 2 percent slopes	12	15	------	30	------	45	------	3. 0	175	10
Ivie gravelly loam, 2 to 5 percent slopes	12	15	------	25	------	40	------	2. 5	165	10
Ivie gravelly loam, 5 to 20 percent slopes	------	------	------	------	------	------	------	------	------	10
Ivie stony loam, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	5
Kanosh loam, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	15
Kanosh loam, poorly drained, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	25
Kanosh loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	15
Kanosh loam, very shallow, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	1
Kanosh loam, very shallow, poorly drained, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
Kanosh loam, very shallow, 2 to 10 percent slopes	------	------	------	------	------	------	------	------	------	1
Kanosh silty clay loam, very shallow, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	1
Kanosh sandy loam, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	15
Kanosh sandy loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	6
Kanosh sandy loam, 2 to 5 percent slopes	------	------	25	35	40	50	2. 0	3. 0	200	10
Kanosh sandy loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	15
Kanosh sandy loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	15
Kanosh sandy loam, poorly drained, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	25
Lahontan silty clay, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	7
Lahontan silty clay, imperfectly drained, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	14
Lahontan silty clay, poorly drained, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	20
Lahontan silty clay loam, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	6
Lahontan silty clay loam, eroded, 0 to 5 percent slopes	------	------	------	------	------	------	------	------	------	3
Lahontan loam, deep, over Hardy soil material, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	7
Lava flows	------	------	------	------	------	------	------	------	------	1
Lynndyl loamy sand, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	5
Lynndyl loamy sand, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
Lynndyl loamy sand, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	5
Lynndyl loamy sand, 5 to 20 percent slopes	------	------	------	------	------	------	------	------	------	4
Lynndyl sandy loam, 0 to 2 percent slopes	------	------	------	20	------	30	------	2. 0	150	6
Lynndyl sandy loam, 2 to 5 percent slopes	------	------	------	18	------	27	------	2. 0	140	6
Lynndyl sandy loam, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	5
Lynndyl loam, 0 to 2 percent slopes	------	------	------	20	------	30	------	2. 0	150	6
McCornick fine sandy loam, 0 to 2 percent slopes	------	------	------	25	------	40	------	3. 0	200	7
McCornick fine sandy loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
McCornick fine sandy loam, 2 to 5 percent slopes	------	------	------	20	------	35	------	2. 5	175	6
McCornick loam, 0 to 2 percent slopes	------	------	------	30	------	50	------	3. 0	200	7
McCornick loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
McCornick clay loam, 0 to 2 percent slopes	------	------	------	30	------	45	------	3. 0	200	6
McCornick loamy fine sand, eroded, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	5
Mellor loam, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	5
Mellor loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
Mellor loam, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	5
Mellor silty clay loam, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	5
Mellor silty clay loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
Mellor silty clay loam, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	5
Mellor fine sandy loam, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	5
Mellor fine sandy loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
Mellor loamy fine sand, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
Millard gravelly loam, 2 to 5 percent slopes	15	20	------	27	------	40	------	2. 7	175	15
Millard gravelly loam, 0 to 2 percent slopes	15	20	------	30	------	45	------	3. 0	200	16
Millard loam, 2 to 5 percent slopes	18	23	------	30	------	45	------	3. 0	200	16
Millard loam, 0 to 2 percent slopes	18	23	------	35	------	50	------	3. 5	200	16
Millard fine sandy loam, 2 to 5 percent slopes	15	20	------	30	------	45	------	3. 0	200	16
Millard clay loam, 0 to 2 percent slopes	20	25	------	40	------	55	------	4. 0	225	16
Millard stony loam, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	12
Millard stony loam, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	12
Millard stony sandy loam, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	12

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Dry-farmed winter wheat		Irrigated crops						Irrigated pasture	Range
			Wheat		Barley		Alfalfa			
	A	B	A	B	A	B	A	B		
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Naples loam, 0 to 2 percent slopes	------	------	------	50	------	80	------	4. 0	250	12
Naples loam, 2 to 5 percent slopes	------	------	------	45	------	75	------	3. 5	225	12
Naples fine sandy loam, 0 to 2 percent slopes	------	------	------	45	------	75	------	3. 5	225	12
Naples fine sandy loam, deep, over gravel, 2 to 5 percent slopes	------	------	------	40	------	70	------	3. 5	225	12
Neola sandy loam, 2 to 5 percent slopes	------	------	------	25	------	40	------	2. 5	185	7
Neola sandy loam, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	6
Neola sandy loam, 0 to 2 percent slopes	------	------	------	30	------	45	------	3. 0	200	7
Neola gravelly sandy loam, 2 to 5 percent slopes	------	------	------	25	------	40	------	2. 5	185	7
Neola gravelly sandy loam, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	6
Neola stony sandy loam, 10 to 20 percent slopes	------	------	------	------	------	------	------	------	------	6
Neola stony sandy loam, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	7
Neola stony sandy loam, eroded, 5 to 20 percent slopes	------	------	------	------	------	------	------	------	------	4
Neola loam, 2 to 5 percent slopes	------	------	------	30	------	45	------	3. 0	200	7
Neola loam, 5 to 20 percent slopes	------	------	------	------	------	------	------	3. 0	------	5
Neola loamy sand, 2 to 10 percent slopes	------	------	------	------	------	------	------	------	------	6
Neola gravelly loamy sand, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	5
Neola stony loamy sand, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	6
Oasis fine sandy loam, 0 to 2 percent slopes	------	------	------	45	------	70	------	4. 0	225	8
Oasis fine sandy loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	5
Oasis fine sandy loam, 2 to 5 percent slopes	------	------	------	40	------	65	------	3. 5	200	8
Oasis fine sandy loam, eroded, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	4
Oasis fine sandy loam, deep, over Woodrow soil material, 0 to 2 percent slopes	------	------	------	40	------	65	------	3. 5	200	8
Oasis fine sandy loam, deep, over Woodrow soil material, 2 to 5 percent slopes	------	------	------	35	------	60	------	3. 0	185	8
Oasis fine sandy loam, deep, over Escalante soil material, 0 to 2 percent slopes	------	------	------	35	------	60	------	3. 0	185	8
Oasis fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	------	------	40	45	65	75	2. 5	3. 5	225	9
Oasis fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes	------	------	------	40	------	65	------	3. 5	200	8
Oasis loam, 0 to 2 percent slopes	------	------	40	50	70	80	3. 0	4. 0	250	9
Oasis loam, imperfectly drained, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	25
Oasis loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	5
Oasis loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	------	------	40	45	65	75	2. 5	3. 5	225	10
Oasis loam, deep, over gravel, 0 to 2 percent slopes	------	------	40	45	65	75	2. 5	3. 5	225	9
Oasis loam, deep, over Woodrow soil material, 0 to 2 percent slopes	------	------	------	45	------	70	------	4. 0	225	9
Oasis loam, deep, over Woodrow soil material, 2 to 5 percent slopes	------	------	------	40	------	65	------	3. 5	200	9
Oasis loam, deep, over Hardy soil material, 0 to 2 percent slopes	------	------	------	35	------	60	------	3. 0	185	9
Oasis loam, 2 to 5 percent slopes	------	------	------	45	------	70	------	4. 0	225	9
Oasis silty clay loam, 0 to 2 percent slopes	------	------	40	50	70	80	3. 0	4. 0	250	8
Oasis silty clay loam, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	7
Oasis silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes	------	------	------	45	------	75	------	3. 5	225	8
Oasis silty clay loam, deep, over Woodrow soil material, 0 to 5 percent slopes	------	------	------	45	------	75	------	3. 5	225	8
Oasis silty clay, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	14
Oasis silty clay, imperfectly drained, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	20
Oasis loamy fine sand, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	6
Oasis loamy fine sand, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	3
Oasis loamy sand, moderately deep, over Boxelder soil material, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	7
Orem loamy fine sand, 2 to 5 percent slopes	------	------	------	------	------	------	------	------	------	3
Orem loamy fine sand, 5 to 10 percent slopes	------	------	------	------	------	------	------	------	------	3
Palisade fine sandy loam, 0 to 2 percent slopes	------	------	------	45	------	75	------	4. 0	225	10
Palisade fine sandy loam, eroded, 0 to 2 percent slopes	------	------	------	------	------	------	------	------	------	5
Palisade fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes	------	------	------	40	------	65	------	3. 5	200	10
Palisade fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes	------	------	------	40	------	65	------	3. 5	200	10
Palisade fine sandy loam, 2 to 5 percent slopes	------	------	------	40	------	65	------	3. 5	200	10

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Dry-farmed winter wheat		Irrigated crops						Irrigated pasture	Range
			Wheat		Barley		Alfalfa			
	A	B	A	B	A	B	A	B		
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Palisade fine sandy loam, eroded, 2 to 5 percent slopes										6
Palisade fine sandy loam, 5 to 10 percent slopes				35		60		3.0	185	9
Palisade loam, 0 to 2 percent slopes				50		80		4.0	250	10
Palisade loam, deep, over Boxelder soil material, 0 to 2 percent slopes				45		70		3.5	225	10
Palisade loam, deep, over Boxelder soil material, 2 to 5 percent slopes				40		65		3.0	200	10
Palisade loam, 2 to 5 percent slopes				45		70		3.5	225	10
Palisade loamy fine sand, 2 to 5 percent slopes										7
Palisade loamy fine sand, deep, over Boxelder soil material, 0 to 2 percent slopes										6
Palisade loamy fine sand, eroded, 2 to 5 percent slopes										4
Palisade loamy fine sand, 5 to 10 percent slopes										5
Palisade clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes				45		70		3.5	225	10
Pavant gravelly sandy loam, 2 to 5 percent slopes				20		30		2.0	140	10
Pavant gravelly sandy loam, 0 to 2 percent slopes				20		35		2.0	140	10
Pavant gravelly sandy loam, 5 to 10 percent slopes										9
Pavant gravelly sandy loam, 10 to 20 percent slopes										9
Pavant stony sandy loam, 5 to 10 percent slopes										10
Pavant stony sandy loam, 2 to 5 percent slopes										10
Pavant stony sandy loam, 10 to 20 percent slopes										10
Pavant sandy loam, 2 to 5 percent slopes				20		30		2.0	150	10
Pavant loam, 2 to 5 percent slopes				25		35		2.0	160	10
Pavant loam, 0 to 2 percent slopes				25		35		2.0	160	10
Pavant loam, 5 to 10 percent slopes										9
Pavant loam, 10 to 20 percent slopes										10
Pharo loam, 0 to 2 percent slopes	12	17		25		35		2.5	150	10
Pharo loam, 2 to 5 percent slopes	12	17		25		35		2.5	150	10
Pharo gravelly loam, 0 to 2 percent slopes	12	17		22		30		2.0	140	9
Pharo gravelly loam, 2 to 5 percent slopes	12	17		22		30		2.0	140	9
Pharo gravelly loam, 5 to 10 percent slopes										9
Playas										1
Poganeab soils, undifferentiated, poorly drained, 0 to 2 percent slopes										30
Preston fine sand, duny										3
Preston fine sand, hummocky										3
Preston fine sand, moderately deep, over Boxelder soil material, 1 to 5 percent slopes										4
Preston and Escalante soils and sand dunes										5
Preston and Lynndyl soils, 2 to 5 percent slopes										3
Preston and Lynndyl soils, 0 to 2 percent slopes										3
Preston and Taylorsflat soils and sand dunes										4
Red Rock loam, 0 to 2 percent slopes	25	35	45	50	70	80	3.0	4.0	250	18
Red Rock loam, 2 to 5 percent slopes	25	32	40	45	65	75	3.0	4.0	250	18
Red Rock loam, moderately deep, over Boxelder soil material, 2 to 5 percent slopes	25	32	35	40	60	70	2.5	3.5	225	17
Red Rock loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	25	30	40	45	65	75	3.0	4.0	250	18
Red Rock fine sandy loam, 2 to 5 percent slopes	20	25	30	35	55	65	2.5	3.5	225	17
Red Rock clay loam, 0 to 2 percent slopes	25	35	45	50	70	80	3.0	4.0	250	18
Red Rock clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	25	30	40	45	65	75	3.0	4.0	225	17
Riverwash										1
Rough gullied land, Ebbs soil material										3
Rough gullied land, Sigurd soil material										2
Rough gullied land, Woodrow soil material										3
Rough stony land										3
Sand dunes										1
Sanpete gravelly sandy loam, 2 to 5 percent slopes				30		40		3.0	185	8
Sanpete gravelly sandy loam, 0 to 2 percent slopes				30		40		3.0	185	8
Sanpete gravelly sandy loam, 5 to 10 percent slopes										8
Sanpete stony sandy loam, 2 to 5 percent slopes										7
Sanpete stony sandy loam, 5 to 20 percent slopes										6
Sanpete stony sandy loam, eroded, 5 to 20 percent slopes										4
Sanpete fine sandy loam, 0 to 2 percent slopes				30		40		3.0	185	8

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of principal crops under two levels of management*—Continued

Soil	Dry-farmed winter wheat		Irrigated crops						Irrigated pasture	Range
			Wheat		Barley		Alfalfa			
	A	B	A	B	A	B	A	B		
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
Sanpete fine sandy loam, moderately deep, 2 to 5 percent slopes				25		35		2.5	150	7
Sanpete fine sandy loam, shallow, 2 to 5 percent slopes										5
Sanpete fine sandy loam, shallow, 5 to 10 percent slopes										5
Sanpete loam, 0 to 2 percent slopes				35		45		3.5	200	8
Sanpete loam, 2 to 5 percent slopes				30		40		3.0	185	8
Sanpete loam, 5 to 10 percent slopes										6
Santaquin loamy fine sand, 2 to 5 percent slopes										9
Santaquin loamy fine sand, 5 to 10 percent slopes										9
Santaquin sandy loam, 2 to 5 percent slopes				30		40		2.5	185	9
Santaquin sandy loam, 0 to 2 percent slopes				30		40		2.5	185	9
Santaquin fine sandy loam, moderately deep, over Pavant soil material, 5 to 10 percent slopes			25	30	35	40	2.0	2.5	185	9
Santaquin fine sandy loam, moderately deep, over Pharo soil material, 2 to 5 percent slopes				35		45		3.0	185	9
Scabland										4
Sigurd fine sandy loam, 2 to 5 percent slopes				25		35		2.0	150	7
Sigurd fine sandy loam, 0 to 2 percent slopes				30		40		2.5	150	7
Sigurd loam, 0 to 2 percent slopes				30		40		2.5	175	8
Sigurd loam, 2 to 5 percent slopes				30		35		2.5	150	8
Sigurd gravelly sandy loam, 2 to 5 percent slopes				25		30		2.0	150	8
Sigurd gravelly sandy loam, 0 to 2 percent slopes				25		30		2.0	150	8
Sigurd gravelly sandy loam, 5 to 10 percent slopes										7
Sigurd gravelly sandy loam, moderately deep, over Boxelder soil material, 0 to 5 percent slopes				25		30		2.0	150	8
Sigurd stony sandy loam, 5 to 10 percent slopes										7
Sigurd stony sandy loam, 2 to 5 percent slopes										7
Sigurd stony sandy loam, eroded, 2 to 5 percent slopes										3
Sigurd gravelly loamy sand, 2 to 5 percent slopes										3
Smooth stony land										
Sunset loam, 0 to 2 percent slopes			40	50	70	80	3.0	4.0	250	12
Sunset loam, poorly drained, 0 to 2 percent slopes										60
Sunset fine sandy loam, 0 to 2 percent slopes			40	50	70	80	3.0	4.0	250	12
Sunset silty clay loam, 0 to 2 percent slopes										15
Sunset silty clay loam, imperfectly drained, 0 to 2 percent slopes										60
Taylorsflat sandy loam, 0 to 2 percent slopes				30		40		3.0	175	7
Taylorsflat sandy loam, imperfectly drained, 0 to 2 percent slopes										20
Taylorsflat loam, 0 to 2 percent slopes			25	35	40	50	2.5	3.5	200	8
Taylorsflat silty clay loam, 0 to 2 percent slopes										
Terrace escarpments										5
Woodrow silty clay loam, 0 to 2 percent slopes			35	45	65	80	3.0	4.0	250	8
Woodrow silty clay loam, deep, over Oasis soil material, 0 to 2 percent slopes			35	45	65	80	3.0	4.0	250	8
Woodrow silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes										7
Woodrow silty clay loam, eroded, 2 to 5 percent slopes										4
Woodrow loam, 0 to 2 percent slopes			35	45	65	80	3.0	4.0	225	8
Woodrow loam, 2 to 5 percent slopes				45		75		4.0	225	8
Woodrow loam, eroded, 2 to 5 percent slopes										5
Woodrow loam, deep, over Oasis soil material, 0 to 2 percent slopes			35	45	65	80	3.0	4.0	250	8
Woodrow fine sandy loam, 0 to 2 percent slopes			35	45	65	80	3.0	4.0	250	7
Woodrow fine sandy loam, deep, over Hardy soil material, 0 to 2 percent slopes										8
Woodrow fine sandy loam, deep, over Oasis soil material, 0 to 2 percent slopes				45		80	4.0		250	7
Woodrow silty clay, 0 to 2 percent slopes										6

[1] Number of days 1 acre will graze an animal unit without injury to the pasture.

another and to learn the things about the soil that influence its capacity to support plants.

Color is usually related to the amount of organic matter. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers. Texture is later checked by laboratory analysis. Texture determines how well the soil retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

Structure, which is the way the individual soil particles are arranged in aggregates and the amount of pore space between aggregates, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture. The aggregates may have prismatic, columnar, blocky, platy, or granular structure.

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over bedrock or compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the gradient and pattern of slopes; the degree of erosion; the nature of the underlying parent material from which the soil has developed; and the acidity or alkalinity of the soil as measured by chemical tests.

CLASSIFICATION.—On the basis of the characteristics observed by the survey team or determined by laboratory tests, soils are classified by series, types, and phases.

As an example of classification, consider how the Pharo series in the East Millard Area is separated into types and phases:

Series	*Type*	*Phase*
Pharo	Loam	0 to 2 percent slopes.
		2 to 5 percent slopes.
	Gravelly loam	0 to 2 percent slopes.
		2 to 5 percent slopes.
		5 to 10 percent slopes.

Soil series.—Soils similar in kind, thickness, and arrangement of layers are normally designated as a soil series. In a given area, however, a soil series may be represented by only one soil.

Soil type.—Soils having the same texture in the surface layer and similar in kind, thickness, and arrangement of layers are classified as one soil type. A soil type may be divided into two or more soil phases.

Soil phase.—Soil types are divided into soil phases because of differences other than those of kind, thickness, and arrangement of layers. Slope variations, frequency of rock outcrops, degree of erosion, depth of soil over the substratum, or natural drainage are examples of characteristics that suggest dividing a soil type into phases.

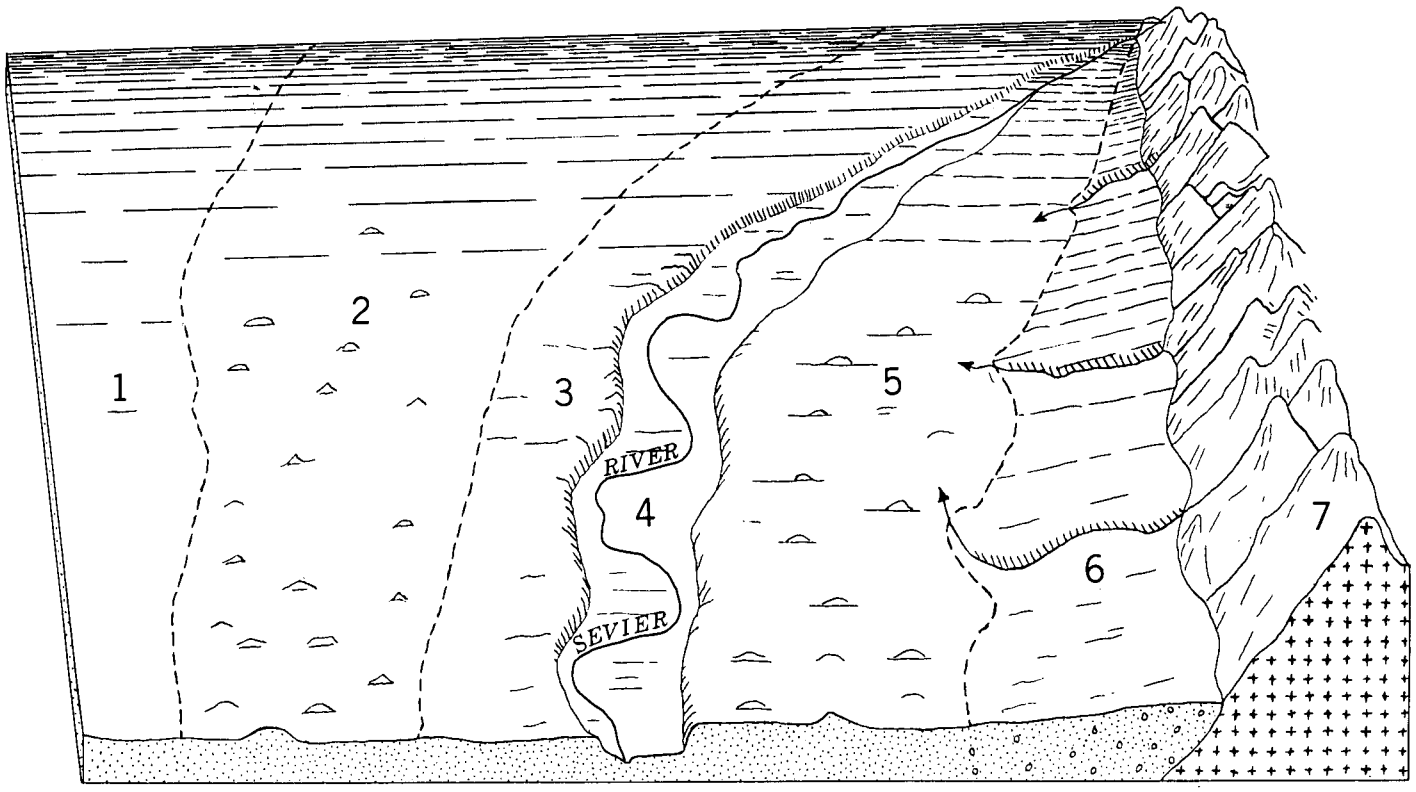

***Figure 2.*—East-west cross section in the northern part of the East Millard Area, near Lynndyl, showing position of soils on the landscape.**

1—Mellor, Harding, Woodrow, and Lahontan soils.
2—Preston and Lynndyl soils.
3—Woodrow and Oasis soils.
4—Poganeab soils.
5—Preston and Taylorsflat soils and sand dunes.
6—Taylorsflat and Naples soils.
7—Canyon Mountains.

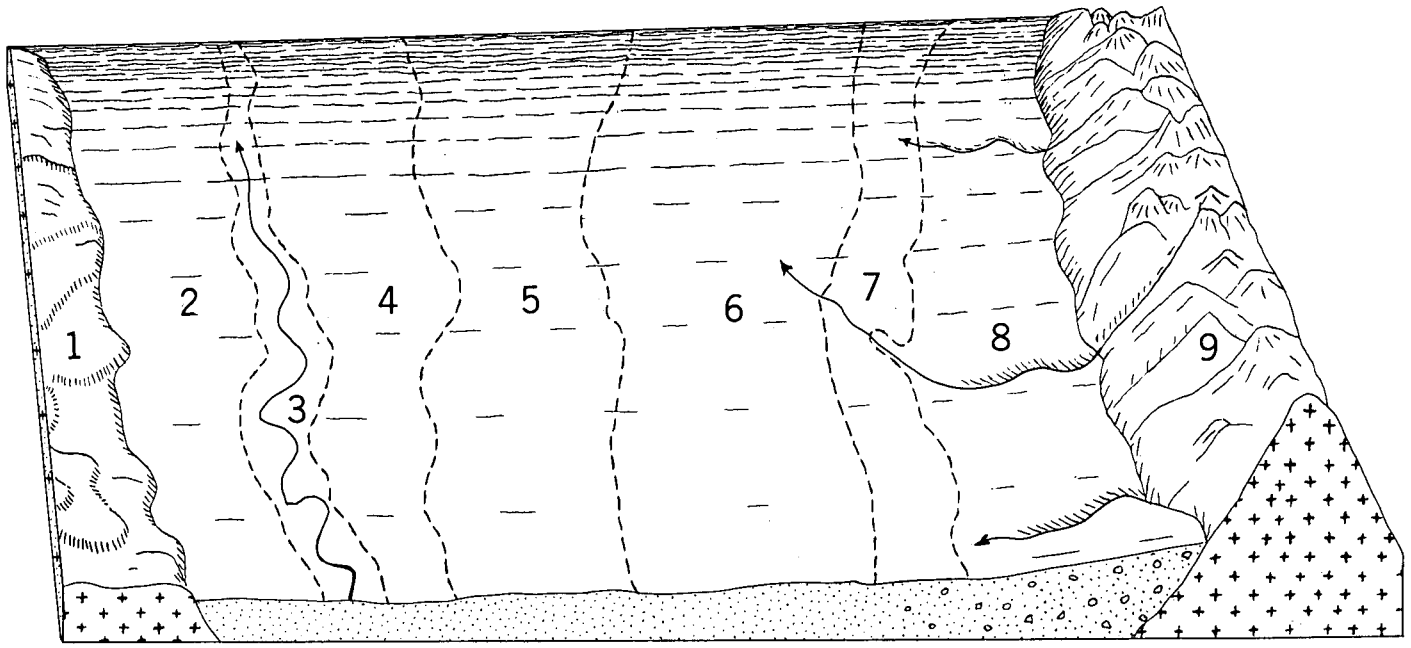

***Figure 3.*—East-west cross section in the southern part of the East Millard Area, near Fillmore, showing position of soils on the landscape.**

1—Lava ridges.
2—Kanosh and Oasis soils.
3—Sunset soils.
4—Deseret soils.
5—Woodrow, Hardy, and Oasis soils.
6—Boxelder and McCornick soils.
7—Millard and Ebbs soils.
8—Flowell and Pavant soils.
9—Pavant Mountains.

The soil phase, or the soil type, if it is not to be subdivided, is the mapping unit on the soil map. It is the unit that has the narrowest range of characteristics. Use and management practices therefore can be specified more easily than for soil series or yet broader groups that contain more variation.

Miscellaneous land types.—Fresh stream deposits and rough, stony, or severely gullied land are not classified by types and series. They are identified by a descriptive name. Rough gullied land, Ebbs soil material, is a miscellaneous land type in the East Millard Area.

Descriptions of Soils

In the following pages the soils of the East Millard Area are described in detail, and their use and management are discussed. At the back of this report is the soil map that shows the location and distribution of each soil in the Area, and also a summary of the characteristics of the soils. Figures 2 and 3 show the topographic relationships of soils in specific parts of the survey Area. The approximate acreage and proportionate extent of each soil mapped are given in table 4.

Abbott silty clay, 0 to 2 percent slopes (Aa) (management group 10).—This moderately deep, fine-textured soil is located in low positions. It occurs near the western border of the Area, about 8 miles northwest of Fillmore, and also in the extreme northwestern corner. It is imperfectly drained. Internal drainage is slow to very slow, and surface drainage is very slow to ponded. The parent materials were mainly fine-textured lake sediments. The vegetation is saltgrass and greasewood. Many spots are barren.

Profile description:

0 to 3 inches, light-gray to light brownish-gray silty clay; fine granular structure; slightly hard when dry, friable when moist; strongly calcareous; low in organic matter.
3 to 38 inches, light-gray to light brownish-gray clay or silty clay; massive; hard when dry, firm when moist, very sticky when wet; strongly calcareous and in places has streaks and veins of segregated lime.
38 to 72 inches, light-gray to very pale brown hard clay or silty clay; massive; slightly stratified in places and normally mottled with yellowish brown and reddish brown.

The entire profile is free of gravel and stones. It normally contains slight to strong concentrations of salt. This soil has a high water-holding capacity and is slowly to very slowly permeable. Surface cracks are numerous. Many are as much as 15 inches deep.

Use and management.—This soil is used entirely for range. The carrying capacity is low. Reclaiming it for irrigated farming would be difficult because the permeability is slow to very slow, and because it would be hard to provide adequate drainage. Also, tilling this soil would be difficult.

Abbott silty clay loam, 0 to 2 percent slopes (Ab) (management group 10).—This soil is in the northwestern part of the Area. It is like Abbott silty clay, 0 to 2 percent slopes, except for the texture of the surface soil. Normally it has a fairly dense cover of greasewood.

Reclaiming this soil for irrigated farming would be about as difficult as reclaiming Abbott silty clay, 0 to 2 percent slopes. Tilling and preparing for irrigation, however, would be somewhat easier. A combination of the border and corrugation methods of irrigation would be best for this soil. Such a system provides fairly uniform distribution of water and maximum penetration.

TABLE 4.—*Approximate acreage and proportionate extent of soils mapped*

Soil	Area	Extent
	Acres	*Percent*
Abbott silty clay, 0 to 2 percent slopes	338	0. 1
Abbott silty clay loam, 0 to 2 percent slopes	330	. 1
Boxelder loam, 0 to 2 percent slopes	9, 524	2. 0
Boxelder loam, 2 to 5 percent slopes	1, 257	. 3
Boxelder loam, eroded, 0 to 5 percent slopes	211	(1)
Boxelder loam, deep, over Pavant soil material, 0 to 2 percent slopes	880	. 2
Boxelder loam, moderately deep and deep, over gravel, 0 to 2 percent slopes	246	. 1
Boxelder fine sandy loam, 0 to 2 percent slopes	631	. 1
Boxelder fine sandy loam, 2 to 5 percent slopes	692	. 1
Boxelder clay loam, 0 to 2 percent slopes	1, 230	. 3
Boxelder clay loam, moderately deep and deep, over gravel, 0 to 2 percent slopes	862	. 2
Boxelder clay loam, 2 to 5 percent slopes	298	. 1
Bullion silty clay loam, 0 to 2 percent slopes	164	(1)
Bullion loam, 0 to 2 percent slopes	795	. 2
Calita loam, 2 to 5 percent slopes	1, 140	. 2
Calita loam, 0 to 2 percent slopes	284	. 1
Calita loam, 5 to 10 percent slopes	145	(1)
Calita fine sandy loam, 2 to 5 percent slopes	209	(1)
Calita silty clay loam, 0 to 5 percent slopes	82	(1)
Clay dunes	753	. 2
Deseret silty clay loam, 0 to 2 percent slopes	1, 646	. 3
Deseret silty clay loam, imperfectly drained, 0 to 2 percent slopes	1, 551	. 3
Deseret silty clay loam, eroded, 0 to 2 percent slopes	103	(1)
Deseret loam, 0 to 2 percent slopes	1, 815	. 4
Deseret loam, 2 to 5 percent slopes	72	(1)
Deseret sandy loam, 0 to 2 percent slopes	492	. 1
Deseret sandy loam, imperfectly drained, 0 to 2 percent slopes	531	. 1
Ebbs loam, 0 to 2 percent slopes	12, 415	2. 6
Ebbs loam, 2 to 5 percent slopes	7, 398	1. 5
Ebbs loam, 5 to 10 percent slopes	684	. 1
Ebbs loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	1, 993	. 4
Ebbs loam, deep, over gravel, 0 to 2 percent slopes	114	(1)
Ebbs loam, deep, over gravel, 2 to 5 percent slopes	561	. 1
Ebbs loam, eroded, 10 to 20 percent slopes	301	. 1
Ebbs silty clay loam, 0 to 2 percent slopes	3, 189	. 7
Ebbs silty clay loam, 2 to 5 percent slopes	392	. 1
Ebbs silty clay loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes	477	. 1
Ebbs silty clay loam, moderately deep, over Woodrow soil material, 2 to 5 percent slopes	74	(1)
Ebbs silty clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	1, 523	. 3
Ebbs silty clay loam, 5 to 10 percent slopes	102	(1)
Ebbs fine sandy loam, 0 to 2 percent slopes	2, 120	. 4
Ebbs fine sandy loam, 2 to 5 percent slopes	755	. 2
Ebbs fine sandy loam, 5 to 10 percent slopes	84	(1)
Ebbs fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	244	. 1
Ebbs fine sandy loam, eroded, 5 to 20 percent slopes	88	(1)
Ebbs loamy fine sand, 2 to 5 percent slopes	80	(1)
Escalante sandy loam, 0 to 2 percent slopes	4, 833	1. 0
Escalante sandy loam, eroded, 0 to 5 percent slopes	647	. 1
Escalante loam, 0 to 2 percent slopes	1, 471	. 3
Escalante loam, deep, over Boxelder soil material, 0 to 2 percent slopes	250	. 1
Escalante loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes	146	(1)
Escalante loamy sand, 0 to 2 percent slopes	336	0. 1
Escalante loamy sand, 2 to 5 percent slopes	145	(1)
Flowell loam, 2 to 5 percent slopes	1, 228	. 3
Flowell loam, 5 to 10 percent slopes	641	. 1
Flowell stony loam, 5 to 10 percent slopes	4, 201	. 9
Flowell stony loam, 10 to 20 percent slopes	351	. 1
Flowell clay loam, 2 to 5 percent slopes	108	(1)
Flowell gravelly loam, 10 to 20 percent slopes	387	. 1
Fruita fine sandy loam, 0 to 2 percent slopes	154	(1)
Genola fine sandy loam, 0 to 2 percent slopes	4, 310	1. 0
Genola fine sandy loam, 2 to 5 percent slopes	7, 278	1. 5
Genola fine sandy loam, 5 to 10 percent slopes	815	. 2
Genola fine sandy loam, deep, over sand, 2 to 5 percent slopes	588	. 1
Genola fine sandy loam, deep, over sand, 5 to 10 percent slopes	129	(1)
Genola fine sandy loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes	144	(1)
Genola fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes	399	. 1
Genola fine sandy loam, deep, over Sanpete soil material, 2 to 5 percent slopes	153	(1)
Genola fine sandy loam, eroded, 5 to 20 percent slopes	121	(1)
Genola fine sandy loam, deep, over gravel, 0 to 2 percent slopes	126	(1)
Genola fine sandy loam, deep, over gravel, 2 to 5 percent slopes	2, 114	. 4
Genola loam, 0 to 2 percent slopes	3, 565	. 7
Genola loam, 2 to 5 percent slopes	3, 798	. 8
Genola loam, deep, over gravel, 0 to 2 percent slopes	358	. 1
Genola loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes	1, 091	. 2
Genola loam, deep, over gravel, 2 to 5 percent slopes	1, 157	. 2
Genola loam, 5 to 10 percent slopes	406	. 1
Genola clay loam, 0 to 2 percent slopes	699	. 1
Genola clay loam, 2 to 5 percent slopes	371	. 1
Genola clay loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes	43	(1)
Genola loamy fine sand, 2 to 5 percent slopes	675	. 1
Genola loamy fine sand, 5 to 10 percent slopes	60	(1)
Genola loamy fine sand, 0 to 2 percent slopes	134	(1)
Genola loamy fine sand, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes	51	(1)
Harding silty clay loam, 0 to 2 percent slopes	3, 439	. 7
Harding silty clay loam, eroded, 0 to 2 percent slopes	174	(1)
Harding loam, 0 to 2 percent slopes	2, 690	. 6
Harding loam, eroded, 0 to 2 percent slopes	344	. 1
Harding loam, 2 to 5 percent slopes	378	. 1
Harding sandy loam, 0 to 2 percent slopes	780	. 2
Harding sandy loam, eroded, 0 to 2 percent slopes	153	(1)
Harding silty clay, moderately deep, over Kanosh soil material, 0 to 2 percent slopes	132	(1)
Hardy loam, 0 to 2 percent slopes	2, 880	. 6
Hardy loam, poorly drained, 0 to 2 percent slopes	285	. 1
Hardy sandy loam, 0 to 2 percent slopes	1, 715	. 4
Hardy sandy loam, eroded, 0 to 2 percent slopes	159	(1)

See footnote at end of table.

TABLE 4.—*Approximate acreage and proportionate extent of soils mapped*—Continued

Soil	Area	Extent
	Acres	*Percent*
Hardy sandy loam, imperfectly drained, 0 to 2 percent slopes	145	(1)
Hardy clay loam, 0 to 2 percent slopes	334	0. 1
Highland loam, 5 to 10 percent slopes	222	(1)
Holden gravelly sandy loam, 2 to 5 percent slopes	1, 486	. 3
Holden gravelly sandy loam, 5 to 20 percent slopes	757	. 2
Holden gravelly loamy sand, 0 to 2 percent slopes	253	. 1
Holden sandy loam, 0 to 5-percent slopes	242	. 1
Ivie loam, 0 to 2 percent slopes	1, 213	. 3
Ivie loam, 2 to 5 percent slopes	757	. 2
Ivie loam, 5 to 10 percent slopes	75	(1)
Ivie gravelly loam, 0 to 2 percent slopes	571	. 1
Ivie gravelly loam, 2 to 5 percent slopes	1, 108	. 2
Ivie gravelly loam, 5 to 20 percent slopes	83	(1)
Ivie stony loam, 2 to 5 percent slopes	278	. 1
Kanosh loam, 0 to 2 percent slopes	2, 197	. 5
Kanosh loam, poorly drained, 0 to 2 percent slopes	918	. 2
Kanosh loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes	232	(1)
Kanosh loam, very shallow, 0 to 2 percent slopes	918	. 2
Kanosh loam, very shallow, poorly drained, 0 to 2 percent slopes	6, 716	1. 4
Kanosh loam, very shallow, 2 to 10 percent slopes	369	. 1
Kanosh silty clay loam, very shallow, 0 to 2 percent slopes	1, 283	. 3
Kanosh sandy loam, 0 to 2 percent slopes	750	. 2
Kanosh sandy loam, eroded, 0 to 2 percent slopes	280	. 1
Kanosh sandy loam, 2 to 5 percent slopes	72	(1)
Kanosh sandy loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes	174	(1)
Kanosh sandy loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes	145	(1)
Kanosh sandy loam, poorly drained, 0 to 2 percent slopes	229	(1)
Lahontan silty clay, 0 to 2 percent slopes	243	. 1
Lahontan silty clay, imperfectly drained, 0 to 2 percent slopes	1, 763	. 4
Lahontan silty clay, poorly drained, 0 to 2 percent slopes	1, 045	. 2
Lahontan silty clay loam, 0 to 2 percent slopes	3, 204	. 7
Lahontan silty clay loam, eroded, 0 to 5 percent slopes	1, 306	. 3
Lahontan loam, deep, over Hardy soil material, 0 to 2 percent slopes	298	. 1
Lava flows	2, 453	. 5
Lynndyl loamy sand, 0 to 2 percent slopes	8, 264	1. 7
Lynndyl loamy sand, eroded, 0 to 2 percent slopes	476	. 1
Lynndyl loamy sand, 2 to 5 percent slopes	126	(1)
Lynndyl loamy sand, 5 to 20 percent slopes	77	(1)
Lynndyl sandy loam, 0 to 2 percent slopes	2, 799	. 6
Lynndyl sandy loam, 2 to 5 percent slopes	364	. 1
Lynndyl sandy loam, 5 to 10 percent slopes	365	. 1
Lynndyl loam, 0 to 2 percent slopes	356	. 1
McCornick fine sandy loam, 0 to 2 percent slopes	3, 741	. 8
McCornick fine sandy loam, eroded, 0 to 2 percent slopes	1, 028	. 2
McCornick fine sandy loam, 2 to 5 percent slopes	106	(1)
McCornick loam, 0 to 2 percent slopes	2, 867	. 6
McCornick loam, eroded, 0 to 2 percent slopes	122	(1)
McCornick clay loam, 0 to 2 percent slopes	284	0. 1
McCornick loamy fine sand, eroded, 2 to 5 percent slopes	39	(1)
Mellor loam, 0 to 2 percent slopes	4, 754	1. 0
Mellor loam, eroded, 0 to 2 percent slopes	997	. 2
Mellor loam, 2 to 5 percent slopes	89	(1)
Mellor silty clay loam, 0 to 2 percent slopes	899	. 2
Mellor silty clay loam, eroded, 0 to 2 percent slopes	110	(1)
Mellor silty clay loam, 2 to 5 percent slopes	114	(1)
Mellor fine sandy loam, 0 to 2 percent slopes	2, 668	. 6
Mellor fine sandy loam, eroded, 0 to 2 percent slopes	3, 196	. 7
Mellor loamy fine sand, eroded, 0 to 2 percent slopes	634	. 1
Millard gravelly loam, 2 to 5 percent slopes	4, 412	1. 0
Millard gravelly loam, 0 to 2 percent slopes	3, 042	. 6
Millard loam, 2 to 5 percent slopes	1, 229	. 3
Millard loam, 0 to 2 percent slopes	823	. 2
Millard fine sandy loam, 2 to 5 percent slopes	258	. 1
Millard clay loam, 0 to 2 percent slopes	97	(1)
Millard stony loam, 2 to 5 percent slopes	696	. 1
Millard stony loam, 0 to 2 percent slopes	118	(1)
Millard stony sandy loam, 5 to 10 percent slopes	2, 212	. 5
Naples loam, 0 to 2 percent slopes	1, 416	. 3
Naples loam, 2 to 5 percent slopes	480	. 1
Naples fine sandy loam, 0 to 2 percent slopes	219	(1)
Naples fine sandy loam, deep, over gravel, 2 to 5 percent slopes	54	(1)
Neola sandy loam, 2 to 5 percent slopes	1, 031	. 2
Neola sandy loam, 5 to 10 percent slopes	688	. 1
Neola sandy loam, 0 to 2 percent slopes	106	(1)
Neola gravelly sandy loam, 2 to 5 percent slopes	275	. 1
Neola gravelly sandy loam, 5 to 10 percent slopes	1, 232	. 3
Neola stony sandy loam, 10 to 20 percent slopes	3, 524	. 7
Neola stony sandy loam, 2 to 5 percent slopes	793	. 2
Neola stony sandy loam, eroded, 5 to 20 percent slopes	111	(1)
Neola loam, 2 to 5 percent slopes	459	. 1
Neola loam, 5 to 20 percent slopes	360	. 1
Neola loamy sand, 2 to 10 percent slopes	153	(1)
Neola gravelly loamy sand, 5 to 10 percent slopes	878	. 2
Neola stony loamy sand, 5 to 10 percent slopes	413	. 1
Oasis fine sandy loam, 0 to 2 percent slopes	11, 776	2. 5
Oasis fine sandy loam, eroded, 0 to 2 percent slopes	734	. 2
Oasis fine sandy loam, 2 to 5 percent slopes	1, 043	. 2
Oasis fine sandy loam, eroded, 2 to 5 percent slopes	104	(1)
Oasis fine sandy loam, deep, over Woodrow soil material, 0 to 2 percent slopes	672	. 1
Oasis fine sandy loam, deep, over Woodrow soil material, 2 to 5 percent slopes	286	. 1
Oasis fine sandy loam, deep, over Escalante soil material, 0 to 2 percent slopes	212	(1)
Oasis fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	174	(1)
Oasis fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes	790	. 2
Oasis loam, 0 to 2 percent slopes	6, 952	1. 4
Oasis loam, imperfectly drained, 0 to 2 percent slopes	109	(1)

See footnote at end of table.

TABLE 4.—*Approximate acreage and proportionate extent of soils mapped*—Continued

Soil	Area	Extent
	Acres	*Percent*
Oasis loam, eroded, 0 to 2 percent slopes	136	(1)
Oasis loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	193	(1)
Oasis loam, deep, over gravel, 0 to 2 percent slopes	708	0. 1
Oasis loam, deep, over Woodrow soil material, 0 to 2 percent slopes	807	. 2
Oasis loam, deep, over Woodrow soil material, 2 to 5 percent slopes	106	(1)
Oasis loam, deep, over Hardy soil material, 0 to 2 percent slopes	83	(1)
Oasis loam, 2 to 5 percent slopes	392	. 1
Oasis silty clay loam, 0 to 2 percent slopes	3, 000	. 6
Oasis silty clay loam, 5 to 10 percent slopes	65	(1)
Oasis silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes	146	(1)
Oasis silty clay loam, deep, over Woodrow soil material, 0 to 5 percent slopes	128	(1)
Oasis silty clay, 0 to 2 percent slopes	76	(1)
Oasis silty clay, imperfectly drained, 0 to 2 percent slopes	300	. 1
Oasis loamy fine sand, 0 to 2 percent slopes	606	. 1
Oasis loamy fine sand, eroded, 0 to 2 percent slopes	207	(1)
Oasis loamy sand, moderately deep, over Boxelder soil material, 2 to 5 percent slopes	241	. 1
Orem loamy fine sand, 2 to 5 percent slopes	145	(1)
Orem loamy fine sand, 5 to 10 percent slopes	335	. 1
Palisade fine sandy loam, 0 to 2 percent slopes	2, 841	. 6
Palisade fine sandy loam, eroded, 0 to 2 percent slopes	1, 050	. 2
Palisade fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes	767	. 2
Palisade fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes	600	. 1
Palisade fine sandy loam, 2 to 5 percent slopes	2, 895	. 6
Palisade fine sandy loam, eroded, 2 to 5 percent slopes	107	(1)
Palisade fine sandy loam, 5 to 10 percent slopes	287	. 1
Palisade loam, 0 to 2 percent slopes	2, 364	. 5
Palisade loam, deep, over Boxelder soil material, 0 to 2 percent slopes	768	. 2
Palisade loam, deep, over Boxelder soil material, 2 to 5 percent slopes	172	(1)
Palisade loam, 2 to 5 percent slopes	1, 110	. 2
Palisade loamy fine sand, 2 to 5 percent slopes	563	. 1
Palisade loamy fine sand, deep, over Boxelder soil material, 0 to 2 percent slopes	139	(1)
Palisade loamy fine sand, eroded, 2 to 5 percent slopes	55	(1)
Palisade loamy fine sand, 5 to 10 percent slopes	482	. 1
Palisade clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes	330	. 1
Pavant gravelly sandy loam, 2 to 5 percent slopes	2, 251	. 5
Pavant gravelly sandy loam, 0 to 2 percent slopes	1, 775	. 4
Pavant gravelly sandy loam, 5 to 10 percent slopes	2, 423	. 5
Pavant gravelly sandy loam, 10 to 20 percent slopes	112	(1)
Pavant stony sandy loam, 5 to 10 percent slopes	8, 964	1. 9
Pavant stony sandy loam, 2 to 5 percent slopes	281	. 1
Pavant stony sandy loam, 10 to 20 percent slopes	8, 580	1. 8
Pavant sandy loam, 2 to 5 percent slopes	407	. 1
Pavant loam, 2 to 5 percent slopes	3, 510	. 7
Pavant loam, 0 to 2 percent slopes	877	. 2
Pavant loam, 5 to 10 percent slopes	2, 708	. 6
Pavant loam, 10 to 20 percent slopes	903	. 2
Pharo loam, 0 to 2 percent slopes	1, 813	. 4
Pharo loam, 2 to 5 percent slopes	382	. 1
Pharo gravelly loam, 0 to 2 percent slopes	372	. 1
Pharo gravelly loam, 2 to 5 percent slopes	720	. 2
Pharo gravelly loam, 5 to 10 percent slopes	175	(1)
Playas	3, 817	. 8
Poganeab soils, undifferentiated, poorly drained, 0 to 2 percent slopes	4, 423	1. 0
Preston fine sand, duny	5, 634	1. 2
Preston fine sand, hummocky	1, 253	. 3
Preston fine sand, moderately deep, over Boxelder soil material, 1 to 5 percent slopes	125	(1)
Preston and Escalante soils and sand dunes	5, 035	1. 0
Preston and Lynndyl soils, 2 to 5 percent slopes	58, 412	12. 2
Preston and Lynndyl soils, 0 to 2 percent slopes	2, 578	. 5
Preston and Taylorsflat soils and sand dunes	9, 672	2. 0
Red Rock loam, 0 to 2 percent slopes	1, 246	. 3
Red Rock loam, 2 to 5 percent slopes	1, 246	. 3
Red Rock loam, moderately deep, over Boxelder soil material, 2 to 5 percent slopes	714	. 1
Red Rock loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	108	(1)
Red Rock fine sandy loam, 2 to 5 percent slopes	777	. 2
Red Rock clay loam, 0 to 2 percent slopes	286	. 1
Red Rock clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes	388	. 1
Riverwash	173	(1)
Rough gullied land, Ebbs soil material	47	(1)
Rough gullied land, Sigurd soil material	86	(1)
Rough gullied land, Woodrow soil material	61	(1)
Rough stony land	1, 953	. 4
Sand dunes	7, 804	1. 6
Sanpete gravelly sandy loam, 2 to 5 percent slopes	3, 325	. 7
Sanpete gravelly sandy loam, 0 to 2 percent slopes	495	. 1
Sanpete gravelly sandy loam, 5 to 10 percent slopes	273	. 1
Sanpete stony sandy loam, 2 to 5 percent slopes	1, 878	. 4
Sanpete stony sandy loam, 5 to 20 percent slopes	1, 141	. 2
Sanpete stony sandy loam, eroded, 5 to 20 percent slopes	692	. 1
Sanpete fine sandy loam, 0 to 2 percent slopes	133	(1)
Sanpete fine sandy loam, moderately deep, 2 to 5 percent slopes	637	. 1
Sanpete fine sandy loam, shallow, 2 to 5 percent slopes	1, 152	. 2
Sanpete fine sandy loam, shallow, 5 to 10 percent slopes	99	(1)
Sanpete loam, 0 to 2 percent slopes	501	. 1
Sanpete loam, 2 to 5 percent slopes	226	(1)
Sanpete loam, 5 to 10 percent slopes	103	(1)
Santaquin loamy fine sand, 2 to 5 percent slopes	808	. 2
Santaquin loamy fine sand, 5 to 10 percent slopes	149	(1)
Santaquin sandy loam, 2 to 5 percent slopes	170	(1)

See footnote at end of table.

TABLE 4.—*Approximate acreage and proportionate extent of soils mapped*—Continued

Soil	Area	Extent
	Acres	*Percent*
Santaquin sandy loam, 0 to 2 percent slopes	101	(1)
Santaquin fine sandy loam, moderately deep, over Pavant soil material, 5 to 10 percent slopes	207	(1)
Santaquin fine sandy loam, moderately deep, over Pharo soil material, 2 to 5 percent slopes	130	(1)
Scabland	2, 161	0. 5
Sigurd fine sandy loam, 2 to 5 percent slopes	564	1. 0
Sigurd fine sandy loam, 0 to 2 percent slopes	125	(1)
Sigurd loam, 0 to 2 percent slopes	268	. 1
Sigurd loam, 2 to 5 percent slopes	176	(1)
Sigurd gravelly sandy loam, 2 to 5 percent slopes	1, 366	. 3
Sigurd gravelly sandy loam, 0 to 2 percent slopes	353	. 1
Sigurd gravelly sandy loam, 5 to 10 percent slopes	500	. 1
Sigurd gravelly sandy loam, moderately deep, over Boxelder soil material, 0 to 5 percent slopes	343	. 1
Sigurd stony sandy loam, 5 to 10 percent slopes	1, 035	. 2
Sigurd stony sandy loam, 2 to 5 percent slopes	216	(1)
Sigurd stony sandy loam, eroded, 2 to 5 percent slopes	487	. 1
Sigurd gravelly loamy sand, 2 to 5 percent slopes	156	(1)
Smooth stony land	25, 859	5. 4
Sunset loam, 0 to 2 percent slopes	2, 117	. 4
Sunset loam, poorly drained, 0 to 2 percent slopes	250	. 1
Sunset fine sandy loam, 0 to 2 percent slopes	894	. 2
Sunset silty clay loam, 0 to 2 percent slopes	3, 513	. 7
Sunset silty clay loam, imperfectly drained, 0 to 2 percent slopes	336	. 1
Taylorsflat sandy loam, 0 to 2 percent slopes	1, 769	. 4
Taylorsflat sandy loam, imperfectly drained, 0 to 2 percent slopes	64	(1)
Taylorsflat loam, 0 to 2 percent slopes	1, 220	. 3
Taylorsflat silty clay loam, 0 to 2 percent slopes	279	. 1
Terrace escarpments	4, 356	1. 0
Woodrow silty clay loam, 0 to 2 percent slopes	16, 298	3. 4
Woodrow silty clay loam, deep, over Oasis soil material, 0 to 2 percent slopes	420	. 1
Woodrow silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes	413	. 1
Woodrow silty clay loam, eroded, 2 to 5 percent slopes	281	. 1
Woodrow loam, 0 to 2 percent slopes	4, 511	1. 0
Woodrow loam, 2 to 5 percent slopes	668	. 1
Woodrow loam, eroded, 2 to 5 percent slopes	202	(1)
Woodrow loam, deep, over Oasis soil material, 0 to 2 percent slopes	487	. 1
Woodrow fine sandy loam, 0 to 2 percent slopes	882	. 2
Woodrow fine sandy loam, deep, over Hardy soil material, 0 to 2 percent slopes	54	(1)
Woodrow fine sandy loam, deep, over Oasis soil material, 0 to 2 percent slopes	183	(1)
Woodrow silty clay, 0 to 2 percent slopes	351	. 1
Total	479, 684	100. 0

[1] Less than 0.1 percent.

Boxelder loam, 0 to 2 percent slopes (Bf) (management group 5).—This soil occurs mainly in a narrow discontinuous band on old lake terraces below the highest shoreline of prehistoric Lake Bonneville. It has developed from white, diatomaceous, calcareous lake deposits (fig. 4). Most of it is between Greenwood and the southern boundary of the Area.

Figure 4.—**Profile of Boxelder loam, about 2 miles south of Meadow, showing white parent material.**

This soil is moderately permeable. The water-holding capacity is moderate. Wind action has somewhat modified the surface soil. Moderate amounts of soluble salts are common in the substratum. The vegetation is mostly shadscale, greasewood, and sagebrush, mixed with a small amount of bunchgrass.

Profile description:

0 to 3 inches, light-gray or very pale brown loam; very weak thin platy structure; soft when dry, friable when moist; strongly calcareous; moderate to low in organic matter.

3 to 7 inches, light-gray or very pale brown silt loam; moderate medium granular structure; numerous fine roots; strongly calcareous; soft when dry, friable when moist.

7 to 12 inches, very pale brown to white light silty clay loam or silt loam; weak medium granular structure; strongly calcareous.

12 to 22 inches, white silty clay loam; strong coarse blocky structure; strongly calcareous; hard when dry, friable when moist.

22 to 72 inches, white silty clay loam to silt loam, somewhat stratified; coarse blocky structure; hard when dry, friable when moist; strongly calcareous; in places contains scattered angular lime nodules and thin strata of black or dark-gray cinders.

The soil above the white blocky material is from 7 to 18 inches deep; the average depth is 12 inches. Slight variations in the color of the surface soil are also common.

Use and management.—This soil is used for range, dry farming, and irrigated farming. In irrigated areas material from the substratum has been eroded from the ditchbanks and carried over the fields by the irrigation water. This material has a tendency to seal the surface and reduce permeability. Applications of barnyard manure would restore the permeability and also improve

fertility. In the vicinity of Meadow and Kanosh, dryland winter wheat is grown.

Boxelder loam, 2 to 5 percent slopes (Bg) (management group 5).—This soil occurs about 6 miles north of Fillmore along the western foot slopes of West Mountain, and also in the extreme southwestern part of the Area. It is like Boxelder loam, 0 to 2 percent slopes, but because of the steeper slopes it is more likely to erode if irrigated. The surface soil is so shallow that leveling or terracing would probably not be practical.

The areas north of Fillmore are used mostly for dry farming; those in the southwestern part of the survey Area are all used for range. This soil is as well suited to dry farming as Boxelder loam, 0 to 2 percent slopes, but it requires more careful management to control erosion.

Boxelder loam, eroded, 0 to 5 percent slopes (Bh) (management group 5).—This soil occurs southwest of Meadow and about 8 miles northwest of Fillmore. Its surface has been modified by wind and water erosion. Small dunes of various heights are numerous. Between the dunes, erosion has exposed some of the subsoil. Most of the native vegetation has been destroyed, and Russian-thistle is now the most common plant. This soil is all used for range.

Boxelder loam, deep, over Pavant soil material, 0 to 2 percent slopes (Bm) (management group 5).—This soil occupies low lake terraces about 3 miles west and slightly south of Fillmore. The surface soil is typical of the Boxelder series, but at a depth of 36 to 60 inches there is a layer of lime-cemented gravel about 2 feet thick. Below the cemented layer is loose gravelly material.

This soil is used mainly for range, but a small acreage is used for irrigated farming. The present vegetation consists of low sagebrush mixed with cheatgrass and Russian-thistle.

Boxelder loam, moderately deep and deep, over gravel, 0 to 2 percent slopes (Bl) (management group 5).—This soil occurs on nearly level lake terraces southwest of Fillmore and north of Meadow. It is similar to Boxelder loam, but has strata of gravel and sand at depths of 20 to 60 inches. The pebbles are lime-coated but not cemented. This soil is used mainly for range.

Boxelder fine sandy loam, 0 to 2 percent slopes (Bd) (management group 5).—This soil occurs on moderately high lake terraces, mostly between Flowell and McCornick. It developed partly from the material derived from the substratum and partly from lake deposits. All of it has been reworked by wind and water.

Use and management.—This soil was cleared and fitted for irrigation but was later abandoned, probably because the water supply was inadequate. Much of it is now used for range. The vegetation is mostly Russian-thistle. Uncleared areas support a vigorous growth of greasewood. If adequately irrigated and well managed, this soil would be fairly productive. Wind erosion would be a hazard, especially in spring and early in summer, if spring-seeded crops were grown.

Boxelder fine sandy loam, 2 to 5 percent slopes (Be) (management group 5).—This soil occurs in several widely separated localities. It is most extensive in the vicinity of Fool Creek. It is used for dry farming. Some irrigation water is applied early in spring. Alfalfa and small grains are the principal crops.

Boxelder clay loam, 0 to 2 percent slopes (Ba) (management group 5).—This soil occurs 3 or 4 miles southwest of Fillmore and also on the western edge of the survey Area about 9 miles west of Meadow. It occupies the lower parts of the lake terraces. In many places it is associated with the Boxelder loams. The parent material was derived partly from the substratum and partly from lake deposits. Runoff is very slow and internal drainage medium. The vegetation is shadscale, sagebrush, and greasewood.

Use and management.—About half of this soil is used to raise dry-farmed wheat. The rest of the acreage is used for range. Yields of wheat are spotty, because the surface soil is shallow in places. Most of the range has a very low carrying capacity.

Boxelder clay loam, moderately deep and deep, over gravel, 0 to 2 percent slopes (Bc) (management group 5).—This soil resembles Boxelder clay loam, 0 to 2 percent slopes, except that the substratum contains gravel. In a few places there are layers that consist almost entirely of gravel, but normally the pebbles are dispersed through the white blocky material. This soil occurs only near the shoreline of prehistoric Lake Bonneville. Most likely the pebbles were deposited in the lake at about the same time as the calcareous diatomaceous material. The pebbles are firmly imbedded in the lake sediments. Yields of dryland wheat are good. If carefully managed, this soil should produce good yields under irrigation.

Boxelder clay loam, 2 to 5 percent slopes (Bb) (management group 5).—This soil resembles Boxelder loam, 0 to 2 percent slopes, but it is more likely to erode because of the stronger slopes. It occurs about 7 miles west of Meadow. It is associated with Boxelder clay loam, 0 to 2 percent slopes, and with Woodrow silty clay loam, 0 to 2 percent slopes. The vegetation, mostly shadscale and greasewood, provides a small amount of forage.

Bullion silty clay loam, 0 to 2 percent slopes (Fl) (management group 1).—This soil occurs northwest of Kanosh, near the fans and flood plains of Corn Creek. It is well drained. Internal drainage is slow. The water-holding capacity is high. The parent materials were deposited by streams. They were derived mainly from quartzite, sandstone, and limestone. The native vegetation probably consisted of sagebrush, shadscale, and grasses.

Profile description:

0 to 3 inches, light-brown silty clay loam; strong fine platy structure: soft and floury when dry, sticky when wet; strongly calcareous; low in organic matter.

3 to 8 inches, light-brown, strongly calcareous silty clay loam; very coarse blocky structure; aggregates hard and brittle and difficult to crush.

8 to 14 inches, reddish-brown, hard silty clay; sticky when wet; weak very coarse blocky structure; moderate colloidal staining on the aggregates; strongly calcareous; little lime segregation.

14 to 40 inches, reddish-brown silty clay; coarse blocky structure; hard when dry, sticky when wet; much colloidal staining; strongly calcareous; many streaks and blotches of segregated lime.

40 to 72 inches, pale-brown fine sandy loam; massive; slightly hard when dry, friable when moist; strongly calcareous.

The entire profile is free of pebbles and stones.

Use and management.—Some areas of this soil are used to grow grain without irrigation. Other areas are no longer cultivated because they do not receive enough rainfall. This soil is only fairly well suited to general farming under irrigation. It is easy to prepare for irrigation because it is nearly level. Care is needed to prevent waterlogging, which results in accumulations of salts and alkali.

Bullion loam, 0 to 2 percent slopes (Fh) (management group 1).—This soil occurs along Corn Creek northwest of Kanosh and west of Hatton. The surface soil is light brown to light reddish brown. The subsoil from about 8 to 15 inches is brown silty clay loam or silt loam. This layer is moderately compact and weakly prismatic. It has slight colloidal staining. Below the subsoil there is a weak lime horizon. The substratum is sandy in most places.

This soil is suitable for irrigation. Some of it is used to grow grain without irrigation, but yields are low because the rainfall is not adequate.

Calita loam, 2 to 5 percent slopes (Cc) (management group 1).—This soil occurs on old alluvial fans in the eastern part of the Area, between Holden and Kanosh. It is associated with Ebbs loam, 2 to 5 percent slopes, from which it differs in having a definite lime horizon in the subsoil. The parent rocks include limestone, sandstone, and quartzite. The present vegetation is mainly sagebrush, but the native vegetation probably consisted of a mixture of bunchgrasses and some sagebrush. Overgrazing has killed most of the native bunchgrasses.

Profile description:

0 to 7 inches, brown loam; noncalcareous to weakly calcareous; fine granular structure; soft when dry, very friable when moist.
7 to 18 inches, light-brown moderately calcareous loam; similar to layer above but lighter colored and slightly lower in humus.
18 to 36 inches, very pale brown loam; weakly lime cemented; slightly hard when dry, very friable when moist.
36 to 72 inches, very pale brown stratified loam, very fine sandy loam, and sandy loam; slightly darker colored than horizon above; strongly calcareous; very friable when moist, soft when dry.

Use and management.—This soil is used mainly for winter wheat. It is one of the better soils for dry farming. Yields are generally good. This soil could be used for irrigated farming, but would need careful management because of its slopes.

Calita loam, 0 to 2 percent slopes (Cb) (management group 1).—This soil is closely associated with Calita loam, 2 to 5 percent slopes, but usually occurs in lower positions. It is well suited to both dry farming and irrigated farming. If well managed, it will produce high yields.

Calita loam, 5 to 10 percent slopes (Cd) (management group 1).—This soil is located on a sloping alluvial fan about 1 mile west of United States Highway No. 91, midway between Fillmore and Holden. The vegetation consists almost entirely of sagebrush. This soil is fairly well suited to dry farming, if it is contour tilled or stubble mulched to prevent erosion. It is not well suited to irrigation.

Calita fine sandy loam, 2 to 5 percent slopes (Ca) (management group 1).—This soil is located between Fillmore and Holden, immediately below an area of Holden soils on a fairly prominent old shoreline. Part of this soil is used for dry farming, and part is used for range. On the range there is a heavy growth of sagebrush.

One area about 2 miles north of Fillmore is of variable texture. Part of it has a surface layer of loamy sand, and the entire profile is somewhat coarser textured than in other areas of Calita fine sandy loam. Because of its coarser texture, this soil is not so productive as the Calita loams, especially if it is dry-farmed.

Calita silty clay loam, 0 to 5 percent slopes (Ce) (management group 1).—This soil is finer textured throughout than Calita loam, 2 to 5 percent slopes. Most of it is located approximately 3 miles north of Fillmore. It is closely associated with Ebbs and Pharo soils. The texture of the surface soil ranges from clay loam to light silty clay. This soil is well suited to irrigated farming, but all of it is now used to grow dry-farmed winter wheat. Yields are generally good.

Clay dunes (Cf) (management group 13).—This mapping unit consists of clay dunes that range from about 3 to 20 feet in height (fig. 5). It is closely associated with Playas and with soils of the Lahontan series. This land type is located about 10 miles southeast of Delta, near the western border of the Area. The surface is somewhat puddled (fig. 6). Below the thin surface crust are crumb aggregates that are quite soft and that absorb moisture readily. The vegetation is a sparse stand of scrubby shadscale.

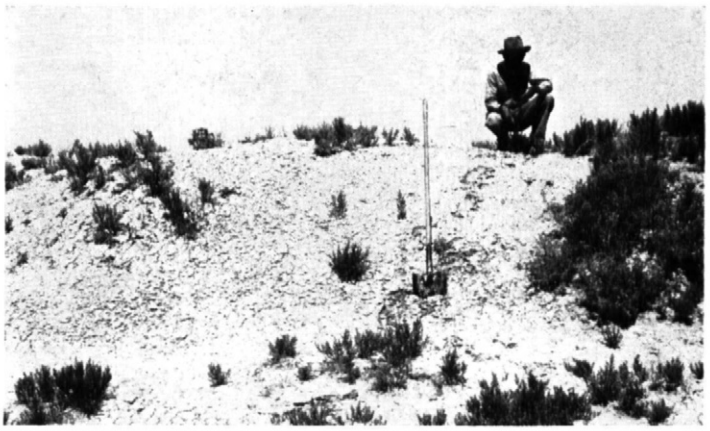

***Figure 5.*—Clay dunes in northwestern part of Area, adjacent to areas of Lahontan silty clay, from which material in the dunes has been blown.**

Deseret silty clay loam, 0 to 2 percent slopes (Df) (management group 6).—This soil occurs on broad, low lake terraces in the western part of the Area, both north and south of Flowell. The parent materials were mostly lake deposits derived from many kinds of parent rock. Drainage is moderately good. Runoff is very slow, and internal drainage is medium to slow. The vegetation consists mainly of greasewood and shadscale.

Profile description:

0 to 3 inches, light-gray or very pale brown silty clay loam; strongly calcareous; moderate thin platy structure; numerous vesicular pores; breaks easily to fine granules; soft to slightly hard when dry, friable when moist.
3 to 9 inches, light-gray or very pale brown silty clay loam; moderate fine granular structure; soft to slightly hard when dry, friable when moist; strongly calcareous.
9 to 24 inches, very pale brown to pink silty clay loam; similar to the layer above but has a few flecks or veins of gypsum.
24 to 44 inches, very pale brown to pink silty clay loam; massive; strongly calcareous; contains numerous soft crystals of gypsum; estimated to be 10 to 20 percent gypsum.
44 to 72 inches, very pale brown to pink silty clay loam; reddish-brown iron mottlings; strong concentration of gypsum in the form of white crystals; massive; weakly calcareous.

The entire profile is strongly saline.

Use and management.—This soil is used mainly for range. The carrying capacity is low. Reclaiming it would require leaching and drainage. Because it contains so much

Figure 6.—**Clay dunes, showing puddled surface that makes the surface material more resistant to erosion.**

gypsum, it is likely to develop sinkholes and depressions if reclaimed and to require considerable leveling to make it suitable for cultivation.

Deseret silty clay loam, imperfectly drained, 0 to 2 percent slopes (Dh) (management group 6).—Most of this soil occurs south of Flowell. It is like Deseret silty clay loam, 0 to 2 percent slopes, except that the water table is only 2 to 4 feet below the surface. Reclaiming this soil to make it suitable for irrigated farming would require draining and leaching. The vegetation consists mainly of saltgrass, alkali sacaton, and scattered scrubby greasewood.

Deseret silty clay loam, eroded, 0 to 2 percent slopes (Dg) (management group 6).—This soil is located about 5 miles west of Meadow. It is closely associated with Deseret silty clay loam, imperfectly drained, 0 to 2 percent slopes, and Kanosh loam, very shallow, poorly drained, 0 to 2 percent slopes. Wind erosion has shifted the surface soil into small hummocks around the desert shrubs. This soil is used for range. The carrying capacity is low.

Deseret loam, 0 to 2 percent slopes (Da) (management group 6).—This soil occurs on low lake terraces, mainly near the western side and center of the Area. It is associated with the Deseret silty clay loams and with soils of the Kanosh series. Except for the texture of the surface soil, the profile is like that of Deseret silty clay loam, 0 to 2 percent slopes. The depth to the strongly gypsiferous horizons and the concentration of gypsum crystals vary from place to place. This soil is used for range. The carrying capacity is low. Reclaiming would require draining and leaching. Leveling might also be necessary, because depressions and sinkholes develop when this soil is leached.

Deseret loam, 2 to 5 percent slopes (Db) (management group 6).—This soil is in the west-central part of the Area, near the northwestern base of Bald Mountain. It is used for range. Reclaiming it would require leveling, draining, and leaching.

Deseret sandy loam, 0 to 2 percent slopes (Dd) (management group 6).—This soil occurs mostly in long narrow strips between narrow ridges of Preston sand. The surface soil contains small amounts of sand from the surrounding sand dunes. Otherwise, this soil is like the Deseret silty clay loams and the Deseret loams. It is used entirely for range. The carrying capacity is low.

Deseret sandy loam, imperfectly drained, 0 to 2 percent slopes (De) (management group 6).—This soil is closely associated with Preston sand. It lies so low that it receives drainage water from surrounding areas. The depth to the water table varies from place to place; it is generally about 3 feet. The vegetation consists mainly of saltgrass, alkali sacaton, and rabbitbrush. This soil is used for range. The carrying capacity is much higher than that of Deseret sandy loam, 0 to 2 percent slopes.

Ebbs loam, 0 to 2 percent slopes (Ef) (management group 1).—This soil is widely distributed along the eastern side of Pavant Valley. It occurs on recent alluvial fans and flood plains along streams that rise in the Pavant Mountains. Most of the parent material was derived from quartzite and limestone. This soil is well drained, deep, medium textured, and moderately permeable. Runoff is very slow and internal drainage is medium. The water-holding capacity is moderate. This soil is slightly saline to nonsaline. The present vegetation consists of sagebrush and a thin scattering of bunchgrasses.

Profile description:

0 to 3 inches, brown loam; moderate thin platy structure; breaks down to fine granules; soft when dry, very friable when moist; weakly calcareous; well supplied with organic matter.

3 to 13 inches, pale-brown loam; moderate granular structure; slightly hard when dry, friable when moist; strongly calcareous; fair organic-matter content.

13 to 32 inches, light yellowish-brown or light-brown silt loam; massive; slightly hard when dry, friable when moist; strongly calcareous; many lime specks.

32 to 72 inches, light-brown to light yellowish-brown silt loam or loam; massive; somewhat stratified; strongly calcareous; no visible segregated lime.

This soil is free of pebbles and stones.

Use and management.—This soil is well suited to both dryland and irrigated farming. Yields are high; they are higher in the areas near the mountains than in those farther west.

Alfalfa is the main crop grown under irrigation. Three-fourths of the acreage is used for this crop. Usually the alfalfa is maintained until the stand deteriorates—generally from 6 to 10 years. Then it is plowed up, and grain is grown for a few years. Alfalfa is reestablished by using a small grain as a nurse crop.

When wheat is grown under dryland management, the common practice is to plow late in spring, maintain a clean fallow, and sow early in fall.

West of Holden, some rye is grown for hay. In spring the rye is pastured. Early in summer, the rye is cut with a header. During the cutting, enough grain is shattered

to reseed the fields. Many fields have been maintained in this manner for at least 7 years.

Little commercial fertilizer is used. Barnyard manure is applied to some fields, but much manure that could be used for fertilizer is dumped in ditches and along roadsides.

Ebbs loam, 2 to 5 percent slopes (Eg) (management group 1).—This soil occurs along the eastern side of Pavant Valley. It is like Ebbs loam, 0 to 2 percent slopes, except that in a few places stones are scattered throughout the surface soil.

Much of this soil is used to grow winter wheat without irrigation. Yields are generally high. Contour tilling, stubble mulching, terracing, and other erosion-control practices are needed. If used for general farming under irrigation, this soil must be protected from erosion by contour irrigation or bench terracing. Because this soil is of uniformly medium texture to considerable depth, slight erosion would not greatly reduce its productivity.

Ebbs loam, 5 to 10 percent slopes (Eh) (management group 1).—This soil occurs in the vicinity of Holden, on sloping alluvial fans or beside narrow streams along the western front of the Pavant Mountains. It is closely associated with broad areas of Pavant stony sandy loam. This soil is like Ebbs loam, 0 to 2 percent slopes. Strata of materials coarser than loam commonly occur below the surface. In some areas runoff has resulted in accelerated erosion.

If proper management is practiced, this soil is fairly well suited to dry farming. However, many areas are small and are surrounded by nonarable soil; consequently, only a little of this soil is cultivated. Most of it is used for range. The carrying capacity could be increased by seeding the range to crested wheatgrass.

Ebbs loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes (Ej) (management group 1).—Generally, this soil is associated with Boxelder loams and with other Ebbs loams. The boundaries between the soils are indistinct in many places. To a depth of about 24 inches this soil is like Ebbs loam, 0 to 2 percent slopes, but it overlies calcareous, diatomaceous lake deposits that are like the subsoil and substratum of the Boxelder soils. The surface soil is slightly lighter colored than Ebbs loam, 0 to 2 percent slopes. The depth to the lake deposits ranges from 16 to 30 inches. They consist of stratified silty clay loam and silt loam.

This soil is suited to dry farming and range. It is used mainly for dry farming. Wheat yields are nearly equal to those obtained from Ebbs loam, 0 to 2 percent slopes. The soil is somewhat less desirable for irrigated farming than Ebbs loam, 0 to 2 percent slopes.

Ebbs loam, deep, over gravel, 0 to 2 percent slopes (Ek) (management group 1).—To a depth of about 40 inches this soil is like Ebbs loam, 0 to 2 percent slopes, with which it is closely associated. The deeper substratum consists of stratified gravel and sand.

This soil occurs in two separate localities. One area is just west of United States Highway No. 91 and about 1 mile north of Holden. It is used mainly for farming without irrigation. The other area is about 1 mile southeast of Kanosh in the extreme southeastern part of the Area. It is used both for dry farming and for range.

Ebbs loam, deep, over gravel, 2 to 5 percent slopes (El) (management group 1).—Most of this soil occurs north and south of Holden. It is like Ebbs loam, deep, over gravel, 0 to 2 percent slopes, except that the depth to the gravelly substratum varies more from place to place. It occurs in close association with Ebbs loam, 2 to 5 percent slopes. This soil is used mainly for farming without irrigation. Yields are about the same as on Ebbs loam, 2 to 5 percent slopes.

Ebbs loam, eroded, 10 to 20 percent slopes (Ei) (management group 1).—This soil occurs in the extreme northeastern corner and also in the extreme southeastern part of the Area. In both localities, it consists of narrow strips of eroded soil on either side of deep gullies. Overgrazing on the surrounding higher areas increases runoff, which widens and deepens the gullies. Until a protective cover of vegetation is established on the surrounding range, erosion is likely to continue.

Ebbs silty clay loam, 0 to 2 percent slopes (En) (management group 1).—Much of this soil is located along the east side of Pavant Valley. Except for the finer texture, the profile is like that of Ebbs loam, 0 to 2 percent slopes. The water-holding capacity is high. Injurious concentrations of soluble salts are rare.

In places, this soil is fairly uniform silty clay loam, but in others there are strata of loam, silt loam, or fine sandy loam.

Use and management.—Some areas of this soil occur in pockets behind shoreline bars occupied by Holden soils. These areas are likely to be flooded after heavy rains.

This soil is used to grow grain without irrigation and for general farming under irrigation. It is well suited to a wide range of general farm crops. Yields of winter wheat are high. This soil responds well to irrigation, but the water supply is generally inadequate.

Ebbs silty clay loam, 2 to 5 percent slopes (Eo) (management group 1).—This soil is similar to and is closely associated with Ebbs silty clay loam, 0 to 2 percent slopes, except that it is located in higher positions on the fans. It is used mainly to grow winter wheat without irrigation. Contour tilling, stubble mulching, and terracing are needed to control erosion.

Ebbs silty clay loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes (Er) (management group 1).—To a depth of about 30 inches the profile is similar to Ebbs silty clay loam, 0 to 2 percent slopes. The substratum is a lake-laid silty clay loam or silty clay and is somewhat finer textured than the substratum of Ebbs silty clay loam, 0 to 2 percent slopes. Runoff is very slow. Yields of grains grown without irrigation are high. If irrigated, this soil is suited to a number of general farm crops. It is fairly easy to prepare this soil for irrigation. If irrigated, this soil would need to be drained to prevent waterlogging.

Ebbs silty clay loam, moderately deep, over Woodrow soil material, 2 to 5 percent slopes (Es) (management group 1).—This soil occurs in two localities. One is about a mile west and slightly south of Meadow. It is used for general irrigated farming. The other area is about 3 miles north of Fillmore. It is used for range.

This soil has slow internal drainage, especially in the deeper substratum.

Ebbs silty clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes (Eq) (management group 1).—Most of this soil is located in the southeastern part of the Area, south of Meadow. To a depth of about 30 inches the profile is similar to that of Ebbs silty clay loam, 0 to 2 percent slopes. The substratum is light-

gray, calcareous, diatomaceous silty clay loam like the substrata of the Boxelder and McCornick soils.

This soil is used for both dry and irrigated farming. The supply of irrigation water is generally inadequate, especially during the later part of the growing season.

Ebbs silty clay loam, 5 to 10 percent slopes (Ep) (management group 1).—This soil occurs on sloping alluvial fans. It is like Ebbs silty clay loam, 2 to 5 percent slopes, except that it is somewhat eroded. For either dry farming or general farming under irrigation, special care is needed to control erosion. The vegetation is sagebrush and a little grass. Much of the grass has been destroyed by erosion and overgrazing.

Ebbs fine sandy loam, 0 to 2 percent slopes (Ea) (management group 1).—Most of this soil occurs along Meadow, Chalk, and Corn Creeks. Except for coarser texture throughout the profile, this soil is similar to Ebbs loam, 0 to 2 percent slopes. The substratum is mainly a fine sandy loam to loam, but it may contain strata of clay loam. In some areas the lower part of the substratum contains fine gravel. The parent material was derived mainly from sandstone mixed with some quartzite and limestone. Permeability and water-holding capacity are both moderate.

Use and management.—This soil is used mainly to grow alfalfa and small grains under irrigation. There is generally a shortage of irrigation water late in the growing season.

Ebbs fine sandy loam, 2 to 5 percent slopes (Eb) (management group 1).—This soil has somewhat less water-holding capacity than Ebbs loam, 2 to 5 percent slopes. Wheat yields are generally lower. It is used mainly for farming without irrigation and for range.

Ebbs fine sandy loam, 5 to 10 percent slopes (Ec) (management group 1).—This soil occurs in small areas at the base of a local mountainous area about 3 miles north of Fillmore. It is used for range. The carrying capacity is low. If protected from erosion, this soil could be used for farming without irrigation. However, it would be rather poor for irrigated farming, unless it was used for fruit or other special crops.

Ebbs fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes (Ee) (management group 1).—Fine-textured lake sediments, similar to the substratum of the Boxelder soils, underlie this soil at depths of 20 to 36 inches. Many areas of this soil are transitional between the Ebbs and the Boxelder series.

This soil is fairly widely distributed. It is most extensive 3 miles west and slightly north of Fillmore. In this area, it is used for general irrigated farming. If carefully irrigated and drained, it should be as productive as Ebbs fine sandy loam, 0 to 2 percent slopes.

Ebbs fine sandy loam, eroded, 5 to 20 percent slopes (Ed) (management group 1).—This soil occurs in a narrow strip along the lower part of Chalk Creek, northwest of Fillmore. In places it contains strata of gravel. It is nonarable and is of little value for grazing.

Ebbs loamy fine sand, 2 to 5 percent slopes (Em) (management group 1).—This soil is located about 4 miles northeast of Fillmore. It is almost surrounded by mountains. The profile is similar to that of Ebbs fine sandy loam, but the surface texture is coarser. The vegetation consists of oak brush, sagebrush, and some bunchgrass. This soil is used entirely for range. The carrying capacity is fairly good.

Escalante sandy loam, 0 to 2 percent slopes (Ey) (management group 5).—This soil occurs on low, old lake terraces, mainly in the extreme southwestern part of the Area and in the west-central part between McCornick and Harding. It has a horizon of accumulated lime that in places is almost like a hardpan. In many places, at shallow to moderate depths, there are thin lime-cemented strata. The parent materials were deposited in shallow lake waters. They were derived from many different kinds of rock.

This soil is well drained, but the thick layer of calcium carbonate resists penetration by water. The surface soil is low in organic matter and is subject to wind erosion. The content of soluble salt is slight.

The vegetation is largely sagebrush. In many places this has been replaced by yellowbrush, shadscale, and Russian-thistle.

Profile description:

0 to 3 inches, light-gray to very pale brown sandy loam; weak platy structure that breaks to weak granular; strongly calcareous; soft when dry, very friable when moist; low in organic matter.
3 to 21 inches, light-gray to very pale brown sandy loam; massive to weak fine granular structure; slightly hard when dry, very friable when moist; strongly calcareous.
21 to 29 inches, light-gray to very pale brown fine sandy loam; massive structure; weakly cemented by lime; hard when dry, friable when moist.
29 to 52 inches, white to very pale brown loam; weakly to strongly lime cemented; very hard when dry, firm when moist; moderately to slowly permeable.
52 to 72 inches, very pale brown silt loam to clay loam; massive structure; slightly hard when dry, friable when moist.

The entire profile is free of gravel and stones.

Use and management.—In the McCornick Area, this soil is irrigated and used to grow general farm crops, principally alfalfa and barley. Yields are good. This soil is not well suited to sugar beets because it is subject to wind erosion in spring. Wind erosion may also damage alfalfa and barley. Damage by wind can be controlled by listing the soil at right angles to the prevailing winds, keeping stubble on the soil, establishing windbreaks, and moistening the surface before cultivating.

Escalante sandy loam, eroded, 0 to 5 percent slopes (Ez) (management group 5).—This soil is similar to Escalante sandy loam, 0 to 2 percent slopes, except that the surface soil has been altered by wind erosion. Accumulations of windblown material range from 6 to 36 inches in thickness. The intervening spaces are eroded to depths of several inches. At present, none of this soil is farmed. At one time it was cleared to prepare it for irrigation, but it was later abandoned. If adequately irrigated and protected from erosion, this soil should be fairly productive. It is low in organic matter, which could be supplied by using plant residues, growing green-manure crops, and applying barnyard manure.

Escalante loam, 0 to 2 percent slopes (Et) (management group 5).—This soil occurs mainly in the extreme southwestern part of the Area and in the west-central part between McCornick and Harding. It is similar to Escalante sandy loam, 0 to 2 percent slopes, except that it is slightly finer textured throughout. The lime-cemented horizon is also slightly harder. The depth to the lime zone is about 24 inches. This soil has moderate water-holding capacity, but it is low in organic matter. Under irrigation, it would be fairly good for general farming, but

like Escalante sandy loam, 0 to 2 percent slopes, it needs special management to control erosion.

Escalante loam, deep, over Boxelder soil material, 0 to 2 percent slopes (Ev) (management group 5).—This soil occurs in one area near the Harding railroad siding. It is closely associated with Escalante loam, 0 to 2 percent slopes, and Escalante sandy loam, 0 to 2 percent slopes. Below a depth of about 40 inches, the substratum contains white, diatomaceous, calcareous lake deposits and resembles the substratum of the Boxelder soils.

The vegetation is mainly shadscale and a few scattered greasewood plants. The soil is strongly saline. All of it is used for range. The carrying capacity is low.

Escalante loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes (Eu) (management group 5).—This soil occurs on low lake terraces. It is located about 8 miles northwest of Fillmore in the extreme western part of the Area. It is closely associated with other Escalante loams and with Woodrow loams. There are a few small outcrops of lava in the vicinity. To a depth of about 30 inches the soil is similar to Escalante loam, 0 to 2 percent slopes, but the underlying material consists of lake sediments of silty clay or clay texture. All of this soil is used for range. The carrying capacity is very low. The vegetation consists mainly of a scattered growth of short shadscale.

Escalante loamy sand, 0 to 2 percent slopes (Ew) (management group 5).—This soil occurs on low lake terraces. It is located near the west side of the Area about ten miles southeast of Delta. It is associated with Preston and Escalante soils and sand dunes. The surface soil has been affected by wind erosion. Hummocks 6 inches to 3 feet high are common. The depth to the lime-cemented horizon varies; it is generally 12 to 14 inches. This soil is used entirely for range. The vegetation is sparse, and the carrying capacity is very low.

Escalante loamy sand, 2 to 5 percent slopes (Ex) (management group 5).—This soil occurs on gently sloping lake terraces. It is located near the west side of the Area about ten miles southeast of Delta. It consists of long narrow areas which separate two levels of nearly level low lake terraces. Some places are severely eroded and have fragments of lime hardpan on the surface. This soil is used entirely for range.

Flowell loam, 2 to 5 percent slopes (Fc) (management group 3).—This soil occurs on old alluvial fans along the western front of the Pavant Mountains. It is closely associated with soils of the Pavant series. Most of the parent material was derived from quartzite mixed with small amounts of limestone and sandstone. Runoff is slow and has not caused serious erosion. Internal drainage is very slow. The vegetation is mostly sagebrush and grasses, with scattered junipers or clumps of oak brush (fig. 7).

Profile description:

0 to 3 inches, dark-brown loam; slightly calcareous to noncalcareous; weak platy structure, breaks to medium granules; soft when dry, friable when moist; well supplied with organic matter.
3 to 9 inches, similar to layer above, but slightly lighter colored and lower in organic matter; many fine roots.
9 to 19 inches, reddish-brown heavy loam; noncalcareous; moderate fine blocky structure; hard when dry, friable when moist, slightly sticky when wet.
19 to 36 inches, reddish-brown silty clay; noncalcareous; blocky structure, breaks with difficulty into hard, rough, angular aggregates.
36 to 56 inches, white to pink, strongly lime cemented hardpan; slowly permeable; practically devoid of plant roots; many quartzite pebbles and stones firmly cemented in place.
56 to 72 inches, reddish-yellow gravelly loam: strongly calcareous; many white mottlings of lime; massive; hard when dry, friable when moist.

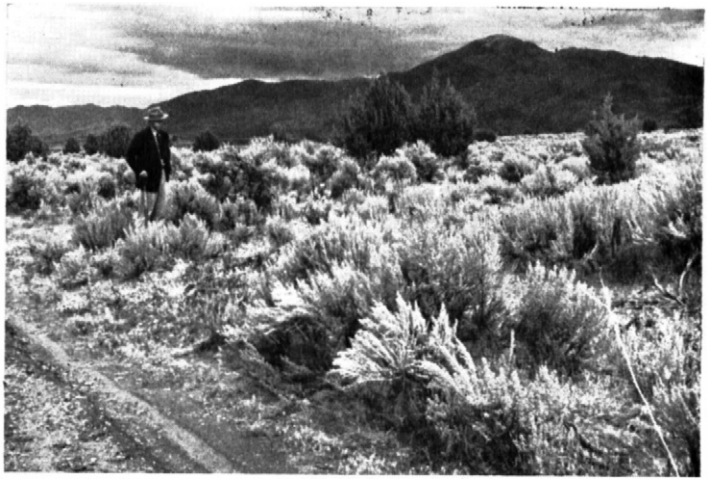

Figure 7.—**Sagebrush and junipers on Flowell loam 4 miles south of Fillmore. Cheatgrass is prominent in early summer.**

The depth to the hardpan varies, and so does the thickness and hardness of the hardpan (fig. 8). A few stones and pebbles are present in all horizons.

Use and management.—Some of this soil is used for dry and irrigated farming, but most of it is used for range. In the irrigated areas alfalfa and small grains are grown. Winter wheat is grown without irrigation. The cultivated areas are mostly small isolated tracts surrounded by large areas of range. Early in spring and late in fall, deer do much damage to crops. Because the surface soil is thin, leveling or terracing is not practical. It is usually difficult to irrigate this soil uniformly and economically.

Flowell loam, 5 to 10 percent slopes (Fd) (management group 3).—This soil occurs east and northeast of Fillmore and also east of Meadow near the Pavant Mountains. It has a somewhat thinner and more variable surface soil than Flowell loam, 2 to 5 percent slopes. This soil is poor for general irrigated farming and is best suited to range. The present grazing capacity is almost as high as that of Flowell loam, 2 to 5 percent slopes, but the danger of accelerated erosion is greater.

Flowell stony loam, 5 to 10 percent slopes (Fe) (management group 3).—This soil is widely distributed near the base of the Pavant Mountains between Holden and Kanosh. It differs from Flowell loam, 5 to 10 percent slopes, in having more cobblestones scattered over the surface and throughout the profile. It is closely associated with Pavant stony loam, 5 to 10 percent slopes, and can be distinguished from this soil only in subsoil characteristics. This soil is nonarable but it is good for grazing. Oak brush, sagebrush, and many grasses and shrubs are the main vegetation.

Flowell stony loam, 10 to 20 percent slopes (Ff) (management group 3).—This soil is associated with Flowell stony loam, 5 to 10 percent slopes, but is located on higher positions on the fans. It is similar to Flowell stony loam, 5 to 10 percent slopes. In a few places erosion has cut through the silty clay subsoil and has exposed the underlying hardpan.

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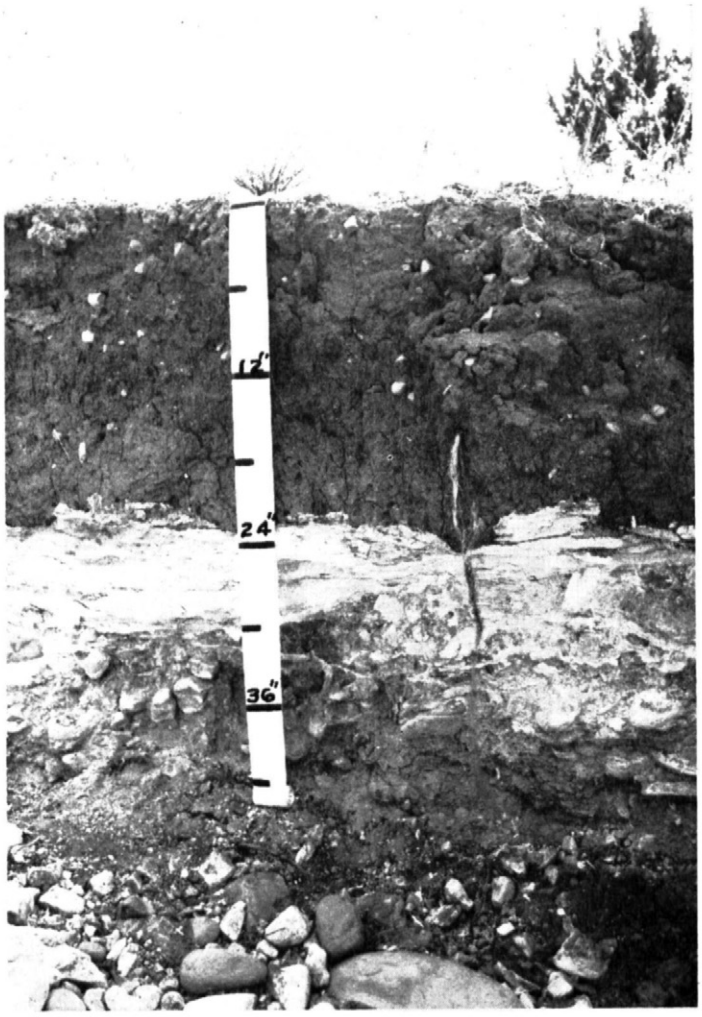

Figure 8.—**Profile of Flowell loam about 4 miles south of Fillmore.**

Flowell clay loam, 2 to 5 percent slopes (Fa) (management group 3).—Most of this soil occurs near the mouth of Pioneer Creek. Except for finer texture, it is similar to Flowell loam, 2 to 5 percent slopes.

Use and management.—This soil is used mainly for range. There is a good cover of oak brush and bunchgrass. The carrying capacity of the range is fair. Juniper trees are rare on this soil.

About 20 acres is farmed without irrigation. This area is surrounded by range. Deer do considerable damage to crops early in spring and late in fall. This soil is fairly well suited to irrigated farming, but it would be difficult to prepare it for irrigation.

Flowell gravelly loam, 10 to 20 percent slopes (Fb) (management group 3).—This soil occurs in the southeastern corner of the Area about 3 miles southeast of Kanosh. It is similar to Flowell stony loam, 10 to 20 percent slopes, except that its surface soil contains many pebbles but only a few stones. The vegetation consists of a fairly thick cover of oak brush, juniper, sagebrush, and bunchgrasses. This soil is nonarable. It is well suited to range.

Fruita fine sandy loam, 0 to 2 percent slopes (Fg) (management group 1).—This soil occurs along the flood plain of Corn Creek northwest of Kanosh. The parent materials were derived mainly from sandstone and limestone. Drainage is good. The vegetation consists of sagebrush and bunchgrasses.

Profile description:

0 to 12 inches, light reddish-brown fine sandy loam; weak fine granular structure; soft, very friable; moderately calcareous.
12 to 26 inches, light reddish-brown fine sandy loam; massive; soft, friable; strongly calcareous; veins and streaks of segregated lime.
26 to 38 inches, pink fine sandy loam; massive; slightly hard, friable; strong accumulation of lime.
38 to 72 inches, light reddish-brown stratified loamy fine sand and fine sandy loam; soft to slightly hard; massive; strongly calcareous.

Use and management.—This soil is used mainly for dry farming because irrigation water is generally not readily available. It would be well suited to general irrigated farming if protected from erosion.

Genola fine sandy loam, 0 to 2 percent slopes (Gd) (management group 1).—This deep, well-drained soil is on recent alluvial fans, flood plains, and stream terraces. It occurs along the western front of the Canyon Mountains in the northeastern part of the Area and also in the extreme southwestern part. It is associated with other Genola soils and with soils of the Sigurd series. The parent materials were derived from nearby mountains and consist mostly of a mixture of quartzite and sedimentary rock.

This soil is moderately to rapidly permeable. It is low in organic matter. Runoff is very slow, and internal drainage is medium. The water-holding capacity is moderate. The vegetation is mainly sagebrush. There are a few scattered bunches of wheatgrass.

Profile description;

0 to 4 inches, light yellowish-brown to very pale brown soft fine sandy loam; fine platy structure; low in organic matter.
4 to 18 inches, light yellowish-brown soft fine sandy loam; massive; in places slightly compacted between 12 and 18 inches.
18 to 72 inches, light yellowish-brown, massive, stratified loamy fine sand to light clay loam; soft to slightly hard.

The entire profile is moderately to strongly calcareous, but there is no segregated lime. In places, the lower layers are iron stained and contain a few sandstone or limestone pebbles.

Use and management.—Large areas of this soil have been cleared and used to grow winter wheat. Yields have been fairly high because the soil has been cultivated only a short time and, during that time, rainfall has been above normal. Generally, however, this soil is not well suited to farming without irrigation. If it is dry-farmed, it should be protected from wind erosion. Under irrigation, this soil would produce many different crops, but it would need careful management to prevent erosion. Unirrigated areas can best be used for permanent pastures of crested wheatgrass.

Genola fine sandy loam, 2 to 5 percent slopes (Ge) (management group 1).—This soil occurs near Genola fine sandy loam, 0 to 2 percent slopes, on broad, smooth slopes of even relief. It is generally located higher on the alluvial fans and terraces than Genola fine sandy loam, 0 to 2 percent slopes.

Much of this soil is now used for farming without irrigation. It is best suited to range if irrigation water is not available. The range is all unimproved. The vegetation consists mainly of sagebrush.

Genola fine sandy loam, 5 to 10 percent slopes (Gf) (management group 1).—This soil is like Genola fine sandy loam, 2 to 5 percent slopes, except that it is more stratified and has pebbles scattered throughout. Runoff is slow to medium. The soil is subject to sheet and gully erosion. Some areas have been cleared for dry farming, but most of this soil is used for unimproved range.

Genola fine sandy loam, deep, over sand, 2 to 5 percent slopes (Gj) (management group 1).—Most of this soil occurs adjacent to Sand dunes or to the Preston fine sands, in the northeastern part of the Area southwest of Oak City. To a depth of about 40 inches it is a light fine sandy loam. Below that, it is a loose loamy sand. It is used mainly for range. The vegetation is sagebrush and a few scattered junipers.

Genola fine sandy loam, deep, over sand, 5 to 10 percent slopes (Gk) (management group 1).—This soil is similar to Genola fine sandy loam, deep, over sand, 2 to 5 percent slopes, except that it has steeper slopes. It would be difficult to irrigate. It is used entirely for range.

Genola fine sandy loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes (Gh) (management group 1).—This soil occurs in the northeastern part of the Area, on the lower parts of alluvial fans. It is associated with the Genola fine sandy loams and the Boxelder and McCornick soils.

The upper part of the profile is from about 20 to 60 inches thick and resembles the Genola fine sandy loams. The underlying material is similar to the substratum of the Boxelder soils. In places, the substratum contains thin layers of calcareous hardpan. All of this soil is used for range.

Genola fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes (Gn) (management group 1).—This soil occurs on alluvial fans in the northeastern part of the Area. It is adjacent to Genola fine sandy loam, 2 to 5 percent slopes. To a depth of about 40 inches, this soil resembles the Genola fine sandy loams, but it is underlain by a substratum of lake-laid calcareous deposits similar to the Boxelder soils. All of this soil is used for range.

Genola fine sandy loam, deep, over Sanpete soil material, 2 to 5 percent slopes (Go) (management group 1).—This soil occurs northeast of McCornick, almost parallel to the Utah Central Canal. It is distinctly undulating. The profile consists of an overwash of Genola fine sandy loam over a substratum similar to that of the Sanpete soils. Within short distances the profile varies markedly. Accumulations of windblown material, 6 to 8 inches deep, are common. All of this soil is used for range. It is also well suited to irrigated farming.

Genola fine sandy loam, eroded, 5 to 20 percent slopes (Gg) (management group 1).—This soil consists mainly of old drainage channels that have steep eroded banks. It occurs in small widely separated locations. One small area about 1½ miles southeast of Leamington is gently sloping. In this area, gullies have developed because irrigation water has been carelessly applied. This soil is nonarable and is of limited value for range.

Genola fine sandy loam, deep, over gravel, 0 to 2 percent slopes (Gl) (management group 1).—Most of this soil occurs on nearly level parts of the fans in the northeastern part of the Area. In profile characteristics it is like Genola fine sandy loam, deep, over gravel, 2 to 5 percent slopes. It is used for range and irrigated crops.

Genola fine sandy loam, deep, over gravel, 2 to 5 percent slopes (Gm) (management group 1).—Most of this soil occurs in the northeastern part of the Area, in the vicinity of Oak City and along Fool Creek. The profile is similar to that of Genola fine sandy loam, 2 to 5 percent slopes, except that the substratum is gravelly below a depth of about 40 inches. Above the gravel the soil material is somewhat more stratified. Permeability is rapid, and the water-holding capacity is fairly low. If water is available, this soil is used for general farming under irrigation.

Genola loam, 0 to 2 percent slopes (Gp) (management group 1).—Most of this soil occurs in the northeastern part of the Area along the western front of the Canyon Mountains. It resembles the associated Genola fine sandy loam, 0 to 2 percent slopes, except that it is of loam texture throughout. Generally, the substratum is stratified with fine sandy loam and clay loam and the deeper part may contain some small pebbles. Permeability is moderate, and the water-holding capacity is also moderate.

Use and management.—This soil is used for range, for dry farming, and in places for irrigated farming. Under dry farming, yields are only fair. If sufficient irrigation water is available, this soil is suited to many different crops. There is usually a shortage of water late in summer. Some of the irrigated fields in the vicinity of Oak City consist of this soil. Although this soil is highly erodible and is apt to gully if irrigated carelessly, erosion has not yet become a serious problem.

Genola loam, 2 to 5 percent slopes (Gr) (management group 1).—This soil is not so well suited to dry and irrigated farming as Genola loam, 0 to 2 percent slopes. Under virgin conditions erosion has not been a problem, but it is a problem on dry farms. To control erosion a stubble mulch should be maintained while the soil is fallow, and the soil should be tilled on the contour. If irrigation water is not properly controlled, severe gully erosion will result. Even with careful application of water there is likely to be some erosion. Fitting for irrigation should not be too costly, because the slopes are smooth and uniform. This soil is well suited to range and pasture.

Genola loam, deep, over gravel, 0 to 2 percent slopes (Gu) (management group 1).—This soil occurs mainly in and around Oak City. It is like Genola loam, 0 to 2 percent slopes, except that it is underlain, at depths of 36 to 60 inches, by stratified fine gravel. The pebbles are of quartzite and limestone and are uniform in size and slightly rounded to angular. The gravelly substratum does not interfere with practices to improve the range. This soil is used to grow fruits and vegetables, principally peaches, tomatoes, cantaloups, and watermelons. It needs more irrigation water than Genola loam, 0 to 2 percent slopes.

Genola loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes (Gt) (management group 1).—This soil is underlain, at depths of 20 to 60 inches, by light-gray, chalky, diatomaceous silty clay loam, like the substrata of the Boxelder and McCornick series. This does not affect the grazing capacity or the possibility of range improvement, but does make the soil less suitable for irrigation. Permeability is more rapid in the upper part of the profile than in the lower part, especially if the Boxelder material dries out. Consequently, drainage in irrigated areas may be poor.

Genola loam, deep, over gravel, 2 to 5 percent slopes (Gv) (management group 1).—Most of this soil occurs in

the northeastern part of the Area near Oak City and in the southern part of the Fool Creek flat. The profile is like that of Genola loam, deep, over gravel, 0 to 2 percent slopes, but is somewhat more variable in depth to gravel.

This soil is used mainly for general irrigated farming, but some areas have a fairly thick growth of sagebrush and are used for range. Because of the gravelly substratum, which occurs at a depth of about 40 inches, the water-holding capacity is only moderate. Frequent irrigation is needed. The water supply is not sufficient for maximum yields.

Genola loam, 5 to 10 percent slopes (Gs) (management group 1).—This soil occurs mainly on alluvial fans at the base of terrace escarpments in the narrow valley of the Sevier River in the northeastern part of the Area. It is used entirely for range.

Genola clay loam, 0 to 2 percent slopes (Ga) (management group 1).—This soil occurs adjacent to the Canyon Range and in the extreme southern part of the Area. Most of it is on nearly level areas behind the shoreline bars of the prehistoric lake. Slopes generally do not exceed 1 percent. Except for finer texture throughout, the profile is similar to that of Genola fine sandy loam, 0 to 2 percent slopes. In places, a small amount of threadlike lime occurs in the subsoil at depths of 15 to 30 inches.

This soil is well drained. Runoff is very slow, and internal drainage is medium. The water-holding capacity is high. The native vegetation is largely sagebrush, shadscale, and a little grass.

Use and management.—Some areas of this soil are used to grow grain under the usual summer-fallow method. Yields are low, probably because of a shortage of moisture. If adequately drained, this soil is well suited to irrigation. The carrying capacity of the range is very low, but it could be improved by reseeding.

Genola clay loam, 2 to 5 percent slopes (Gb) (management group 1).—This soil is like Genola clay loam, 0 to 2 percent slopes, except that it is on gentle slopes and, therefore, runoff is more rapid. However, this has not caused accelerated erosion. Dry-farmed wheat is the principal crop. It would be fairly easy to fit this soil for irrigation.

Genola clay loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes (Gc) (management group 1).—This soil occurs in the extreme southwestern part of the Area. Except for the texture of the surface soil, it is like Genola loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes, with which it is associated.

This soil is used for dry farming. Yields of winter wheat are fair.

Genola loamy fine sand, 2 to 5 percent slopes (Gx) (management group 1).—This soil occurs mainly about 4 to 5 miles southwest of Oak City in a large area of generally sandy soils. In places, it is surrounded by dunes of Preston fine sand. Because of the slopes, droughtiness, the hazard of wind erosion, and its isolated location, it is not well suited to irrigation. It is used for range.

Genola loamy fine sand, 5 to 10 percent slopes (Gy) (management group 1).—Except for stronger slopes, this soil is like Genola loamy fine sand, 2 to 5 percent slopes. It is of very low value for grazing. Because of the slopes, droughtiness, and the hazard of wind erosion, it is not well suited to agriculture.

Genola loamy fine sand, 0 to 2 percent slopes (Gw) (management group 1).—Most of this soil occurs in association with Preston and Lynndyl soils. The surface soil is very pale brown, calcareous loamy fine sand consisting of weakly developed fine granules that break easily into single grains. The texture becomes sandier with depth.

This soil is droughty, low in organic matter, and free of alkali. Permeability is very rapid, and the water-holding capacity is low. Much of the surface soil has been modified to some extent by wind erosion. Small hummocks, mostly no more than 6 inches high, are common.

The vegetation of sagebrush and a little grass has been partly destroyed by overgrazing. Russian-thistle is generally abundant.

This soil is not suited to irrigated farming because it needs a great deal of water and because erosion is difficult to control. Reseeding with suitable range plants would increase the grazing capacity.

Genola loamy fine sand, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes (Gz) (management group 1).—This soil occurs in one area about 4 miles north of Oak City. It consists of about 30 inches of very pale brown loamy fine sand over chalky silty clay loam that is like the substratum of Boxelder soils. Accumulations of windblown material are numerous and range from 6 to 12 inches in depth. The principal vegetation is sagebrush. This soil is used for range.

Harding silty clay loam, 0 to 2 percent slopes (Hg) (management group 8).—Most of this soil occurs in the northern part of the Area, on nearly level, low lake terraces. Internal drainage and runoff are very slow. Much of the rainwater collects in small pools and evaporates. Permeability is very slow. The vegetation is greasewood, shadscale, bud sage, and gray molly.

This soil is strongly saline and alkali. It is high in exchangeable sodium and has a high pH.

Profile description:

0 to 1 inch, very pale brown clay loam; moderately to strongly calcareous; platy and vesicular; breaks to medium to fine granules; soft to slightly hard when dry; sticky when wet.
1 to 3 inches, light-brown silty clay loam; strong fine granular structure; sticky and plastic when wet; strongly calcareous.
3 to 8 inches, light-brown silty clay; moderately to strongly calcareous; prismatic; colloidal staining on surface of aggregates; prisms break down to coarse granules; hard when dry, firm when moist, sticky when wet.
8 to 15 inches, very pale brown prismatic clay; very hard when dry, firm when moist; strongly calcareous; some segregated lime in threadlike white flecks.
15 to 72 inches, very pale brown to white clay; strongly calcareous; very hard when dry, very firm when moist.

The entire profile is free of pebbles and stones.

Use and management.—This soil is not suited to crops. Reclaiming it would be difficult and expensive. It needs drainage, prolonged deep leaching, and the addition of soil amendments. It is used mainly for winter range. The carrying capacity is very low.

Harding silty clay loam, eroded, 0 to 2 percent slopes (Hh) (management group 8).—This soil is like Harding silty clay loam, 0 to 2 percent slopes, except that wind erosion has formed 6- to 12-inch hummocks of moderately fine textured material. Between the hummocks, the prismatic subsoil is exposed. The native vegetation has been largely replaced by annual weeds. The grazing capacity is very low and would be difficult to increase.

Harding loam, 0 to 2 percent slopes (Ha) (management group 8).—This soil occurs on low lake terraces

throughout the northern third of the Area. It has a dense clay subsoil and substratum like those of Harding silty clay loam, 0 to 2 percent slopes. Included are many areas of silt loam. Wind erosion has affected the surface soil to some extent.

This soil is strongly saline and alkali. Reclaiming it would be difficult because the soil would need drainage and prolonged deep leaching. The grazing capacity is very low. The vegetation is mostly shadscale and greasewood.

Harding loam, eroded, 0 to 2 percent slopes (Hb) (management group 8).—This soil occurs immediately southwest of the Delta airport, in an area that was cleared for irrigation and later abandoned. It is like Harding loam, 0 to 2 percent slopes, except for the surface soil, which has been altered by wind erosion. The hummocks are 12 to 36 inches high. In many instances erosion has been severe enough to expose the prismatic clay subsoil. The grazing capacity is very low. The vegetation is mostly Russian-thistle and annual salt-tolerant weeds.

Harding loam, 2 to 5 percent slopes (Hc) (management group 8).—This soil occurs about 2 miles east of Lynndyl on a rather high river terrace. Included is one small area, north of and near the main area, which has a slope range of 5 to 10 percent. This soil is closely associated with Taylorsflat loam. It is like Taylorsflat loam, except that it has a well-developed prismatic horizon in the subsoil at depths of 5 to 12 inches.

All of this soil is used for range. It produces only annual weeds and is not suited to cultivation.

Harding sandy loam, 0 to 2 percent slopes (Hd) (management group 8).—This soil occurs on low lake terraces in the western part of the Area. The surface soil is sandy loam to coarse sandy loam. In many places it has been altered by wind erosion. The subsoil and substratum are like those of other Harding soils.

The subsoil is highly colloidal sandy clay of well-developed prismatic structure. The vegetation is sagebrush, shadscale, and small amounts of greasewood, which in many places have been replaced by Russian-thistle and annual salt-tolerant weeds. All of this soil is used for range. The carrying capacity is very low.

Harding sandy loam, eroded, 0 to 2 percent slopes (He) (management group 8).—This soil occurs about 3 miles southwest of Lynndyl. It is like Harding sandy loam, 0 to 2 percent slopes, except that the surface soil has been altered by wind erosion. The low dunes are from 3 to 6 feet high. In many places between the dunes the prismatic clay subsoil is exposed. Russian-thistle and other annual weeds have replaced the native vegetation. The grazing capacity is low.

Harding silty clay, moderately deep, over Kanosh soil material, 0 to 2 percent slopes (Hf) (management group 8).—This soil occurs in one area, 8 miles northwest of Kanosh. It is associated with Woodrow silty clay loam. It is lower than the surrounding soils and would probably be poorly drained if the higher lying areas were irrigated.

This soil consists of 3 to 4 inches of silty clay over prismatic clay that has dark stains at the top. The prismatic layer extends to a depth of about 12 inches. To a depth of about 36 inches it is underlain by blocky clay. Below that, highly gypsiferous sandy loam extends to a depth of more than 6 feet.

All of this soil is used for range. The vegetation is mainly shadscale.

Hardy loam, 0 to 2 percent slopes (Hm) (management group 5).—This soil occurs in the lower part of Pavant Valley. Most of it is between Meadow and Flowell; some is near Greenwood. It is on low flats or low lake terraces. The water table is below the hardpan. The soil material was derived from a wide variety of parent rock.

This soil has a well-developed hardpan that probably formed as a result of the upward movement of ground water. Runoff is very slow. Internal drainage is medium above the hardpan, but very slow within the hardpan.

The vegetation is saltgrass, alkali sacaton, rabbitbrush, and many annual weeds.

Profile description:

0 to 3 inches, gray loam; strong platy structure; breaks into medium and fine granules; strongly calcareous; moderate in organic matter; contains many fine roots.
3 to 15 inches, gray clay loam; strong fine granular structure; hard when dry, friable when moist; strongly calcareous; small lime nodules at deeper levels; contains many fine roots.
15 to 35 inches, white heavy silt loam or silty clay loam; massive; hard when dry, friable when moist; strongly calcareous; some lime cementation; variable; in places is like a hardpan.
35 to 72 inches, white lime hardpan.

The depth to and thickness of the hardpan vary considerably from place to place.

Use and management.—This soil is used for irrigated farming and for range. It is not suited to dry farming. The cropped areas are spotty, apparently because of differences in depth to the hardpan. Under good management good yields of alfalfa, corn, wheat, and barley are obtained.

Hardy loam, poorly drained, 0 to 2 percent slopes (Hn) (management group 5).—This soil occurs along a slough west of Meadow. The small areas immediately along the slough are broken and dissected. They are kept wet by water that seeps from numerous springs.

This soil is like Hardy loam, 0 to 2 percent slopes, except that the water table is within 3 feet of the surface. Free water is confined below the hardpan, but the soil above remains moist. This soil supports a rich growth of grasses, rushes, and sedges. It is used for year-round grazing and has a fairly high carrying capacity.

Hardy sandy loam, 0 to 2 percent slopes (Ho) (management group 5).—Most of this soil occurs 5 or 6 miles west of Holden. Normally, it is associated with other Hardy soils or with Preston fine sand, hummocky, or Preston fine sand, duny. It resembles Hardy loam, 0 to 2 percent slopes, except that the surface soil is lighter colored and lower in organic matter.

This soil is used for range. It is not suited to dry farming, but if carefully managed it should be fairly productive under irrigation. In some areas the native vegetation has been replaced by Russian-thistle and annual weeds.

Hardy sandy loam, eroded, 0 to 2 percent slopes (Hp) (management group 5).—This soil is associated with Hardy sandy loam, 0 to 2 percent slopes, and with Preston fine sand, hummocky, or Preston fine sand, duny. It has been severely eroded by wind. About 25 to 30 percent of the surface is covered with hummocks from 1 to 6 feet high. The areas between hummocks are eroded to varying degrees. In some places only the surface soil has been affected by erosion, but in others the underlying hardpan is exposed. This soil is used to a limited extent for range. It

has very low carrying capacity. The vegetation is mostly Russian-thistle.

Hardy sandy loam, imperfectly drained, 0 to 2 percent slopes (Hr) (management group 5).—This soil occurs a few miles west of Holden. It is closely associated with Deseret sandy loams and Preston fine sands. The depth to the water table varies from place to place, but is normally about 3 feet. This soil is used entirely for range. The carrying capacity is relatively high. The vegetation consists mainly of saltgrass, alkali sacaton, and scattered rabbitbrush.

Hardy clay loam, 0 to 2 percent slopes (Hl) (management group 5).—This soil occurs in the same general localities as Hardy loam, 0 to 2 percent slopes. One area about 2 miles northwest of Meadow is cropped. The soil in this area is about as good for general irrigated farming as Hardy loam, 0 to 2 percent slopes. Yields of small grains and alfalfa are fairly good. The areas west of Holden are used for range. Water for irrigation is not available in this locality.

Highland loam, 5 to 10 percent slopes (Hs) (management group 1).—This soil occurs in small areas near the foot of the Pavant Mountains between Fillmore and Holden and also near Whisky Creek. The parent material was alluvium, mainly sandstone, limestone, and quartzite, washed from the higher mountains.

This soil is well drained. Runoff is slow to medium, and internal drainage is medium. The vegetation is largely oak brush, sagebrush, and grass.

Profile description:

0 to 3 inches, dark grayish-brown loam; very dark brown when moist; moderate thin platy structure; crumbles easily to strong medium granules; slightly hard when dry, friable when moist; weakly calcareous to noncalcareous, high in organic matter.
3 to 13 inches, grayish-brown silt loam; dark grayish-brown when moist; weakly calcareous; strong medium granular structure; slightly hard when dry, friable when moist; moderately high in organic matter; many roots.
13 to 28 inches, grayish-brown heavy silt loam; weakly calcareous; a few faint veins of threadlike lime; moderate fine granular structure; aggregates slightly hard when dry, friable when moist.
28 to 72 inches, very pale brown loam; massive; slightly hard when dry, friable when moist; moderately calcareous.

In some places the surface soil is weakly calcareous. The profile may contain a little segregated lime. The substratum is somewhat stratified and in places contains some pebbles. Within short distances the texture of the surface soil may vary. This soil is subject both to erosion and to deposition of new material by flood waters.

Use and management.—A small area near the mouth of Whisky Creek is used for farming. Cultivated areas need special care to control erosion. The rest of this soil is used for range. The carrying capacity is fairly high, and the forage is of good quality.

Holden gravelly sandy loam, 2 to 5 percent slopes (Hu) (management group 7).—This soil occurs on bars and beaches of prehistoric Lake Bonneville. The main areas follow two of the stabilized shorelines of the lake. The higher is at about 5,200 feet, and is known as the Bonneville level. About 500 feet lower there is a similar shoreline, known as the Provo level. These shorelines are nearly continuous, but in places they are interrupted by buttes, alluvial fans, windblown areas, or stream channels.

The gravelly surface soil overlies an intermittent lime hardpan. The gravel was derived from many kinds of rock, but mostly from quartzite, limestone, and sandstone. The substratum consists of stratified layers of sandy and gravelly material. The surface is convex. This soil is somewhat excessively drained. The vegetation is mostly sagebrush and grasses, and a few juniper trees.

Profile description:

0 to 2 inches, pale-brown gravelly sandy loam or light loam; weakly calcareous; weak fine platy structure; crumbles easily to fine granules; soft when dry, very friable when moist; many small rounded pebbles on the surface and a few in the soil.
2 to 8 inches, pale-brown gravelly sandy loam or light loam, slightly darker colored than layer above; weakly to moderately calcareous; moderate fine granular structure; soft when dry, very friable when moist; moderate content of organic matter.
8 to 13 inches, brown gravelly loam similar to the above horizon, but slightly hard and more gravelly.
13 to 27 inches, zone of lime accumulation; light-gray very gravelly sandy loam; weakly cemented; less strongly cemented with depth.
27 to 72 inches, very pale brown slightly loamy sand and gravel; loose, single grained; pebbles are lime coated on bottom.

The thickness of the lime carbonate horizon and the degree of cementation vary considerably.

Use and management.—Because this soil is droughty and steep, not much of it is farmed. To avoid splitting fields a few areas surrounded by better soils are farmed. Yields, however, are low. Gravel pits are common. The subsoil is a source of gravel used in roadbuilding and other construction.

Holden gravelly sandy loam, 5 to 20 percent slopes (Hv) (management group 7).—This soil occurs fairly close to the mountains. It is like Holden gravelly sandy loam, 2 to 5 percent slopes. Some of it is used for range. It is also a good source of medium to fine gravel for construction.

Holden gravelly loamy sand, 0 to 2 percent slopes (Ht) (management group 7).—This soil occurs northwest of Holden near Greenwood, on the lower (Provo level) of the two prominent old lake beaches. In this locality the beach is fairly broad and not distinct. This soil is like Holden gravelly sandy loam, 2 to 5 percent slopes, except that the surface soil varies in depth and also in content of gravel. There are numerous hummocks of loamy sand. The grazing capacity is low, and the soil is not suited to cultivation.

Holden sandy loam, 0 to 5 percent slopes (Hw) (management group 7).—Most of this soil occurs in the Greenwood area, mainly on the lower (Provo level) of the two prominent old lake beaches. The soil resembles Holden gravelly sandy loam, 2 to 5 percent slopes, except that the surface soil contains little gravel and the subsoil is sandier in places.

Ivie loam, 0 to 2 percent slopes (Id) (management group 2).—This soil occurs between Holden and Kanosh on recent alluvial fans and flood plains. It is closely associated with Ebbs loam, 0 to 2 percent slopes. The parent rocks are mostly quartzite, sandstone, and limestone. This soil is well drained. Runoff is very slow, and internal drainage is medium. The present vegetation consists mainly of sagebrush and cheatgrass.

Profile description:

0 to 8 inches, brown to light-brown loam; weakly to moderately calcareous; fine granular structure; soft when dry, very friable when moist.
8 to 18 inches, light-brown to pale-brown loam; moderately calcareous; weak fine granular structure; soft when dry, very friable when moist.
18 to 30 inches, light brown to very pale brown light loam or fine sandy loam; a few rounded pebbles in the lower part; massive; soft when dry, friable when moist; moderately calcareous.
30 to 72 inches, pale brown to very pale brown gravelly sandy loam; massive; moderately calcareous; very rapidly permeable.

Below the surface layer, textures range from silt loam to loamy fine sand, and the soil may be uniform in texture or stratified. The average depth to the gravelly substratum is 24 inches. In some places the substratum is gravelly throughout, and in others it contains strata of gravelly material.

Use and management.—This soil is used for both irrigated and dry farming. In Fillmore and Kanosh, much of it is used for irrigated gardens. If adequately irrigated, the soil is well suited to many kinds of vegetables and to hardy fruits. If rainfall is adequate, yields of dry-farmed wheat are good and compare favorably with those obtained on Ebbs loam, 0 to 2 percent slopes. In dry years, wheat yields are much lower.

Ivie loam, 2 to 5 percent slopes (Ie) (management group 2).—Most of this soil occurs south and southwest of Holden. It is closely associated with Ivie loam, 0 to 2 percent slopes. It is like the associated soil except that it occurs on slightly higher positions on the alluvial fans. It is used mainly for dry farming and range.

Ivie loam, 5 to 10 percent slopes (If) (management group 2).—Most of this soil occurs about 2½ miles south and about 1 mile east of Holden. It is closely associated with Pavant stony sandy loam, 10 to 20 percent slopes. It is like Ivie loam, 0 to 2 percent slopes, except that the depth to the gravelly substratum varies from place to place. In some places the surface soil contains a little gravel; in other places scattered stones occur. This soil is used mainly for dry farming.

Ivie gravelly loam, 2 to 5 percent slopes (Ib) (management group 2).—This soil is closely associated with the Ivie loams and Ebbs loams. Except that it is gravelly throughout the profile, it resembles the Ivie loams. About 25 to 30 percent of the surface soil consists of small rounded pebbles of quartzite, limestone, and sandstone. The amount of gravel increases, and the texture becomes somewhat coarser, with increasing depth. The material below a depth of about 36 inches is mostly gravel, mixed with a small amount of finer material. This soil is used for dry farming and range. If rainfall is high during the summer, yields of winter wheat are fair. In droughty years crop failures are common.

Ivie gravelly loam, 0 to 2 percent slopes (Ia) (management group 2).—This soil is closely associated with Ivie gravelly loam, 2 to 5 percent slopes, but occurs slightly lower on the fans. It is like Ivie gravelly loam, 2 to 5 percent slopes, except that it has slightly less gravel in the surface soil and in the upper part of the profile. This soil is used mainly for dry farming. Crop yields are fair to poor.

Ivie gravelly loam, 5 to 20 percent slopes (Ic) (management group 2).—This soil occurs near Holden and south of Kanosh, on sloping, moderately steep alluvial fans. The surface soil is gravelly and normally contains scattered stones. The profile becomes more gravelly and stony with increasing depth. All of this soil is used for range. It is poorly suited to any other use.

Ivie stony loam, 2 to 5 percent slopes (Ig) (management group 2).—This soil occurs mainly east of Meadow, on gently sloping flood plains along Meadow Creek. Several stream channels cross the area. The content of gravel and stones varies. Next to the stream channels the surface soil is stony sandy loam or loamy sand; further away from the stream channels, it is stony loam. This soil is likely to be flooded when the streams overflow. It is nonarable and is used only for range.

Kanosh loam, 0 to 2 percent slopes (Ka) (management group 6).—This soil occurs between Meadow and McCornick in the western part of the Area, on low, nearly level, old lake terraces. It is associated with soils of the Deseret series. The parent materials are mixed, moderately coarse textured lake deposits.

This soil is strongly saline. It is imperfectly drained. The water table varies from place to place and from season to season, but it is generally more than 3 feet below the surface. During most of the year this soil is moist nearly to the surface. The vegetation is mainly saltgrass and alkali sacaton. In some places it also includes greasewood, squirreltail, and rabbitbrush (fig. 9).

Figure 9.—**Dunes of gypsum blown from areas of Kanosh soils. Rabbitbrush thrives on the dunes.**

Profile description:

0 to 5 inches, light-gray loam; weak platy structure, crushes to medium to fine granular; strongly calcareous; many small gypsum crystals; soft when dry, very friable when moist.
5 to 18 inches, very pale brown to white loam; strongly calcareous; moderate fine granular structure; soft when dry, very friable when moist; horizon contains some disseminated gypsum.
18 to 34 inches, white to very pale brown loam; massive; weakly cemented by lime and gypsum; very hard when dry, firm when moist.
34 to 72 inches, white fine sandy loam; weakly calcareous; very high in gypsum; massive; slightly hard when dry, friable when moist; reddish-brown to pale-yellow mottlings are common.

The degree of cementation in the subsoil varies. In some places the subsoil resembles a hardpan; in others there is little evidence of cementation.

Use and management.—This soil is used mainly for range. The carrying capacity varies depending on the vegetation. Saltgrass and alkali sacaton provide good grazing. If adequate drainage outlets are provided, it should not be difficult to reclaim this soil.

Kanosh loam, poorly drained, 0 to 2 percent slopes (Kf) (management group 6).—This soil is like Kanosh loam, 0 to 2 percent slopes, except that throughout the year the water level remains 2 or 3 feet from the surface. Normally, the depth to free water is not more than 30 inches. Drainage outlets are difficult to find. The soil is strongly saline, and the vegetation is limited to saltgrass, alkali sacaton, and other salt-tolerant plants. This soil is used for range. The quality of the forage can be improved by proper reseeding and improved management.

Kanosh loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes (Ke) (management group 6).—This soil occurs about 10 miles northwest of Holden near the western border of the Area, in slight depressions. To a depth of about 30 inches, it resembles the associated Kanosh loam, 0 to 2 percent slopes. The underlying material, however, consists of fine-textured lake sediments, similar to the substratum of the Lahontan soils. Reclaiming this soil would be more difficult than reclaiming Kanosh loam, 0 to 2 percent slopes.

Kanosh loam, very shallow, 0 to 2 percent slopes (Kb) (management group 13).—Most of this soil occurs west of Meadow in the southwestern part of the Area, on nearly level low lake terraces. Except that it is higher in gypsum and has a thinner surface soil, this soil is like Kanosh loam, 0 to 2 percent slopes. The parent material consists mostly of gypsum that was deposited by mineral springs and that has saturated the lake sediments. Although in places the water level is more than 6 feet below the surface, the soil is generally moist near the surface. The vegetation consists mainly of pickleweed and red samphire. At present this soil has no agricultural value. Reclaiming it for irrigated farming would be difficult.

Kanosh loam, very shallow, poorly drained, 0 to 2 percent slopes (Kc) (management group 13).—This soil is associated with Kanosh loam, very shallow, 0 to 2 percent slopes, and is like that soil except that it has a high water table throughout the year. In spring and early in summer, the water table is near the surface. It is seldom more than 30 inches below the surface. This soil is used for range.

Kanosh loam, very shallow, 2 to 10 percent slopes (Kd) (management group 13).—This soil occurs about 8 miles west of Meadow, near the western edge of the Area. It is associated with the other very shallow Kanosh soils and with the Deseret and Woodrow soils. It is like Kanosh loam, very shallow, 0 to 2 percent slopes, except that the surface is somewhat more variable.

Kanosh silty clay loam, very shallow, 0 to 2 percent slopes (Kp) (management group 13).—This soil occurs in the same general location as the other very shallow Kanosh soils. It is overlain by a 2- to 8-inch surface horizon of very pale brown to nearly white silty clay loam. This layer is soft, calcareous, saline, and high in gypsum. The material below it contains so much gypsum that it is white when dry. The vegetation is sparse; it consists of pickleweed and red samphire.

Kanosh sandy loam, 0 to 2 percent slopes (Kg) (management group 6).—This soil occurs most extensively in the west-central part of the Area. It is normally in lower positions than the Kanosh loams, and is more imperfectly drained and more saline. Some areas have a thick stand of saltgrass, alkali sacaton, and squirreltail. The forage is not of good quality, but it is satisfactory for winter range. Reclaiming this soil for general irrigated farming would be difficult, because it occurs in low positions where it is difficult to establish drainage outlets.

Kanosh sandy loam, eroded, 0 to 2 percent slopes (Kh) (management group 6).—This soil is like Kanosh sandy loam, 0 to 2 percent slopes, except that wind erosion has stripped the surface soil in places and has piled it in hummocks that are from 6 to 30 inches high. This soil is used entirely for range. It has a very low carrying capacity.

Kanosh sandy loam, 2 to 5 percent slopes (Kl) (management group 6).—This soil occurs about 6 miles west of Holden, on low lake terraces. It is used for general irrigated farming and for range. Yields of alfalfa, small grains, and corn are fair.

Kanosh sandy loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes (Km) (management group 6).—This soil occurs in depressions, in association with Kanosh sandy loam, 0 to 2 percent slopes. Except for the texture of the surface soil, it is like Kanosh loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes. Because of its low position and its clay substratum, this soil is difficult to reclaim for irrigation. All of it is used for range.

Kanosh sandy loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes (Kn) (management group 6).—This soil occurs west and northwest of Holden, near the western border of the Area. It is associated with Kanosh sandy loam, 0 to 2 percent slopes, and with Preston fine sand, duny. To a depth of about 30 inches, it is like Kanosh sandy loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes, but the substratum is similar to the silty clay loam substratum of the Woodrow soils. All of this soil is used for range.

Kanosh sandy loam, poorly drained, 0 to 2 percent slopes (Ko) (management group 6).—Except for having a high water table throughout the year, this soil is like Kanosh sandy loam, 0 to 2 percent slopes. The water table is generally highest in spring and early in summer and lowest late in fall. It is seldom more than 30 inches below the surface. The vegetation is mostly saltgrass and alkali sacaton.

Lahontan silty clay, 0 to 2 percent slopes (Lb) (management group 10).—This soil occurs in the extreme northwestern part of the Area, and also along the western edge about 4 miles southeast of Delta. It occupies broad, uniform slopes, in the lowest parts of the Area. It is associated with the Woodrow, Oasis, and Harding soils. The parent materials were fine-textured lake sediments of mixed origin.

Runoff is very slow, and ponding may occur in some areas. Internal drainage is very slow. The vegetation is greasewood, shadscale, and a few clumps of rabbitbrush.

This soil is saline and alkali. Generally it contains strong concentrations of soluble salts and a high percentage of exchangeable sodium.

Profile description:

0 to 3 inches, very pale brown to white silty clay; weak to moderate platy structure; usually vesicular; hard when dry, friable when moist; strongly calcareous; very low in organic matter.

3 to 7 inches, very pale brown silty clay; weak fine blocky structure; compact; very sticky when wet; strongly calcareous.
7 to 36 inches, clay, similar in color to horizon above; strongly calcareous; massive; hard when dry, sticky when wet; contains a few white flecks of gypsum.
36 to 72 inches, very pale brown to white massive silty clay or clay; many iron stains but few salt crystals; very hard when dry, sticky when wet.

One tract of this soil in the extreme northwestern part of the Area (mainly in sections 20 and 21, T. 15 S., R. 7 W.) has a stratified sandy loam substratum below a depth of about 40 inches.

Use and management.—All of this soil is used for range. It has a low carrying capacity. Reclaiming it would be difficult and expensive. Drainage and intensive leaching would be needed. Because the soil occurs in low positions, drainage outlets are difficult to establish.

Lahontan silty clay, imperfectly drained, 0 to 2 percent slopes (Ld) (management group 10).—This soil occurs in the same general location as Lahontan silty clay, 0 to 2 percent slopes. It is like Lahontan silty clay, 0 to 2 percent slopes, except that it has a water table within 6 feet of the surface. Generally the depth to free water is about 3 feet. The primary cause of the high water table is irrigation of the nearby fields. Because of imperfect drainage the grazing value of the soil has increased. The vegetation consists of a good stand of saltgrass and other alkali-tolerant plants. Reclaiming this soil would be difficult.

Lahontan silty clay, poorly drained, 0 to 2 percent slopes (Lc) (management group 10).—This soil occurs in the lowest parts of the Area. All of it is located along the west side of the Area, about 10 miles south and about 4 miles east of Delta. It is closely associated with Playas, a miscellaneous land type.

This soil is strongly saline and, in places, strongly alkali also. Most of the year the water table is within about 1 foot of the surface, and after rainy periods water may stand on the surface. Reclamation would be very difficult. The vegetation consists mainly of salt sage, pickleweed, gray molly, and scattered scrubby greasewood. All of this soil is used for grazing.

Lahontan silty clay loam, 0 to 2 percent slopes (Le) (management group 10).—This soil occurs mainly along the western edge of the northern half of the Area. The surface soil ranges in texture from silt loam to silty clay loam. At a depth of about 14 inches the subsoil grades to heavy, tough clay, like the subsoil of Lahontan silty clay, 0 to 2 percent slopes. The surface soil is about 3 inches deep; it is strongly platy and highly vesicular. The entire profile is hard, sticky, low in organic matter, strongly calcareous, and generally strongly saline.

The surface is barren in many places. It is cracked into small irregular clods and has the "biscuit" appearance common to many soils of the Great Basin. The barren spots resemble Playa areas. The vegetation consists of shadscale and greasewood. Most of this soil is used for range. The carrying capacity is very low, and the forage is of poor quality. Reclaiming this soil would be similar to reclaiming Lahontan silty clay, 0 to 2 percent slopes.

Lahontan silty clay loam, eroded, 0 to 5 percent slopes (Lf) (management group 10).—This soil occurs in the northwestern part of the Area about 5 miles north of Delta. It is gently sloping or undulating. It is severely gullied, and some of it is sheet eroded. The vegetation is mainly greasewood and shadscale. All of this soil is used for range. The carrying capacity is low.

Lahontan loam, deep, over Hardy soil material, 0 to 2 percent slopes (La) (management group 10).—This soil occurs west and north of Holden. It occupies small acreages in low parts of the Area. The surface soil is 6 to 8 inches deep. The subsoil is heavy silty clay. A zone of lime carbonate occurs at a depth of about 42 inches. The hardness and thickness of the lime zone vary considerably. The vegetation is mainly saltgrass, alkali sacaton, and pickleweed.

Lava flows (Lg) (management group 12).—This miscellaneous land type occurs west of Fillmore, on the western border of the Area. It consists of dark-brown to black basalt and cinder cones. It is essentially devoid of vegetation. The surface is extremely jagged and rough. The cinder material is used to some extent for road-surfacing material, building blocks, and litter for turkey flocks.

Lynndyl loamy sand, 0 to 2 percent slopes (Ll) (management group 7).—This gently undulating or nearly level soil occurs mainly in the northern and north-central part of the Area on high lake terraces that border the Sevier River. It is associated with the Preston fine sands. Wind erosion has somewhat affected the surface.

This soil is somewhat excessively drained. Runoff is very slow, but internal drainage is very rapid. The water-holding capacity is low.

Profile description:

0 to 4 inches, pale-brown loamy sand; contains a small amount of fine, well-rounded, water-worn quartzite and sandstone pebbles; massive to very weak very fine granular structure; loose when dry, very friable when moist; moderately calcareous; very low in organic matter; slight indications of platiness in places, but this has generally been destroyed by wind action.
4 to 14 inches, very pale brown loamy sand; massive structure; slightly more compact than the surface layer.
14 to 42 inches, light-gray loamy fine sand; strongly calcareous; contains scattered flecks of lime; massive; soft when dry, friable when moist; few quartzite and sandstone pebbles in the upper part and increasing amounts in the lower part of the horizon; the pebbles are small, well rounded, and lime coated on the bottom.
42 to 72 inches, stratified layers of sand and loose, well-rounded gravel; pebbles in each gravel layer are of uniform size.

The entire profile is free of stones. A lime hardpan occurs in places, but these areas cannot be mapped separately. The substratum of sand and gravel may begin at any depth below 18 inches.

Use and management.—All of this soil is used for range, which is its best use. Because of extreme droughtiness, it is not suited to general farming or to irrigated farming.

The dominant native vegetation was galletagrass. This has been largely destroyed by overgrazing and replaced by Russian-thistle. At present, the vegetation consists mainly of sagebrush, rabbitbrush, yellowbrush, Russian-thistle, and galletagrass. More grass stands are needed to provide desirable forage and prevent erosion. Good stands of galletagrass still remain in a few isolated areas that are so far from watering places that they are not overgrazed. Grazing should be controlled, to allow natural reseeding and to prevent overgrazing.

Lynndyl loamy sand, eroded, 0 to 2 percent slopes (Lm) (management group 7).—Except that the surface is wind eroded, this soil is like Lynndyl loamy fine sand, 0 to 2 percent slopes. In some places, the surface soil has been

completely removed, and hummocks 12 to 60 inches high have formed. Much of the vegetation has been destroyed and has been replaced by Russian-thistle.

Lynndyl loamy sand, 2 to 5 percent slopes (Ln) (management group 7).—This soil is suited to range, but not to irrigated farming. It has about the same possibilities for development as Lynndyl loamy sand, 0 to 2 percent slopes. All of it is used for range.

Lynndyl loamy sand, 5 to 20 percent slopes (Lo) (management group 7).—This soil occurs about 2 or 3 miles northeast of Delta. It occupies narrow escarpments between two levels of river terraces on which Lynndyl loamy sand, 0 to 2 percent slopes, is the main soil. It is like Lynndyl loamy sand, 2 to 5 percent slopes, except that it is sloping to moderately steep. All of this soil is used for range.

Lynndyl sandy loam, 0 to 2 percent slopes (Lp) (management group 7).—This soil occurs in the northern part of the Area, on nearly level terraces. Except that it is slightly finer textured in both the surface soil and the subsoil, it is like Lynndyl loamy sand, 0 to 2 percent slopes.

This soil is somewhat excessively drained. Runoff is very slow, and internal drainage is rapid. The present vegetation consists of shadscale, bud sage, and Russian-thistle.

This soil could be irrigated, but it is not suited to general farming because it has a droughty substratum. If irrigated, it needs special care to prevent excessive loss of water by deep percolation. Special care needs to be taken to prevent wind erosion when the soil is bare.

Lynndyl sandy loam, 2 to 5 percent slopes (Lr) (management group 7).—This soil occurs about 8 miles north of Delta, in the northwestern part of the Area. It is like Lynndyl sandy loam, 0 to 2 percent slopes, except that it has steeper slopes and is therefore less suited to irrigated farming.

Lynndyl sandy loam, 5 to 10 percent slopes (Ls) (management group 7).—This soil occurs south and southwest of Lynndyl, on sloping river terraces. The surface soil contains more gravel than Lynndyl sandy loam, 0 to 2 percent slopes, and the soil profile varies widely in depth to the gravel and sand substratum. All of this soil is used for range. The carrying capacity is very low.

Lynndyl loam, 0 to 2 percent slopes (Lh) (management group 7).—Most of this soil occurs between Lynndyl and Delta, on a high terrace. It is closely associated with Oasis loam. It is like Oasis loam, except that it has a porous gravelly substratum that begins at a depth of about 24 inches and that it has flecks and veins of lime carbonate in the subsoil below a depth of about 14 inches. The vegetation consists mainly of shadscale.

This soil contains moderate concentrations of soluble salts, which would leach out rapidly if the soil were irrigated. It is fairly well suited to irrigated farming, but because it is somewhat droughty it would need frequent irrigation.

McCornick fine sandy loam, 0 to 2 percent slopes (Mb) (management group 5).—This nearly level soil occurs on old lake terraces of mid-elevation. It is associated with soils of the Boxelder series. The substratum is chalky like the substratum of the Boxelder soils. In the upper few inches of the subsoil is a concentration of weakly to strongly cemented lime.

The parent material consists mainly of white, calcareous, diatomaceous lake deposits that have been reworked somewhat by wind and, in some areas, by streams.

This soil is well drained, but internal drainage through the lime hardpan is slow. The vegetation is mainly shadscale, greasewood, and some sagebrush.

Profile description:

0 to 2 inches, light-gray fine sandy loam; weak fine platy structure; soft when dry, very friable when moist; strongly calcareous; small lime fragments; low in organic matter; has few roots.
2 to 13 inches, very pale brown fine sandy loam; moderate medium to fine granular structure; soft when dry, very friable when moist; strongly calcareous; no lime fragments.
13 to 25 inches, white zone of lime concentration; lime is uniformly segregated and weakly to strongly cemented into a brittle hardpan.
25 to 72 inches, silty clay loam to silt loam texture; white deposit of strongly calcareous diatomaceous material; strong coarse blocky structure; hard when dry, firm to friable when moist.

The depth to the hardpan is 11 to 30 inches. In many places the substratum has thin strata of dark-gray volcanic cinders that are from 1 to 6 inches thick.

Use and management.—Some of this soil is used for dry farming. Some is used for irrigated farming, but, because of the lime hardpan, this soil is not so well suited to general irrigated farming as Boxelder fine sandy loam, 0 to 2 percent slopes. Alfalfa and small grains are grown. Yields are fair. If cleared of vegetation, the surface soil is likely to erode. Special care is needed to prevent erosion in spring before crops are established.

McCornick fine sandy loam, eroded, 0 to 2 percent slopes (Mc) (management group 5).—This soil occurs west and southwest of Holden. Except for its wind-eroded surface, it is like McCornick fine sandy loam, 0 to 2 percent slopes. The wind has removed the surface soil from some areas and piled it into small dunes, 6 to 36 inches high. Generally, only the surface layer is eroded. In a few areas the subsoil is also eroded, but generally the hardpan layer is not exposed. Most of this soil was cleared of its native vegetation and later abandoned. The present vegetation is mainly Russian-thistle.

McCornick fine sandy loam, 2 to 5 percent slopes (Md) (management group 5).—This soil occurs mainly about 8 miles northwest of Holden. It is associated with McCornick fine sandy loam, 0 to 2 percent slopes. It is used only for range.

McCornick loam, 0 to 2 percent slopes (Me) (management group 5).—This soil occurs most extensively about 4 miles west of Holden; some areas are north of Meadow. Except for somewhat finer texture, this soil is similar to McCornick fine sandy loam, 0 to 2 percent slopes. Depth to the hardpan is 12 to 24 inches, but rarely more than 18 inches (fig. 10). In many places, the blocky substratum is stratified; it ranges in texture from fine sandy loam to silty clay loam.

Permeability is moderate. Most of the soil contains moderate to strong concentrations of soluble salts. Wind and water erosion have affected the topsoil. The vegetation is shadscale, greasewood, and some grasses.

Use and management.—Some of this soil is used for dry farming. Only a small acreage is used for irrigated farming. Crop yields vary a great deal from place to place. A fairly large acreage west of Holden below the level of the Utah Central Canal is no longer cultivated because there has been an increase in the salt content of the surface soil.

Figure 10.—**Profile of McCornick loam about 3 miles north of Meadow. Shovel is in lime-cemented hardpan. Black layer is composed of basaltic cinders that were deposited in Lake Bonneville.**

McCornick loam, eroded, 0 to 2 percent slopes (Mf) (management group 5).—This soil occurs mainly about 4 miles west of Holden, in the same locality as McCornick loam, 0 to 2 percent slopes. It is like McCornick loam, 0 to 2 percent slopes, except that wind erosion has altered the surface soil and formed small dunes not more than 18 inches high. Areas between the dunes are eroded; in some places the hardpan is exposed. The vegetation consists mainly of Russian-thistle. Erosion has impaired the grazing value of this soil.

McCornick clay loam, 0 to 2 percent slopes (Ma) (management group 5).—All of this soil occurs west of Holden, near Greenwood. It is closely associated with McCornick loam, 0 to 2 percent slopes. It has a subsoil and substratum similar to those of the associated soil, but the hardpan is slightly more compact and more dense. The surface soil is clay loam or silty clay loam. The surface soil has a weak fine platy structure. It is low in organic matter and high in lime. From 3 to 16 inches, the soil is friable when moist but sticky when wet. This layer rests directly on the hardpan. Because this soil is somewhat deeper than other McCornick soils, it is easy to irrigate. The vegetation is mainly sagebrush and shadscale. This soil is used for dry and irrigated farming. Yields of alfalfa and grain are low.

McCornick loamy fine sand, eroded, 2 to 5 percent slopes (Mg) (management group 5).—This soil occurs west of Holden in the Greenwood area, adjacent to an area of Preston fine sand, hummocky. It is similar to McCornick fine sandy loam, 0 to 2 percent slopes. The surface soil contains many small fragments of lime that make the soil look coarse. The surface soil is 7 to 20 inches deep and rests directly on the hardpan. The pan is well developed. It is practically impenetrable to roots.

Wind erosion has removed much of the surface crust and formed numerous dunes that range up to 36 inches in height. The vegetation is sagebrush, but on most of the eroded areas it has been replaced by Russian-thistle.

Mellor loam, 0 to 2 percent slopes (Mj) (management group 8).—This soil occurs mainly on lake terraces in the northern part of the Area. It is associated with Lynndyl sandy loam, 0 to 2 percent slopes. The parent material was derived from a wide variety of rock formations.

This soil is strongly saline and high in exchangeable sodium. The pH is high. Runoff is very slow. Water ponds after heavy rains. Below the surface soil there is a well-defined layer of prismatic silty clay, through which water drains very slowly. Through the lower part of the profile, drainage is rapid. The vegetation consists mainly of shadscale and greasewood; there is also some bud sage and gray molly.

Profile description:

0 to 5 inches, very pale brown loam; vesicular platy structure; soft when dry, very friable when moist; strongly calcareous; low in organic matter.

5 to 12 inches, pale-brown silty clay; well-defined prismatic structure; colloidal staining on surface of prisms; inside of prisms strongly mottled with lime carbonate; prisms break down to coarse granules that are very hard when dry and sticky when wet; normally strongly saline; high pH.

12 to 42 inches, very pale brown, stratified, massive silty clay loam to fine sandy loam; hard to slightly hard when dry, friable to firm when moist; strongly calcareous.

42 to 72 inches, very pale brown, stratified sandy loam and loamy sand; massive structure; soft when dry, very friable when moist; moderately calcareous.

The thickness of the different horizons varies a great deal. The degree of development of the prismatic structure also varies.

Use and management.—All of this soil is used for range. The carrying capacity is very low. This soil is not suited to irrigation, because the subsoil is very slowly permeable. To reclaim this soil, it would be necessary to break up the clay in the subsoil and mix it with coarse-textured material from the surface layer and the substratum; to remove the salts and alkali by leaching; and to apply gypsum and other amendments.

Mellor loam, eroded, 0 to 2 percent slopes (Mk) (management group 8).—This soil occurs mainly in an area north of the Sevier River and southwest of Lynndyl near United States Highway No. 6. It is associated with other Mellor soils and with the Lynndyl and the Oasis soils. It is like Mellor loam, 0 to 2 percent slopes, except that it has been severely wind eroded.

From more than half of the acreage, erosion has removed the surface soil. In many areas the prismatic clay layer is exposed. Hummocks and small dunes have formed. The eroded areas are nearly barren. Rainwater ponds and stands on the surface until most of it evaporates. This soil is used for range. Erosion has reduced the carrying capacity.

Mellor loam, 2 to 5 percent slopes (Ml) (management group 8).—This slightly saline-alkali soil occurs in two

small areas. One is on a river terrace about 1½ miles east of Leamington. The other is on a narrow terrace escarpment, or break, about 1 mile southeast of the junction of State Highway No. 125 and State Highway No. 26. In both areas, the prismatic structure of the subsurface layer is only weakly defined.

Part of the area near Leamington was cleared, and attempts were made to use it for irrigated farming, but it was later abandoned.

Mellor silty clay loam, 0 to 2 percent slopes (Mn) (management group 8).—This soil is similar to Mellor loam, 0 to 2 percent slopes. It also resembles Harding silty clay loam, 0 to 2 percent slopes, except that the stratified substratum is medium textured to coarse textured. The thickness of the different horizons varies a great deal. The prismatic horizon is 4 to 9 inches thick, but in many places it is very weakly defined. The depth to the stratified substratum ranges from 15 to 30 inches.

Use and management.—All of this soil is used for range. The carrying capacity is very low. It is slightly more difficult to reclaim this soil than to reclaim Mellor loam, 0 to 2 percent slopes.

Mellor silty clay loam, eroded, 0 to 2 percent slopes (Mo) (management group 8).—This soil occurs in a single area about 2 miles southwest of Lynndyl. It is almost completely surrounded by Mellor loamy fine sand, eroded, 0 to 2 percent slopes. Almost all of the surface soil has been removed by wind erosion, and the finer textured silty clay subsoil is exposed. The vegetation is sparse. Reclamation would be very slow and difficult.

Mellor silty clay loam, 2 to 5 percent slopes (Mp) (management group 8).—This soil occurs on a river terrace south of the Sevier River about midway between Lynndyl and Leamington. It is similar to Mellor silty clay loam, 0 to 2 percent slopes. It is strongly saline-alkali, especially in the subsoil and substratum. The vegetation consists of shadscale, seepweed, and white sage.

Mellor fine sandy loam, 0 to 2 percent slopes (Mh) (management group 8).—This soil occurs on smooth lake terraces in the northern part of the Area. It is closely associated with other Mellor soils and also with the Lynndyl soils. Like Mellor loam, 0 to 2 percent slopes, this soil has a well-defined prismatic silty clay layer and a stratified substratum. The surface layer is from 2 to 9 inches deep.

The treatment needed to reclaim this soil for irrigated farming would be the same as for Mellor loam, 0 to 2 percent slopes. If it is reclaimed and used for crops, special care must be taken to prevent erosion, especially in the spring before the soil is protected by a growing crop.

Mellor fine sandy loam, eroded, 0 to 2 percent slopes (Mi) (management group 8).—This soil is associated with Lynndyl sandy loam, 0 to 2 percent slopes. It has been severely wind eroded. In many places the prismatic silty clay layer is exposed, and in other places hummocks and small dunes have formed.

Mellor loamy fine sand, eroded, 0 to 2 percent slopes (Mm) (management group 8).—This soil resembles other eroded Mellor soils and is associated with them. Because of numerous partially stabilized dunes, the relief is distinctly undulating.

Millard gravelly loam, 2 to 5 percent slopes (Mu) (management group 2).—This soil occurs on somewhat older alluvial fans in the southeastern part of the Area, principally south of Fillmore. The parent material is mostly quartzite but includes also a small amount of sandstone. This soil is well drained. Internal drainage is medium. Permeability is moderate, and the water-holding capacity is also moderate. The present vegetation consists mainly of sagebrush and cheatgrass.

Profile description:

0 to 3 inches, brown gravelly loam; noncalcareous; medium platy to fine granular structure; slightly hard when dry, friable when moist; moderate in organic matter.
3 to 10 inches, brown gravelly loam; noncalcareous; weak coarse blocky structure; crushes to medium granular; slightly hard when dry, friable when moist.
10 to 30 inches, brown gravelly heavy loam or light clay loam; noncalcareous; medium subangular blocky structure; hard when dry, friable when moist; contains many pebbles and stones.
30 to 72 inches, pale-brown gravelly sandy loam; moderately to strongly calcareous; some faint lime veins; massive; slightly hard when dry, friable when moist; many pebbles and stones that are generally lime coated on the bottom.

Scattered surface stones are common on this soil. In many places there are small patches or stringers of very stony surface soil. The quantity of pebbles and stones in the profile varies somewhat from place to place. The depth to the calcareous horizon and the amount of lime in this horizon vary.

Use and management.—This soil is used for range and for dry farming. In years of normal or above-normal rainfall, winter wheat grows fairly well. If irrigated, this soil should be fairly well suited to alfalfa, small grains, and other similar crops, and to pasture. Irrigation should be on the contour, and water should be applied frequently.

Millard gravelly loam, 0 to 2 percent slopes (Mt) (management group 2).—This soil occurs on nearly level parts of the alluvial fans. It is associated with Millard gravelly loam, 2 to 5 percent slopes, and resembles that soil except that it is slightly less gravelly and has fewer patches of stony surface soil. It is used for dry farming and to some extent for range. It is well suited to general irrigated farming.

Millard loam, 2 to 5 percent slopes (Mw) (management group 2).—This soil is similar to Millard gravelly loam, 0 to 2 percent slopes. The top 10 to 12 inches of the surface soil are comparatively free of gravel, except for some fine quartzite pebbles and scattered stones on the surface. There are small patches or stringers of very stony surface soil, and below a depth of about 12 inches the profile becomes more gravelly.

This soil is used for range and for dry farming. Yields of winter wheat are fair to good. If special care were taken to prevent erosion and to use irrigation water efficiently, this soil would be fairly well suited to general irrigated farming.

Millard loam, 0 to 2 percent slopes (Mv) (management group 2).—This soil is closely associated with and resembles Millard loam, 2 to 5 percent slopes. Because it is nearly level, it is well suited to irrigated farming and can easily be prepared for irrigation.

Millard fine sandy loam, 2 to 5 percent slopes (Ms) (management group 2).—This soil occurs in small areas, mainly just below the highest shoreline of Lake Bonneville. It is closely associated with and resembles Millard loam, 2 to 5 percent slopes. There is a small amount of fine gravel in the surface soil. The profile contains some sandy material that was washed from the beach of Lake Bonneville. The thickness of the relatively gravel-free soil ranges from 10 to 24 inches. The underlying material

generally becomes increasingly gravelly and stony. To a depth of about 36 inches this soil is noncalcareous.

Millard clay loam, 0 to 2 percent slopes (Mr) (management group 2).—This soil occurs southwest of Fillmore. To a depth of about 8 inches, the surface soil is clay loam. From 8 to 20 inches it is noncalcareous, subangular blocky clay loam. Below a depth of 20 inches the soil becomes increasingly gravelly and stony. This soil is well suited to general irrigated farming, but most of it is used for dry farming.

Millard stony loam, 2 to 5 percent slopes (My) (management group 2).—This soil occurs along the channels of intermittent streams. It is closely associated with the Millard loams and the Millard gravelly loams. It resembles Millard gravelly loam, 2 to 5 percent slopes, except that it has a large quantity of stones and pebbles in the surface soil.

This soil is not suited to dry or irrigated farming, but it has a fairly good carrying capacity if used for range. The vegetation consists mainly of sagebrush and bunchgrasses. In many burned-over areas the vegetation is mainly cheatgrass and snakeweed.

Millard stony loam, 0 to 2 percent slopes (Mx) (management group 2).—This soil occurs in two small areas, one east and one west of Fillmore. It resembles Millard stony loam, 2 to 5 percent slopes. All of it is used for range.

Millard stony sandy loam, 5 to 10 percent slopes (Mz) (management group 2).—This soil occurs at the base of the Pavant Mountains, generally near the channels of intermittent streams. Most of it is south of Fillmore. The largest areas are in the vicinity of Meadow. Except for having more sandstone rock in the profile, this soil is similar to Millard stony loam, 2 to 5 percent slopes. It is suited only to range.

Naples loam, 0 to 2 percent slopes (Nc) (management group 1).—This soil occurs in the extreme northeastern part of the Area, between Oak City and Leamington. Most of it is on the flood plains of Fool Creek and on alluvial fans formed by streams that originate in the Canyon Mountains and flow into Fool Creek. The parent material is mostly quartzite. The entire profile is strongly calcareous and free of pebbles and stones. Permeability is moderate. Drainage is good. Runoff is very slow, and internal drainage is medium. The vegetation is sagebrush, wheatgrass, and a few annual weeds.

Profile description:

0 to 4 inches, light-brown loam; moderate fine platy structure; soft when dry and very friable when moist; strongly calcareous; low in organic matter.
4 to 16 inches, light-brown loam; slightly hard; massive but crumbles easily; strongly calcareous.
16 to 34 inches, light-brown massive sandy loam; slightly hard; strongly calcareous.
53 inches +, similar to above, but soft.

The texture of the subsoil and substratum varies. In some places the entire profile is loam of fairly uniform texture; in others the texture ranges from sandy loam to light silty clay loam.

Use and management.—This soil does not receive enough rainfall to be suitable for dry farming. It is easy to fit for irrigation and would be one of the best soils in the Area for irrigated farming, but the water supply is inadequate and, consequently, yields on irrigated farms are only fair. Erosion is not a problem.

This soil is also used for range. The carrying capacity is low but could be much improved by reseeding.

Naples loam, 2 to 5 percent slopes (Nd) (management group 1).—This soil is closely associated with Naples loam, 0 to 2 percent slopes. It is similar to the associated soil except that it occurs in slightly higher and more strongly sloping positions. Nearly all of this soil is used for dry farming. In years when the rainfall is above normal, good crops of winter wheat are produced. In years when the rainfall is normal or below normal, yields are very low. If irrigated, this soil would be highly productive but would need special care to control erosion.

Naples fine sandy loam, 0 to 2 percent slopes (Na) (management group 1).—This soil occurs in higher positions on the alluvial fans than Naples loam, 0 to 2 percent slopes. In a few areas the profile contains a small amount of pebbles and stones, but generally it consists of uniform fine sandy loam. This soil is low in organic matter. It is strongly calcareous throughout, but there is no visible segregated lime.

All of this soil is used for range. The carrying capacity is rather low.

Naples fine sandy loam, deep, over gravel, 2 to 5 percent slopes (Nb) (management group 1).—This soil is associated with Naples fine sandy loam, 0 to 2 percent slopes, but occurs in slightly higher positions on the alluvial fans. It is characterized by layers of relatively clean gravel in the substratum. The depth to the substratum ranges from about 36 to 60 inches. This soil is somewhat droughty. All of it is used for range.

Neola sandy loam, 2 to 5 percent slopes (No) (management group 3).—This soil occurs on old high alluvial fans in the northeastern and extreme southwestern parts of the Area. It is similar to Pavant sandy loam, 2 to 5 percent slopes, except that it is lighter colored, contains less organic matter, and receives about 4 inches less precipitation annually.

The shallow surface soil overlies a hardpan of lime. Underneath the hardpan there is a porous gravelly substratum. The parent rocks were mainly limestone, quartzite, and sandstone. The vegetation is principally sagebrush and scattered juniper. The annual precipitation is about 10 inches.

Profile description:

0 to 14 inches, very pale brown sandy loam; moderately to strongly calcareous; fine granular structure; slightly hard when dry, very friable when moist.
14 to 34 inches, strongly lime cemented hardpan; white when dry, very pale brown when moist.
34 to 72 inches, very pale brown gravelly sand; strongly calcareous; well-rounded pebbles, many lime coated.

The depth to the hardpan ranges from about 8 to 24 inches. The thickness and hardness of the hardpan vary.

Use and management.—Most of this soil is used for range. The carrying capacity is generally very low. This soil is not suited to dry farming, because it receives little precipitation and its water-holding capacity is low. If irrigated and properly managed, it will produce fair yields of potatoes, peas, beans, alfalfa, and other crops.

Neola sandy loam, 5 to 10 percent slopes (Np) (management group 3).—This soil occurs in the northeastern part of the Area. The surface soil is somewhat shallower than that of Neola sandy loam, 2 to 5 percent slopes. In most areas there are some scattered surface stones or some small stony patches. Erosion has been moderate.

This soil is used for range. It is not suited to general irrigated farming, but some special crops could be grown under irrigation.

Neola sandy loam, 0 to 2 percent slopes (Nn) (management group 3).—This soil occurs about 1½ miles northwest of Oak City. It is almost completely surrounded by a large area of Preston and Lynndyl soils, 2 to 5 percent slopes. The vegetation consists of sagebrush. The growth is fairly thick, but the plants are not large.

Because of its shallow surface soil, its isolated location, and the hazard of drifting sand from the surrounding area, this soil is poorly suited to general irrigated farming.

Neola gravelly sandy loam, 2 to 5 percent slopes (Nf) (management group 3).—This soil occurs mainly in the northeastern part of the Area along the base of the Canyon Mountains. It is similar to Neola sandy loam, 2 to 5 percent slopes, except that there is more horizontal movement of water above the hardpan because of the gravelly texture of the surface layer. Most plant roots do not penetrate the hardpan.

Use and management.—Most of this soil is used for range. The carrying capacity is very low, but it could be increased by improved management. This soil is not suited to dry farming. It is poorly suited to general irrigated farming.

Neola gravelly sandy loam, 5 to 10 percent slopes (Ng) (management group 3).—This soil occurs in both the northeastern and the southwestern parts of the Area. It is similar to Neola gravelly sandy loam, 2 to 5 percent slopes, but it has a somewhat thinner surface soil, especially in eroded areas.

This soil is used almost entirely for range. The carrying capacity is very low, but by improved range management it could be greatly increased. This soil is not suited to dry farming or to general irrigated farming, but if it were irrigated, some special crops like orchard fruits could be grown successfully.

Neola stony sandy loam, 10 to 20 percent slopes (Nt) (management group 3).—This soil is fairly extensive in both the northeastern and the extreme southwestern parts of the Area. It occurs on old alluvial fans adjacent to rough mountains.

To a depth of about 8 inches the surface soil is very pale brown stony sandy loam that contains many cobblestones. Underneath the surface layer there is a thick lime-cemented hardpan that extends to a depth of about 36 inches. This layer contains many cobblestones and pebbles. It is underlain by porous gravelly and stony material.

This soil is used entirely for range. The carrying capacity is very low.

Neola stony sandy loam, 2 to 5 percent slopes (Ns) (management group 3).—This soil is associated with Neola stony sandy loam, 10 to 20 percent slopes, but occurs in lower positions on the alluvial fans. It is used entirely for range.

Neola stony sandy loam, eroded, 5 to 20 percent slopes (Nu) (management group 3).—This soil is associated with Neola stony sandy loam, 10 to 20 percent slopes. It is like the associated soil, except that it has a severely eroded surface soil. It is used entirely for range.

Neola loam, 2 to 5 percent slopes (Nh) (management group 3).—This soil occurs at the base of the Canyon Mountains near Whisky Creek, between Holden and Oak City. Generally, there are many scattered surface stones. This soil is not suited to dry farming. It could be used for irrigated farming if special care were taken to control erosion and to prevent excessive loss of water.

Neola loam, 5 to 20 percent slopes (Nl) (management group 3).—This soil occurs in the same general locality as Neola loam, 2 to 5 percent slopes, but occupies higher and steeper positions on the alluvial fans. It is moderately eroded. The depth of the surface soil varies. This soil is not suited to general irrigated farming. It should be used only for range.

Neola loamy sand, 2 to 10 percent slopes (Nm) (management group 3).—This soil occurs near Whisky Creek between Holden and Oak City. The surface layer apparently did not develop from the underlying material but was deposited by wind over the rest of the profile. It is about 4 to 10 inches deep and consists of yellowish-brown loamy sand or fine sand that is noncalcareous, loose, and single grained. Below the surface layer the profile is similar to that of Neola sandy loam, 2 to 5 percent slopes.

Neola gravelly loamy sand, 5 to 10 percent slopes (Ne) (management group 3).—This soil occurs in the same general vicinity as Neola loamy sand, 2 to 10 percent slopes. It is like the associated soil, except that it has more gravel in the top 6 or 8 inches, and the layer of noncalcareous windblown sand on the surface is much thinner. The native vegetation consists of a fairly thick growth of juniper and some sagebrush. The juniper is cut for fence posts. This soil is used for range.

Neola stony loamy sand, 5 to 10 percent slopes (Nr) (management group 3).—This soil occurs in the northeastern part of the Area in the general vicinity of Whisky Creek. The surface layer of noncalcareous windblown sand varies in thickness but is generally only 1 or 2 inches deep. This soil is used entirely for range. The carrying capacity is very low.

Oasis fine sandy loam, 0 to 2 percent slopes (Oa) (management group 4).—This soil is widely distributed, but is most extensive in the northern and west-central parts of the Area. It occurs in broad tracts on lake terraces. The substratum is medium textured to moderately coarse textured. The parent material is alluvium that was derived from different sources. Drainage is good. Internal drainage is medium, and runoff is very slow. Permeability is moderately rapid, and the water-holding capacity is moderate. In virgin areas there are generally moderate to strong concentrations of soluble salts. The vegetation consists mainly of greasewood, shadscale, and saltgrass.

Profile description:

0 to 6 inches, very pale brown fine sandy loam; weak fine platy structure; breaks into fine granules; soft when dry and very friable when moist; somewhat vesicular; strongly calcareous; low in organic matter.

6 to 12 inches, very pale brown to pale brown sandy loam; weak granular structure; slightly hard when dry, very friable when moist; strongly calcareous.

12 to 72 inches, very pale brown fine sandy loam; massive; soft when dry, very friable when moist; strongly calcareous; in places, a layer of lime carbonate extends from about 15 to 30 inches.

The entire profile is free of gravel and stone. The texture of the stratified substratum ranges from loamy sand to light clay loam.

Use and management.—Much of this soil is used for range. The grazing capacity is low but could be somewhat increased by improved management. Near Pavant and

Flowell, some of this soil is used for irrigated alfalfa and grain. Average yields are low because there is not enough irrigation water. If spring-seeded crops are grown, care must be taken to prevent wind erosion. The surface soil should be kept moist until the crop has grown enough to protect the soil. If sufficient water were available, this soil could be leached of soluble salts.

Oasis fine sandy loam, eroded, 0 to 2 percent slopes (Ob) (management group 4).—This soil is like Oasis fine sandy loam, 0 to 2 percent slopes, except that wind erosion has altered the relief. Dunes of local origin are numerous. Some are as much as 18 inches high, but most are less than 12 inches high. Between the dunes much of the surface soil has been removed. Most of the native grass has been replaced by Russian-thistle.

Much of this soil is on farms that were once fitted for irrigation but were abandoned because of lack of water. Releveling would be required to make it suitable for irrigated farming again. Reseeding would be difficult but should result in some improvement in the range.

Oasis fine sandy loam, 2 to 5 percent slopes (Oc) (management group 4).—This soil occurs in the same general localities as the other Oasis soils. Because it is gently sloping, it is not easy to fit for irrigation. Erosion is a hazard.

Oasis fine sandy loam, eroded, 2 to 5 percent slopes (Od) (management group 4).—This soil is like Oasis fine sandy loam, 2 to 5 percent slopes, except that wind erosion has altered the relief. Hummocks are numerous. Some are as much as 18 inches high. Between the hummocks the surface soil has been removed to a depth of several inches.

Most of the native shrubs and grasses have been replaced by Russian-thistle. The carrying capacity is very low, but could be improved by reseeding. If this soil is irrigated, it should be protected from wind erosion.

Oasis fine sandy loam, deep, over Woodrow soil material, 0 to 2 percent slopes (Oh) (management group 4).—This soil occurs mainly in the northeastern part of the Area, on narrow terraces along the Sevier river. To a depth of 36 inches, it resembles Oasis fine sandy loam, 0 to 2 percent slopes. The material below 36 inches is silty clay loam that is stratified in places with silty clay. If leached, this soil could easily be reclaimed.

Oasis fine sandy loam, deep, over Woodrow soil material, 2 to 5 percent slopes (Oi) (management group 4).—This soil occurs on narrow river terraces in the northeastern part of the Area. It is used for range.

Oasis fine sandy loam, deep, over Escalante soil material, 0 to 2 percent slopes (Og) (management group 4).—To a depth of about 36 inches this soil is similar to Oasis fine sandy loam, 0 to 2 percent slopes. Below 36 inches there is a weakly cemented lime hardpan similar to the one in the Escalante soils. The pan is about 2 feet thick and is underlain by loose fine sandy loam or loamy sand. The vegetation consists mainly of saltgrass, greasewood, and rabbitbrush.

Oasis fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes (Oe) (management group 4).—This soil occurs in the southwestern part of the Area, about 7 miles west of Kanosh. In the subsoil there is a weakly lime cemented pan that extends from 15 to 24 inches. The substratum is similar to that of the Boxelder soils. All of this soil is used for range.

Oasis fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes (Of) (management group 4).—This soil is similar to Oasis fine sandy loam, 0 to 2 percent slopes, but it is underlain at depths of 36 to 60 inches by chalky silty clay loam like that in the subsoil and substratum of the Boxelder soils. This soil is now used for range. It could be used for crops if irrigated, leached, and properly drained.

Oasis loam, 0 to 2 percent slopes (Oj) (management group 4).—This soil occurs mostly in the central and northern parts of the Area. It is moderately permeable and has a moderate water-holding capacity. The vegetation is mainly greasewood and shadscale, but includes also some sagebrush and rabbitbrush. The entire profile is free of pebbles and stones. Below the surface layer the texture varies from place to place. The lime hardpan is weakly to moderately cemented. The pan is lacking in places.

Use and management.—This soil is not suited to dry farming. It is one of the best soils in the Area for irrigated farming, but many areas lack sufficient irrigation water. Alfalfa is the chief irrigated crop. Water is applied by either the corrugation or the strip-border method. It is sufficient to irrigate every 2 weeks, and a lapse of 3 weeks may not be injurious to crops. Most of this soil is used for range. The carrying capacity is generally low.

Oasis loam, imperfectly drained, 0 to 2 percent slopes (Om) (management group 4).—This soil has such a high water table that it is not suited to ordinary crops. At times during the year the water table is within 24 inches of the surface. The excess water accumulates because there is seepage from canals, from overirrigated adjacent fields, or from artesian wells.

This soil could easily be drained, because the substratum is sandy and would permit the free movement of excess water. In some areas, the accumulation of excess water could be prevented by installing intercepting drains or by irrigating the adjoining areas more carefully.

Oasis loam, eroded, 0 to 2 percent slopes (Ok) (management group 4).—This soil occurs mainly southwest of Lynndyl. It is similar to Oasis loam, 0 to 2 percent slopes, except that wind erosion has altered the relief. Dunes 6 to 36 inches high are numerous. In the areas between the dunes, an inch or more of the surface soil has been removed by erosion. The mapping unit includes one small area of silty clay loam that is located about 3½ miles northeast of Delta. In this included area gully erosion is fairly severe.

To make this soil suitable for irrigated farming would require leveling. It would be likely to erode if irrigated and cultivated. It is used entirely for range. The carrying capacity is low.

Oasis loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes (On) (management group 4).—This soil is similar to Oasis loam, 0 to 2 percent slopes, except that at a depth of about 30 inches it rests directly on a substratum like that of the Boxelder and McCornick soils. The substratum is very pale brown, compact, and diatomaceous; it is hard when dry and absorbs water very slowly. The upper six inches of the substratum is hard and brittle and resembles a hardpan. This soil is used mainly for range. The carrying capacity is low.

Oasis loam, deep, over gravel, 0 to 2 percent slopes (Oo) (management group 4).—This soil is similar to Oasis loam, 0 to 2 percent slopes, except that the pan

layer is only weakly to moderately cemented and the substratum is gravelly below a depth of 42 inches. Because the substratum is gravelly, the soil must be irrigated carefully to prevent loss of water by deep percolation. This soil is well suited to a wide range of crops.

Oasis loam, deep, over Woodrow soil material, 0 to 2 percent slopes (Oq) (management group 4).—This soil is like Oasis loam, 0 to 2 percent slopes, except that at a depth of 36 to 60 inches it rests directly on a silty clay loam substratum that resembles the substratum of the Woodrow soils. It is used for range. It can be used for crops. If irrigated, it needs special care to prevent poor drainage.

Oasis loam, deep, over Woodrow soil material, 2 to 5 percent slopes (Or) (management group 4).—This soil occurs in one area, which is south of Pavant. It is strongly saline. The vegetation is mainly greasewood and shadscale. This soil is used for range.

Oasis loam, deep, over Hardy soil material, 0 to 2 percent slopes (Op) (management group 4).—This soil occurs in the west-central part of the Area. To a depth of about 42 inches, it is similar to Oasis loam, 0 to 2 percent slopes. Below a depth of about 42 inches, there is a lime-cemented hardpan that extends to a depth of about 60 inches. Underneath the hardpan there is soft sandy loam material. This soil is used for range.

Oasis loam, 2 to 5 percent slopes (Ol) (management group 4).—This soil is like Oasis loam, 0 to 2 percent slopes, except that it has been somewhat damaged by sheet and gully erosion. It is more likely to erode and is more expensive to fit for irrigation than the nearly level soil. This soil is used both for general irrigated farming and for range. Under irrigation, yields of barley and alfalfa are good.

Oasis silty clay loam, 0 to 2 percent slopes (Ox) (management group 4).—This soil occurs near the western side of the Area. Below the surface layer the profile is texturally stratified and is coarser textured than the surface soil. This soil developed from lake-laid material derived from many kinds of igneous and sedimentary rock. It has a moderate water-holding capacity. Permeability is moderate. Many virgin areas are moderately to strongly saline. They could be reclaimed by leaching. The vegetation consists largely of greasewood and shadscale.

Use and management.—This is one of the more productive soils in the Area. It produces very good crops of irrigated alfalfa, small grains, alfalfa for seed, and potatoes, but in many places yields are low because of a shortage of irrigation water. This soil can be fitted for irrigation at reasonable cost. The saline areas can be reclaimed by draining and leaching.

Oasis silty clay loam, 5 to 10 percent slopes (Oy) (management group 4).—Most of this soil occurs about 1 mile southwest of Meadow, on the side slopes of deep drainage channels. The vegetation is sagebrush, which grows abundantly. This soil is used for range. Reseeding to suitable grasses would greatly improve the grazing capacity. This soil is not severely eroded but, if irrigated, it would need careful attention to prevent erosion.

Oasis silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes (Oz) (management group 4).—This soil occurs 4 miles southwest of Holden. It is associated with the Boxelder and the McCornick soils. To a depth of about 42 inches, it is similar to Oasis silty clay loam, 0 to 2 percent slopes. The material below that depth is diatomaceous and resembles the Boxelder soils. The vegetation is mainly greasewood. It has been partly replaced by Russian-thistle. This soil is slightly to strongly saline. It is used mainly for range.

Oasis silty clay loam, deep, over Woodrow soil material, 0 to 5 percent slopes (Oaa) (management group 4).—This soil occurs in two widely separated areas; one is on a gently sloping river terrace near Leamington and one on a nearly level low lake terrace in the extreme northwestern part of the Area. To a depth of about 42 inches, this soil is like Oasis silty clay loam, 0 to 2 percent slopes, but the underlying material is finer textured, generally a silty clay loam or a light silty clay. The area near Leamington is used for general irrigated farming. The rest is used for range.

Oasis silty clay, 0 to 2 percent slopes (Ov) (management group 4).—This soil occurs in the extreme northwestern corner of the Area, and also along the western side about 7 miles southeast of Delta. The silty clay surface soil is 12 to 18 inches deep. The uppermost 2 inches has a weak platy structure. Below this, to a depth of about 12 inches, the surface soil is either massive or of very weak blocky structure. The subsoil and substratum are stratified and are predominantly medium textured. The vegetation consists of a fairly thick covering of greasewood.

This soil is strongly saline. Reclaiming it would require draining and leaching. It is used for range.

Oasis silty clay, imperfectly drained, 0 to 2 percent slopes (Ow) (management group 4).—This soil occurs mainly in the northwestern part of the Area, north of Delta. It is similar to Oasis silty clay, 0 to 2 percent slopes, except that the water table is at a depth of 30 to 60 inches. The imperfect drainage is the result of accumulation of excess water from nearby irrigated areas. The vegetation is mainly greasewood. This soil is strongly saline. It is used for range.

Oasis loamy fine sand, 0 to 2 percent slopes (Os) (management group 4).—This soil occurs both in the extreme northwestern part of the Area near Delta Airport, and about 6 miles northwest of Holden near Greenwood. It is closely associated with Lynndyl loamy sand, 0 to 2 percent slopes. The surface layers of the two soils are practically the same, but this soil has a stratified, medium-textured to coarse-textured subsoil and substratum.

This soil is used entirely for range. It has a very low carrying capacity.

Oasis loamy fine sand, eroded, 0 to 2 percent slopes (Ot) (management group 4).—This soil occurs on an abandoned airfield near Delta Airport. It is associated with Oasis loamy fine sand, 0 to 2 percent slopes.

While the tract was used as an airfield, it was severely damaged by wind erosion because it had been leveled and cleared of its native vegetation. However, the soil is now partially stabilized by a growth of Russian-thistle and other annual weeds.

Oasis loamy sand, moderately deep, over Boxelder soil material, 2 to 5 percent slopes (Ou) (management group 4).—This soil occurs as a long narrow strip in the southwestern part of the Area, about 6½ miles west of Kanosh. It is located on a gently sloping escarpment, or break, between two low terrace levels. The slopes are very short and the relief is uneven. The profile is about 30 inches deep over a substratum like that of the Boxelder soils.

Orem loamy fine sand, 2 to 5 percent slopes (Oba) (management group 7).—This soil occurs in a small area near the mouth of Whisky Creek Canyon, about 10 miles north and slightly west of Holden. It is above the shorelines of Lake Bonneville. It consists of fairly large stabilized dunes. Drainage is somewhat excessive. Runoff is very slow and internal drainage is very rapid. The vegetation consists of sagebrush, rabbitbrush, some Indian ricegrass, and annual weeds.

Profile description:

0 to 3 inches, brown loamy fine sand; noncalcareous; single grain; loose when dry and very friable to loose when moist.
3 to 23 inches, brown loamy fine sand; noncalcareous; single grain; loose.
23 to 48 inches, light-brown loamy fine sand; moderately to strongly calcareous; single grain; soft when dry and very friable when moist.
48 to 72 inches, light-brown loamy fine sand; strongly calcareous; single grain; loose when dry and very friable to loose when moist.

Use and management.—This soil is used entirely for range. The carrying capacity is very low, but it could be improved by reseeding. This soil is not suited to dry farming, but, if irrigated by sprinklers, it may be suited to some special crops.

Orem loamy fine sand, 5 to 10 percent slopes (Oca) (management group 7).—This soil occurs in about the same general locality as Orem loamy fine sand, 2 to 5 percent slopes. All of it is used for range.

Palisade fine sandy loam, 0 to 2 percent slopes (Pb) (management group 1).—This deep soil occurs along the foot slopes of the Canyon Mountains, along the foot slopes of West Mountain northwest of Fillmore, and in the extreme southern part of the Area. Most of it is on somewhat older alluvial fans. It has a well-defined zone of lime carbonate. The parent material is alluvium from mixed rock, mainly sandstone, limestone, and quartzite. This soil is well drained. Internal drainage is medium and runoff is very slow. Permeability is moderate. This soil is low in organic matter. The present vegetation is mostly a thick growth of sagebrush, but includes also some bunchgrass.

Profile description:

0 to 6 inches, very pale brown fine sandy loam; weak fine platy structure; crushes to fine granules; soft when dry and very friable when moist; strongly calcareous; low in organic matter.
6 to 22 inches, very pale brown fine sandy loam that becomes lighter colored with depth; crushes readily into fine granules.
22 to 32 inches, zone of lime accumulation; very pale brown to nearly white light fine sandy loam; weakly cemented by well-disseminated lime; massive; slightly hard when dry and friable when moist.
32 to 50 inches, light fine sandy loam to loamy fine sand; similar in color to above, but lower in lime; slightly hard when dry and very friable when moist; massive.
50 to 72 inches, very pale brown light fine sandy loam to loamy fine sand; massive; soft when dry and very friable when moist; strongly calcareous.

The profile is free of pebbles, stones, and soluble salts.

Use and management.—Virgin areas of this soil are practically uneroded, but cultivated areas are severely eroded. Normally, there is not sufficient rain for successful dry farming. In years of above-normal precipitation, fairly good yields of winter wheat have been produced. This soil is well suited to irrigated farming but would need special care to prevent erosion. The carrying capacity of the range could be greatly increased by planting suitable forage grasses.

Palisade fine sandy loam, eroded, 0 to 2 percent slopes (Pc) (management group 1).—This soil is similar to Palisade fine sandy loam, 0 to 2 percent slopes, except that the relief has been altered by wind erosion. Water erosion is seldom a problem. It occurs occasionally in combination with wind erosion. The most common indication of erosion is the presence of small dunes. These are rarely more than 12 inches high but range up to 36 inches. Between the dunes, all the surface soil has been removed by erosion. The water-holding capacity is moderate. The grazing value has diminished, and reseeding would be difficult because of wind erosion. If used for irrigated farming, this soil needs frequent applications of water. It is used mainly for range.

Palisade fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes (Pg) (management group 1).—This soil occurs mainly in two areas. One is near the foot slopes of West Mountain, northeast of Flowell, and the other is east of McCornick, near the Central Utah Canal. Some of the acreage is wind eroded. To a depth of about 36 inches, this soil is like Palisade fine sandy loam, 0 to 2 percent slopes. The lower substratum is finer textured, calcareous, and diatomaceous, like the material under the Boxelder soils. This soil is used for dry farming and for range. The area near West Mountain is used generally for dry farming. The grazing capacity is low but could be improved by proper reseeding.

Palisade fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes (Ph) (management group 1).—This soil occurs northeast of Flowell near the foot slopes of West Mountain, and east of McCornick near the Central Utah Canal. It is similar to Palisade fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes, except that it is somewhat more widely distributed and varies more in depth of the surface soil and depth to the substratum.

Palisade fine sandy loam, 2 to 5 percent slopes (Pd) (management group 1).—This soil occurs in the same general localities as Palisade fine sandy loam, 0 to 2 percent slopes, but on higher positions on the alluvial fans. It is used for range and for dry farming. It is fairly well suited to irrigated farming but needs careful management to prevent erosion.

Palisade fine sandy loam, eroded, 2 to 5 percent slopes (Pe) (management group 1).—This soil occurs about 6 miles northwest of Fillmore, along the western foot slopes of Bald Mountain. It is similar to Palisade fine sandy loam, 2 to 5 percent slopes, except that the surface has been wind eroded. It was cleared and used for irrigated farming, but it was later abandoned and the surface soil was exposed to wind erosion. The present vegetation consists mainly of Russian-thistle and a new growth of sagebrush.

Palisade fine sandy loam, 5 to 10 percent slopes (Pf) (management group 1).—This soil occurs about 5 miles southwest of Holden on the foot slopes of West Mountain, and also about 3 miles west of Kanosh on terrace slopes near the base of an old crater. It has been moderately eroded. There are a few gullies and some hummocks. This soil is used mainly for dry-farmed winter wheat. In both areas yields are fairly good. The annual precipitation is somewhat higher than on most Palisade soils.

Palisade loam, 0 to 2 percent slopes (Pi) (management group 1).—This soil occurs mostly in the eastern part of the Area near the Canyon Range. It is extensive and widely

distributed. It is low in organic matter and moderately permeable. The water-holding capacity is moderate. The entire profile is free of pebbles and stones.

Use and management.—Most of this soil receives little rainfall. In years of average or below-average rainfall, dry farming is somewhat hazardous. In years of above-average rainfall, yields have been fairly high.

This soil is well suited to irrigated farming and produces a wide variety of crops. If irrigated, it must be carefully leveled to prevent erosion. A small acreage near Oak City is used for irrigated farming. The main crops are alfalfa, small grains, and corn for ensilage. Yields are limited because there is generally a shortage of irrigation water in the latter part of the growing season.

Palisade loam, deep, over Boxelder soil material, 0 to 2 percent slopes (Pk) (management group 1).—Most of this soil occurs near the southern end of the Area, about 4 miles west and slightly south of Kanosh. It is similar to Palisade fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes, except that it has a slightly finer textured lime carbonate layer. At a depth of about 40 inches the soil rests on Boxelder soil material. The present vegetation is mainly sagebrush.

Much of this soil has been cleared and is used to grow winter wheat. Yields are moderate to good in years when the rainfall is above average.

Palisade loam, deep, over Boxelder soil material, 2 to 5 percent slopes (Pl) (management group 1).—All of this soil occurs in the extreme southwestern part of the Area. Because the risk of erosion is greater, this soil is not so well suited to dry farming as the nearly level soil. It is used mainly for range and dry-farmed wheat.

Palisade loam, 2 to 5 percent slopes (Pj) (management group 1).—This soil occurs in the same general localities as the other Palisade soils. In some places the surface crust has been sheet eroded. There are a few gullies but they are not very large. There has been little wind erosion. The carrying capacity is low but could be improved by proper reseeding. If irrigated, this soil would be highly productive, but it would need careful management to control erosion. This soil is used mainly for range.

Palisade loamy fine sand, 2 to 5 percent slopes (Pm) (management group 1).—This soil occurs mainly at the base of the Canyon Mountains, south of Oak City. The relief is distinctly undulating. There are many hummocks that are from 6 inches to 3 or 4 feet high.

This soil is a very pale brown loamy fine sand with a very weak granular structure that breaks easily into single grains. At a depth of about 24 inches there is a prominent lime layer that extends to a depth of 36 inches. This soil is moderately to strongly calcareous throughout. It is free of pebbles and stones. The water-holding capacity is low. The surface soil is low in organic matter. The present vegetation is largely sagebrush, juniper, wild alfalfa, and Russian-thistle. The carrying capacity of the range is very low and would be difficult to improve. This soil is droughty and is easily wind eroded. It is poorly suited to general farming under irrigation, but could be used for vegetables, fruits, and other special crops.

Palisade loamy fine sand, deep, over Boxelder soil material, 0 to 2 percent slopes (Pp) (management group 1).—At a depth of about 20 inches, this soil is underlain by a prominent lime layer, which rests directly on gray, calcareous, compact silty clay loam like that under the Boxelder and McCornick soils. Wind erosion has formed dunes that are generally about 12 inches high but range up to 36 inches. The areas between the dunes are eroded, but the underlying chalky substratum is exposed in only a few places. The original vegetation was sagebrush; it has been replaced by rabbitbrush. This soil is not suited to general farming. It is used for range. The carrying capacity is very low.

Palisade loamy fine sand, eroded, 2 to 5 percent slopes (Pn) (management group 1).—This soil occurs about 6 miles northwest of Fillmore. It is similar to Palisade loamy fine sand, 2 to 5 percent slopes, except that it is eroded. Hummocks 6 to 12 inches high are numerous. In the areas between the hummocks several inches of surface soil were removed by erosion. This soil is not suited to cultivation because it is droughty and erodible. It is used entirely for range. The carrying capacity is very low.

Palisade loamy fine sand, 5 to 10 percent slopes (Po) (management group 1).—This soil occurs near the base of the Canyon Mountains south of Oak City. The relief is rolling. Dunes 1 to 3 feet high are numerous. The vegetation consists of sagebrush, junipers, and wild alfalfa.

Palisade clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes (Pa) (management group 1).—This soil occurs in the southwestern part of the Area on a low lake terrace. It is similar to Palisade loam, deep, over Boxelder soil material, 0 to 2 percent slopes, except that it has a clay loam or silty clay loam surface texture and is on somewhat lower and more nearly level positions. The native vegetation has been removed and the soil is used to grow winter wheat.

Pavant gravelly sandy loam, 2 to 5 percent slopes (Pr) (management group 3).—This is one of the more extensive soils of the Area. It occurs on old alluvial fans and terraces adjacent to the Pavant Mountains, between Holden and Kanosh. It is an upland soil that has a thin surface soil over a thick lime hardpan. The parent material was derived largely from limestone, sandstone, and quartzite. Runoff is slow. Internal drainage through the hardpan is very slow, except through the cracks. The content of organic matter in the surface soil is medium. The vegetation is mostly grasses.

Profile description:

0 to 3 inches, pale-brown sandy loam to light loam; many pebbles and fragments of lime hardpan that were brought to the surface by burrowing animals; strongly calcareous; very weak platy structure; breaks readily to fine granules; soft when dry and very friable when moist.

3 to 11 inches, pale-brown gravelly sandy loam; soft, granular, and otherwise similar to layer above.

11 to 19 inches, fragmental light-gray to white lime hardpan; large blocks of lime hardpan several inches wide; intervening cracks are filled with soil from layer above; pebbles and cobblestones are tightly cemented into the hardpan.

19 to 36 inches, dense light-gray to white lime hardpan with few cracks or cleavage planes; contains many rocks and pebbles completely cemented in place; many of the stones will break more readily than the cemented material; the hardpan layer softens somewhat with depth.

36 to 72 inches, stratified gravel and stones with some fine material.

Use and management.—This soil is used both for dry farming and for range. Dry farming was practiced only during years of high wheat prices. Yields of dry-farmed wheat are fair in years when rainfall is above normal.

Crop failures are likely if rainfall is below normal. This soil is probably best suited to spring and fall range.

Pavant gravelly sandy loam, 0 to 2 percent slopes (Pq) (management group 3).—This soil occurs mainly in and southwest of Fillmore. It is similar to Pavant gravelly sandy loam, 2 to 5 percent slopes, except that the surface soil is noncalcareous to very weakly calcareous in places. The depth of the soil above the hardpan ranges from about 10 to 24 inches. The native vegetation was probably bunchgrasses mixed with some sagebrush. Much of this has been destroyed and the present vegetation is mainly cheatgrass.

Within the town of Fillmore, this soil is used mainly to grow vegetables and fruits. Outlying areas are used either for dry farming or for spring and fall range. The range could be greatly improved by seeding suitable grasses.

Pavant gravelly sandy loam, 5 to 10 percent slopes (Ps) (management group 3).—This soil is rather extensive along the western base of the Pavant Mountains. It is similar to Pavant gravelly sandy loam, 2 to 5 percent slopes, except that it is slightly more eroded and the surface soil is stonier.

This soil is poorly suited to permanent dry farming but is used to some extent for that purpose. It can best be used for spring and fall range. Erosion has not decreased the range carrying capacity to any great extent.

Pavant gravelly sandy loam, 10 to 20 percent slopes (Pt) (management group 3).—This soil occurs about 3 miles north of Fillmore along the west side of United States Highway No. 91. It is similar to Pavant gravelly sandy loam, 5 to 10 percent slopes, except that it is more eroded because of steeper slopes. Shallow gullies are common. This soil is nonarable but provides fairly good range. The carrying capacity has been somewhat decreased by erosion.

Pavant stony sandy loam, 5 to 10 percent slopes (Paa) (management group 3).—This soil is widely distributed along the west front of the Pavant Mountains. It differs from Pavant gravelly sandy loam, 5 to 10 percent slopes, in having many stones in the surface soil. Most of the stones are quartzite but some are limestone. Because it is stony this soil is not suited to cultivation and is poor for grazing. Only the surface soil has been altered by sheet erosion.

Pavant stony sandy loam, 2 to 5 percent slopes (Pz) (management group 3).—This inextensive soil is similar to Pavant stony sandy loam, 5 to 10 percent slopes, except that it occurs on lower positions on the old alluvial fans, is less eroded, and supports a thicker growth of vegetation. It is not suited to farming.

Pavant stony sandy loam, 10 to 20 percent slopes (Pba) (management group 3).—This soil is similar to Pavant stony sandy loam, 5 to 10 percent slopes, but occurs on higher positions on the old alluvial fans and on steep slopes between entrenched drainageways. If undisturbed, this soil has a fairly good cover of grass and a fair carrying capacity. It is not suited to farming.

Pavant sandy loam, 2 to 5 percent slopes (Py) (management group 3).—This soil occurs mainly north of Holden near Church Spring and about 1 mile southeast of Holden. Except for texture, it is similar to Pavant gravelly sandy loam, 2 to 5 percent slopes.

Use and management.—This soil is used mainly for dry farming and for range. The carrying capacity is low but could be greatly improved by seeding crested wheatgrass. This soil is not well suited to irrigated farming because it is too shallow to be leveled.

Pavant loam, 2 to 5 percent slopes (Pv) (management group 3).—This soil is widely distributed along the western front of the Pavant Mountains, but it is most extensive between Fillmore and Holden. Except for surface texture, it is like Pavant gravelly sandy loam, 2 to 5 percent slopes. It is nearly free of gravel, but contains a few pieces of lime hardpan from the subsoil. There are also a few areas of gravelly or stony surface soil.

The surface soil is from 12 to 20 inches deep and rests directly on the hardpan. The hardpan is a true caliche and is extremely hard, brittle, and compact. Its upper portion may be fragmental or broken, but the main part is so strongly indurated that quartzite pebbles will break on it. Pebbles and stones are common in the hardpan and increase in quantity with depth. The hardpan extends to depths of 30 to 60 inches and rests on unconsolidated layers of gravel and stone.

The vegetation is largely sagebrush and grasses but includes a few scattered junipers. The grazing capacity is only fair. Much of this soil is now used for dry-farmed winter wheat. Yields are fairly good. The soil is not well suited to irrigated farming, mainly because it is shallow and consequently is difficult to level.

Pavant loam, 0 to 2 percent slopes (Pu) (management group 3).—This soil occurs mainly about 4 miles north of Holden and immediately southwest of Fillmore. Near Fillmore, it is closely associated with Millard soils. Depth to the hardpan ranges from 12 to 24 inches; generally it is nearly 24 inches. The vegetation consists of sagebrush and grasses. This soil is used mainly for dry farming. It could easily be fitted for irrigation and is the only Pavant soil suitable for irrigated farming.

Pavant loam, 5 to 10 percent slopes (Pw) (management group 3).—This soil resembles Pavant loam, 2 to 5 percent slopes, except that it has steeper slopes and has lost more surface soil through erosion. Scattered surface stones are common. This soil is used for range and for dry farming.

Pavant loam, 10 to 20 percent slopes (Px) (management group 3).—This soil occurs mainly about 3 miles north of Fillmore. It resembles Pavant loam, 5 to 10 percent slopes, in profile characteristics. The vegetation is predominantly juniper and cheatgrass but includes some sagebrush.

Pharo loam, 0 to 2 percent slopes (Pga) (management group 2).—This soil occurs on old alluvial fans and lake terraces along the east side of Pavant Valley. It is associated with the Pavant soils. The parent materials are mixed; they are mostly quartzite and limestone. This soil is somewhat excessively drained. Runoff is very slow and internal drainage is medium. The organic-matter content is moderate. The vegetation consists mainly of sagebrush and scattered bunchgrasses.

Profile description:

0 to 3 inches, pale-brown loam; contains a very few fine pebbles; weak fine platy structure; soft when dry and friable when moist; weakly calcareous.

3 to 19 inches, pale-brown loam; weak fine granular structure; slightly hard when dry and friable when moist; weakly calcareous.

19 to 34 inches, very pale brown, weakly lime cemented loam; hard when dry and friable when moist; strongly calcareous; some embedded gravel below 26 inches.

34 to 72 inches, very pale brown, slightly hard, stratified layers of medium-textured soil materials; in many places the bulk of this material consists of gravel; strongly calcareous.

The depth to the lime zone and the thickness and texture of the lime zone vary.

Use and management.—This soil is used both for dry farming and for range. Yields of dry-farmed wheat are not so high as those obtained on the Ebbs and Calita soils. Fitting this soil for irrigation would be easy. Under good management there would be only minor erosion problems. If adequately irrigated and well managed, this soil would be fairly well suited to alfalfa, grain, sugar beets, and other crops.

Pharo loam, 2 to 5 percent slopes (Pha) (management group 2).—This inextensive soil occurs in scattered small areas north of Fillmore and also north of Holden. In some places a few stones are scattered on the surface. These could easily be removed.

This soil is almost as well suited to dry farming and range as the nearly level soil. It is used mainly for dry farming. Because of the gentle slopes, it is more difficult to irrigate this soil and to control erosion. If the crops are carefully irrigated, yields should be only slightly less than on the nearly level soil.

Pharo gravelly loam, 0 to 2 percent slopes (Pca) (management group 2).—This soil is widely distributed along the eastern side of Pavant Valley. Except for surface texture, it is similar to Pharo loam, 0 to 2 percent slopes. The gravel is mixed; it is mostly quartzite and limestone.

The lime zone varies in hardness and thickness. It is not so hard as the lime zone in the Pavant soils, but it is generally stronger than the lime zone in the Palisade soils. The native vegetation probably consisted of bunchgrasses and some sagebrush, but most of the grasses have been destroyed by overgrazing.

Use and management.—This soil is used mostly for range. The carrying capacity is low but could be improved by reseeding. Although this soil is somewhat droughty for dry farming, some areas just north of Holden produce fair yields. If irrigated, this soil would be fairly productive, but it would need a lot of water. Fitting it for irrigation would be easy. It is suited to fruit, alfalfa, and grain, but it is poorly suited to root crops or other row crops.

Pharo gravelly loam, 2 to 5 percent slopes (Pda) (management group 2).—This soil occurs extensively in the southern part of the Area and also north of Holden. It resembles Pharo gravelly loam, 0 to 2 percent slopes, but contains stones in local areas. There has been some erosion but no serious damage.

The area north of Holden is used for dry-farmed grains. In years of average or above-average rainfall, yields are fairly good. In dry years, crop failures are common. It would be difficult to fit this soil for irrigation, and large quantities of irrigation water would be needed. Under careful management, fairly good crops of alfalfa, small grains, and possibly some fruits could be grown.

Pharo gravelly loam, 5 to 10 percent slopes (Pfa) (management group 2).—This inextensive soil is located about 1½ miles north of Fillmore. It occurs as a narrow strip on an escarpment between lower lying areas of the Ebbs soils near Chalk Creek and higher lying areas of other Pharo soils. This soil is similar to Pharo loam, 0 to 2 percent slopes, but there is much variation from place to place and many stony spots are included. This soil is nonarable. It is used mainly for range. The carrying capacity is low.

Playas (Pla) (management group 13).—This miscellaneous land type occurs in flat, barren, basinlike areas. It is normally strongly saline or strongly saline-alkali. After rainy periods water stands on the surface. Most areas have been affected by a high water table. Hardpans have developed at variable depths. The vegetation consists of scattered clumps of greasewood or greasewood and shadscale. This land type is not suited to range or crops. It might be useful as shelter for migratory wildlife.

Poganeab soils, undifferentiated, poorly drained, 0 to 2 percent slopes (Pva) (management group 11).—These soils occur on low terraces next to the Sevier River. The water table is seldom more than 3 or 4 feet below the surface. Nearly all of these soils are moderately saline. The surface texture ranges from sand to clay and changes in texture are abrupt. In places, a 6-foot profile may have a number of distinct layers of different colors.

Generally, the sands are deposited nearest the river channel and the finer materials in depressions or old oxbows. The subsoils vary; they are composed of stratified layers of stream-deposited materials.

Some areas contain many old oxbows or sloughs that were formerly part of the river. The sloughs contain water throughout the year. Some areas are subject to floods. In the sloughs, the vegetation consists of cattails, tules, and other water plants. In other areas, the vegetation is mostly saltgrass and greasewood, which are used for forage. The forage is fairly abundant but of poor quality. These soils are not suited to agriculture.

Preston fine sand, duny (Pma) (management group 9).—This soil occurs in the west-central part of the Area, mainly north and west of Pavant. It is closely associated with the Hardy, Deseret, Oasis, Woodrow, and Escalante soils. It consists of light-brown loose fine sand or very slightly loamy fine sand that was deposited by wind. This soil is weakly to moderately calcareous. The dunes, 3 to 12 feet high, are fairly well stabilized by the vegetation, which consists mainly of squawberry, rabbitbrush, and Russian-thistle. This soil is of limited value for range.

Preston fine sand, hummocky (Pna) (management group 9).—This soil is similar to Preston fine sand, duny, except that the hummocks are only 1 to 3 feet high.

Preston fine sand, moderately deep, over Boxelder soil material, 1 to 5 percent slopes (Poa) (management group 9).—This soil occurs immediately west and southwest of Hatton. It resembles Preston fine sand, hummocky, and consists of about 20 to 36 inches of wind-deposited loose fine sand that is underlain by typical lake-deposited Boxelder soil material. This soil is used for range. The quality of the range is poor.

Preston and Escalante soils and sand dunes (Ppa) (management group 9).—These undifferentiated soils occur about 10 miles southeast of Delta. They consist of numerous small areas of Escalante sandy loams that are surrounded by large areas of Preston sands and Sand dunes. The Preston sands consist of deep accumulations of loose sand. The parent material was derived from a mixture of basalt and sandstone. The sand derived from basalt is dark gray to nearly black, and the sand derived from sandstone is very pale brown to light gray. The color of the Preston sands varies from place to place, depending on the color of the different sand particles. The hummocks and dunes are partially stabilized by the

vegetation, which consists mainly of rabbitbrush, greasewood, sagebrush, and Russian-thistle.

Preston and Lynndyl soils, 2 to 5 percent slopes (Psa) (management group 9).—These soils occur in broad areas in the northern part of the Area. The mapping unit is very extensive. Dunes of Preston sand, 3 to 12 feet high, cover about 80 percent of the acreage. In many places, the areas between the dunes have a light-gray, strongly calcareous surface layer of loamy sand or light sandy loam. The original surface soil was lost through erosion, and the present surface layer is the zone of lime accumulation of the Lynndyl loamy sand.

These soils are used mainly for spring and fall range. The carrying capacity is very low.

Preston and Lynndyl soils, 0 to 2 percent slopes (Pra) (management group 9).—This mapping unit of undifferentiated soils occurs on nearly level relief, but the dunes of Preston sand give the landscape an undulating or rolling appearance. These soils resemble Preston and Lynndyl soils, 2 to 5 percent slopes.

Preston and Taylorsflat soils and sand dunes (Pta) (management group 9).—These undifferentiated soils occur in the northeastern part of the Area. They consist of large areas of Preston sand that has been blown over Taylorsflat soils. Hummocks and dunes of Preston sands cover about 60 to 75 percent of the acreage. Between the dunes these soils have the typical Taylorsflat profile, but with a surface soil of wind-deposited loamy sand. The relief of the sand dunes and hummocks is rolling, but generally the areas are nearly level.

The vegetation consists mainly of sagebrush, scattered juniper, rabbitbrush, Russian-thistle, wild alfalfa, and some grass. Galletagrass and Indian ricegrass grow in a few spots that have not been severely overgrazed. The areas of Preston sand are only partially stabilized by vegetation. During windstorms, there is much movement of sand. All of this unit is used for range. The carrying capacity is very low.

Red Rock loam, 0 to 2 percent slopes (Rd) (management group 1).—This deep soil occurs on nearly level parts of recent alluvial fans along the western side of the Pavant Mountains, mainly between Fillmore and Kanosh. It is associated with Millard soils and with other Red Rock soils. The parent materials were derived mainly from quartzite but include some limestone and sandstone. Permeability is moderate throughout. The water-holding capacity is high. Drainage is good. Runoff is very slow, and internal drainage is medium.

Profile description:

0 to 3 inches, brown loam; noncalcareous; moderate medium granular structure; slightly hard when dry and friable when moist; relatively high in organic matter.
3 to 17 inches, pale-brown to brown loam; noncalcareous; granular; slightly hard when dry and friable when moist.
17 to 38 inches, pale-brown clay loam; noncalcareous; massive; slightly hard when dry and friable when moist.
38 to 72 inches, pale-brown clay loam; massive; slightly hard; strongly calcareous; has small streaks of segregated lime and a few scattered quartzite pebbles; in places the deeper parts of this layer are gravelly and contain some cobblestones.

The depth of the noncalcareous material varies from place to place but is generally about 30 inches.

Use and management.—This soil is used mainly for dry-farmed winter wheat. Yields are high. The soil is well suited to general irrigated farming. Under good management, high yields of a number of crops can be obtained.

Red Rock loam, 2 to 5 percent slopes (Re) (management group 1).—This soil is closely associated with Red Rock loam, 0 to 2 percent slopes, but occurs generally in higher positions on the alluvial fans. The noncalcareous surface material is only about 25 inches deep. Below a depth of about 4 feet the substratum is generally gravelly and cobbly.

This soil is used extensively for dry farming and for range. Wheat yields are about the same as on the nearly level Red Rock loam. This soil would be fairly well suited to general irrigated farming, but it would need leveling to fit it for irrigation.

Red Rock loam, moderately deep, over Boxelder soil material, 2 to 5 percent slopes (Rg) (management group 1).—This soil occurs in scattered areas between Fillmore and Kanosh. It is associated with the Millard and Boxelder loams and with other Red Rock loams. At a depth of about 30 inches this soil is underlain by the calcareous, diatomaceous material that characterizes the substratum of the Boxelder soils. This soil is used mainly for dry-farmed wheat. A small area is irrigated.

Red Rock loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes (Rf) (management group 1).—This soil resembles Red Rock loam, moderately deep, over Boxelder soil material, 2 to 5 percent slopes. It is used mainly for dry farming, but it would also be suited to general irrigated farming. Generally, yields of dry-farmed wheat are good.

Red Rock fine sandy loam, 2 to 5 percent slopes (Rc) (management group 1).—This soil occurs mainly on recent high alluvial fans along the western front of the Pavant Mountains between Meadow and Kanosh. It is closely associated with the Millard gravelly loams and Red Rock loams. It is similar to Red Rock loam, 2 to 5 percent slopes, except for texture. The thickness of the noncalcareous material varies from place to place. In some areas the substratum is coarser textured, and the deeper layers may contain pebbles and stones. In places, scattered stones occur in the surface soil.

Use and management.—This soil is used mainly for dry farming. Yields of winter wheat are usually good but slightly less than those obtained on Red Rock loam, 2 to 5 percent slopes. This soil would be fairly well suited to irrigated farming, but would need leveling or terracing to fit it for irrigation.

Red Rock clay loam, 0 to 2 percent slopes (Ra) (management group 1).—This soil occurs mainly south and southwest of Fillmore. It is similar to Red Rock loam, 0 to 2 percent slopes, except for surface texture. This soil is suited to, and is used for, both dry and irrigated farming. Under good management, high yields can be obtained.

Red Rock clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes (Rb) (management group 1).—This soil occurs most extensively about 3 miles southwest of Fillmore. It is associated with the Millard and Boxelder soils and with other Red Rock soils. In profile characteristics this soil is similar to Red Rock clay loam, 0 to 2 percent slopes. At a depth of about 30 inches it is underlain by a white, calcareous, diatomaceous lake deposit that characterizes the substratum of the Boxelder soils. This soil is used for dry farming. Yields of wheat are usually good.

Riverwash (Rh) (management group 13).—This miscellaneous land type is most extensive along Chalk Creek east of Fillmore. It consists of stony and gravelly stream beds and flooded areas. Most of the streams in the Area have well-defined channels and do not form this land type. Riverwash is not suited to agriculture and has little native vegetation.

Rough gullied land, Ebbs soil material (Rl) (management group 13).—This miscellaneous land type occurs about 3 miles northwest of Kanosh. It consists of a narrow strip of Ebbs loam so severely eroded as a result of overflow from Corn Creek that it is of no use for crops. It is used for range. The rather broad deep gully forms a drainageway for surrounding areas of Ebbs loam and Ebbs silty clay loam.

Rough gullied land, Sigurd soil material (Rm) (management group 13).—This miscellaneous land type occurs north of Oak City, in association with Genola fine sandy loam, 2 to 5 percent slopes. It consists of two small areas that have developed as a result of gullying and deposition of coarse pebbles and cobblestones.

Rough gullied land, Woodrow soil material (Rn) (management group 13).—This miscellaneous land type occurs on a gently sloping river terrace about 1 mile northwest of Leamington. It consists of an area of Woodrow clay loam that has been practically destroyed by a network of deep gullies. The gullies apparently resulted from careless use of irrigation water.

Rough stony land (Ro) (management group 12).—This miscellaneous land type is most extensive in the extreme northeastern part of the Area. It consists of steep mountainous slopes ranging from 20 to 40 percent. Most of this mapping unit is barren rocky land. The vegetation consists of scattered juniper trees and sagebrush. Its value for grazing is very low.

Sand dunes (S) (management group 9).—This miscellaneous land type occurs in the northern and west-central parts of the Area. It is closely associated with the Preston and Lynndyl soils and the Preston and Escalante soils. The mapping unit consists of loose sand dunes, 3 to 20 feet high, that shift continuously with the prevailing winds. There is almost no vegetation.

Sanpete gravelly sandy loam, 2 to 5 percent slopes (Sf) (management group 2).—This soil occurs on old alluvial fans and high lake terraces, mainly in the northeast and southwest parts of the Area. It is associated with Neola gravelly sandy loam, 2 to 5 percent slopes, from which it differs in having less lime in the subsoil. The lime is weakly cemented. The parent material consists of alluvium that was derived mainly from sandstone, limestone, and quartzite. Drainage is somewhat excessive. The vegetation is mostly sagebrush and shadscale, but includes scattered bunchgrass and Russian-thistle and other annual weeds.

Profile description:

0 to 3 inches, very pale brown gravelly sandy loam; weak fine platy structure; soft when dry and very friable when moist; moderately calcareous; low in organic matter.
3 to 13 inches, very pale brown gravelly sandy loam; contains more gravel than the surface layer; weak granular structure; strongly calcareous.
13 to 25 inches, white, weakly lime cemented zone; very gravelly sandy loam; pebbles are lime coated on the bottom.
25 to 72 inches, pale-yellow rounded gravel and sand; loose; strongly calcareous.

The depth to the lime zone and the thickness and degree of cementation of the lime zone vary. The gravel content of the surface soil also varies. In some areas scattered stones occur on the surface.

Use and management.—This soil is used mainly for range. It is not suitable for dry farming because it receives little rainfall and does not hold moisture well. If this soil were adequately irrigated, fair yields of small grains, corn, alfalfa, and other general farm crops could be obtained. Tillage would be difficult because of the pebbles and scattered stones.

Sanpete gravelly sandy loam, 0 to 2 percent slopes (Se) (management group 2).—This soil is similar to Sanpete gravelly sandy loam, 2 to 5 percent slopes, but has a slightly thicker and more gravelly surface layer. By good management and frequent irrigation, fair yields of general farm crops could be obtained. This soil is now used for range because irrigation water is not available. The carrying capacity of the range is low but could be improved by proper management.

Sanpete gravelly sandy loam, 5 to 10 percent slopes (Sg) (management group 2).—This soil is similar to Sanpete gravelly sandy loam, 2 to 5 percent slopes, except that the surface layer is somewhat thinner and more variable and the layer of concentrated lime carbonate is also thinner. Included with this soil are 54 acres of moderately steep slopes that occur about 4 miles north of the extreme southwest corner of the Area. This soil is used mainly for range. The carrying capacity is low.

Sanpete stony sandy loam, 2 to 5 percent slopes (Sk) (management group 2).—This soil occurs both in the northeastern and in the southwestern parts of the Area. Except that it is stony throughout the profile, it is like Sanpete gravelly sandy loam, 2 to 5 percent slopes. The present vegetation is mainly sagebrush and scattered juniper trees. The original vegetation was probably bunchgrasses mixed with some sagebrush. This soil is used for spring and fall range.

Sanpete stony sandy loam, 5 to 20 percent slopes (Sl) (management group 2).—This soil consists of sloping and moderately steep areas of Sanpete stony sandy loam. It is associated with Sanpete stony sandy loam, 2 to 5 percent slopes, but occurs in higher positions on the alluvial fans. It is nonarable and can be used only for range. The carrying capacity is very low. Improving it would be difficult and slow.

Sanpete stony sandy loam, eroded, 5 to 20 percent slopes (Sm) (management group 2).—This soil occurs near the western border of the Area west of Kanosh and also on the western foot slopes of West Mountain. It is like Sanpete stony sandy loam, 5 to 20 percent slopes, except that it has been severely eroded. The native vegetation was apparently destroyed by overgrazing. Some places are gullied and others are sheet eroded.

Sanpete fine sandy loam, 0 to 2 percent slopes (Sa) (management group 2).—This soil occurs on old alluvial fans along the western front of the Canyon Mountains. It is closely associated with Palisade fine sandy loam, 0 to 2 percent slopes, and differs from this soil mainly in subsoil and substratum characteristics. Except for finer surface texture, it is similar to Sanpete gravelly sandy loam, 0 to 2 percent slopes.

The thickness of the various layers and their gravel content vary from place to place. The degree of cementation in the lime-carbonate zone varies also. Runoff is

very slow, and internal drainage is medium. The present vegetation is mainly sagebrush and Russian-thistle.

Use and management.—This soil is used mainly for range, but some of it has recently been cleared for dry farming. It is poorly suited to dry farming because its water-holding capacity is low and it receives little rainfall. If cleared, this soil is suited to crested wheatgrass. It could easily be fitted for irrigation. If properly managed, it should produce fair yields of alfalfa, small grains, corn, and potatoes.

Sanpete fine sandy loam, moderately deep, 2 to 5 percent slopes (Sb) (management group 2).—This soil is associated with and is similar to Sanpete fine sandy loam, 0 to 2 percent slopes, but it is more widely distributed. Most of this soil is used for range, but some areas have been cleared and used for dry farming. This soil is not so well suited to irrigated farming as the nearly level Sanpete fine sandy loam, but if it is carefully managed yields are fairly good.

Sanpete fine sandy loam, shallow, 2 to 5 percent slopes (Sc) (management group 2).—This soil occurs in the same general area as the other Sanpete fine sandy loams. It is similar to Sanpete fine sandy loam, moderately deep, 2 to 5 percent slopes, except that the depth to the layer of lime carbonate ranges from 10 to 20 inches; normally, it is about 12 inches.

This soil is used mainly for range. It is best suited to permanent range. Generally, the carrying capacity is very low. This soil is very poor for either dry or irrigated farming. Establishing good stands of crested wheatgrass would increase the carrying capacity of the range.

Sanpete fine sandy loam, shallow, 5 to 10 percent slopes (Sd) (management group 2).—This inextensive soil occurs in two areas. One is on the eastern slopes of West Mountain about 4 miles northwest of Fillmore. The other area is small and is located southeast of Oak City. This soil resembles Sanpete fine sandy loam, shallow, 2 to 5 percent slopes. The vegetation is mainly sagebrush but includes some scattered juniper trees. All of this soil is used for range. The carrying capacity is low.

Sanpete loam, 0 to 2 percent slopes (Sh) (management group 2).—This soil occurs about 5 miles north-northwest of Holden. Except for surface soil texture, it resembles Sanpete fine sandy loam, 0 to 2 percent slopes. It is better suited to dry farming because it has better water-holding capacity. Most of it is used for dry-farmed winter wheat. This soil is easy to fit for irrigated farming. If properly managed and adequately irrigated, it should give good yields of alfalfa, small grains, corn, and potatoes.

Sanpete loam, 2 to 5 percent slopes (Si) (management group 2).—This soil occurs in two widely separated parts of the Area. One is about 1½ miles southeast of Oak City and one, a smaller area, is in the extreme southwestern part. This soil resembles Sanpete loam, 0 to 2 percent slopes, but has more variation in the depth of the surface soil. The area southeast of Oak City supports a fairly thick growth of juniper, and the surface soil is somewhat darker colored than is typical of Sanpete soils. This soil is used for range.

Sanpete loam, 5 to 10 percent slopes (Sj) (management group 2).—This inextensive soil occurs in about the same localities as Sanpete loam, 2 to 5 percent slopes. As a result of erosion, the surface soil varies considerably in depth. In places, scattered stones occur. This soil is used for range. The carrying capacity is very low.

Santaquin loamy fine sand, 2 to 5 percent slopes (Sp) (management group 7).—This soil occurs on upland benches, terraces, and old lake beaches, mainly in the southeastern part of the Area. It is most extensive about 2 or 3 miles southwest of Kanosh. The parent material was derived principally from quartzite and sandstone but includes some igneous material. Permeability is very rapid and the water-holding capacity is low. Runoff is very slow, and internal drainage is very rapid. The vegetation consists of juniper trees, sagebrush, bitterbrush, cheatgrass, and annual weeds.

Profile description (fig. 11):

0 to 4 inches, brown loamy fine sand; weakly granular; soft to loose; noncalcareous; low in organic matter.
4 to 14 inches, reddish-brown loamy fine sand; massive; noncalcareous; soft when dry and very friable when moist.
14 to 42 inches, yellowish-red loamy fine sand; noncalcareous or very weakly calcareous in the lower part; soft when dry and very friable when moist; massive.
42 to 65 inches, pink, slightly loamy fine sand; moderately calcareous; massive; soft to slightly hard when dry and very friable when moist.
65 to 72 inches, pink, slightly loamy fine sand; strongly calcareous with white flecks of lime; soft when dry and very friable when moist; massive.

In places, this soil is slightly stratified. In other places there is a weakly lime cemented horizon.

Use and management.—This soil is used entirely for range. Mainly because it has a low water-holding capacity, it is not suited to dry farming. It would be fairly well suited to irrigated crops, especially orchards or truck crops. Special facilities would be needed to apply irrigation water economically.

Figure 11.—**Profile of Santaquin loamy fine sand about 4 miles southwest of Kanosh.**

Santaquin loamy fine sand, 5 to 10 percent slopes (Sq) (management group 7).—This soil occurs in small widely separated areas between Fillmore and Kanosh. It resembles Santaquin loamy fine sand, 2 to 5 percent slopes. It is used entirely for range. If irrigated, it could be used for orchards.

Santaquin sandy loam, 2 to 5 percent slopes (Ss) (management group 7).—This soil occurs on old narrow beaches in the southeastern part of the Area. One area, about a mile southeast of Meadow, has slopes of 5 to 8 percent. This soil is closely associated with Santaquin loamy fine sands. It is similar to Santaquin loamy fine sand, 2 to 5 percent slopes, except that, to a depth of about 12 inches, it has a light sandy loam texture.

This soil is practically all used for range. It is not suited to dry farming because of its low water-holding capacity, but if irrigated it would be suited to orchards and other special crops.

Santaquin sandy loam, 0 to 2 percent slopes (Sr) (management group 7).—Most of this inextensive soil occurs about 2 miles southwest of Kanosh. It is closely associated with Santaquin loamy fine sand, 2 to 5 percent slopes. In places it occurs as narrow strips between larger areas of the associated soil. The vegetation of the two soils is different. This soil has a thick cover of sagebrush and only a few juniper trees. In use suitability the two soils are similar.

Santaquin fine sandy loam, moderately deep, over Pavant soil material, 5 to 10 percent slopes (Sn) (management group 7).—This soil occurs on old alluvial fans about 10 miles north of Holden near the mouth of Whisky Creek Canyon. At a depth of about 30 inches the uniform, brown, noncalcareous fine sandy loam is underlain by a strongly cemented lime hardpan. Most of this soil is used for irrigated farming. Alfalfa and potatoes are the principal crops. Yields are fair.

Santaquin fine sandy loam, moderately deep, over Pharo soil material, 2 to 5 percent slopes (So) (management group 7).—This inextensive soil is similar to Santaquin fine sandy loam, moderately deep, over Pavant soil material, 5 to 10 percent slopes, except that, at a depth of about 30 inches, it is underlain by a stony and gravelly substratum. The substratum contains a strong concentration of lime that has not been noticeably cemented. All of this soil is used for range.

Scabland (St) (management group 12).—This miscellaneous land type occurs only near the western border of the Area. It consists mainly of lava flows that were partially covered by lake sediments during the Lake Bonneville period. In depressed areas the lake sediments are fairly deep, but on the lava ridges there are practically no lake deposits. A rather small area west of Hatton consists mainly of tufa ridges and of nearly white tufaceous soil material in the depressions. The vegetation consists of shadscale, rabbitbrush, other desert shrubs, and some grasses, which provide a small amount of grazing.

Sigurd fine sandy loam, 2 to 5 percent slopes (Sv) (management group 2).—This soil occurs on recent alluvial fans near the base of the mountains in the northeastern and southwestern parts of the Area. The parent material was derived from a mixture of quartzite, limestone, and sandstone. Below a depth of about 24 inches there is a gravelly substratum. Runoff is slow and internal drainage is rapid. The present vegetation is mainly sagebrush but includes scattered juniper trees. The original native vegetation, which has been almost entirely destroyed by overgrazing, probably consisted of a mixture of bunchgrasses and some sagebrush.

Profile description (observed in a pit near the Oak City-McCornick crossroads):

0 to 8 inches, very pale brown fine sandy loam; strongly calcareous; very weak fine granular structure; soft when dry and very friable when moist; low in organic matter.
8 to 20 inches, very pale brown light sandy loam; strongly calcareous; massive; soft when dry, very friable when moist.
20 to 33 inches, light yellowish-brown gravelly loamy sand; strongly calcareous; loose; massive; large amount of fine to medium gravel; some pebbles are lightly lime coated on bottom.
33 to 60 inches, very pale brown loose sand and gravel; estimated to contain 70 percent gravel; strongly calcareous.

Use and management.—A few small areas of this soil near Oak City are closely associated with the Genola soils and produce irrigated fruits, vegetables, and general crops. This soil is best suited to melons, tomatoes, and other fruits and vegetables. It needs light, frequent irrigation to prevent excessive loss of water by deep percolation.

Sigurd fine sandy loam, 0 to 2 percent slopes (Su) (management group 2).—This soil occurs in the same general localities as Sigurd fine sandy loam, 2 to 5 percent slopes, on the nearly level parts of the alluvial fans. It resembles the associated soil.

Sigurd loam, 0 to 2 percent slopes (Sba) (management group 2).—This soil occurs in widely separated localities. The larger areas are in and immediately west of Oak City. The smaller areas are about 6 miles north-northwest of Holden.

Except for surface texture, this soil resembles Sigurd fine sandy loam, 0 to 2 percent slopes. The depth to the loose gravelly substratum ranges from 12 to 30 inches. The larger areas of this soil in and near Oak City are used for intensive irrigated farming, and the smaller areas near Holden are used entirely for range.

Sigurd loam, 2 to 5 percent slopes (Sca) (management group 2).—This soil occurs near Oak City and also about 4 miles west of Kanosh. In both areas it is closely associated with the Genola soils. It resembles Sigurd loam, 0 to 2 percent slopes. The surface soil contains a few scattered cobblestones. The stones can easily be removed to prepare the soil for cultivation. The areas near Oak City are used partly for dry farming and partly for range, but near Kanosh all of this soil is used for dry farming.

Sigurd gravelly sandy loam, 2 to 5 percent slopes (Sy) (management group 2).—This soil occurs on gently sloping alluvial fans near the base of the mountains in the northeastern and southwestern parts of the Area. It is the most extensive of the Sigurd soils. With depth, the soil profile becomes sandier and more gravelly.

This soil is not suited to general irrigated farming, because it is droughty. If the local climate is favorable, this soil is fairly well suited to irrigated fruits.

Sigurd gravelly sandy loam, 0 to 2 percent slopes (Sx) (management group 2).—This soil resembles Sigurd gravelly sandy loam, 2 to 5 percent slopes. It occurs on slightly higher positions on the alluvial fans. Because it is nearly level, it would be somewhat more suitable for orchards than the gently sloping soil. Nearly all of this soil is used for range.

Sigurd gravelly sandy loam, 5 to 10 percent slopes (Sz) (management group 2).—This soil occurs in the same gen-

eral localities as the other Sigurd soils. It resembles Sigurd gravelly sandy loam, 2 to 5 percent slopes. It is not suited to general irrigated farming, because it is gravelly, droughty, and sloping. If the local climate is favorable and if special irrigation facilities are provided, it is suited to orchards.

Sigurd gravelly sandy loam, moderately deep, over Boxelder soil material, 0 to 5 percent slopes (Saa) (management group 2).—This soil occurs on alluvial deposits consisting principally of volcanic cinders washed from a large crater west of Flowell. The gravelly sandy loam is about 30 inches deep and is underlain by chalky material like that in the Boxelder soils. The vegetation consists mainly of short sagebrush.

Sigurd stony sandy loam, 5 to 10 percent slopes (Sfa) (management group 2).—This soil occurs in the same general areas as the other Sigurd soils, but higher on the alluvial fans. It resembles Sigurd gravelly sandy loam, 5 to 10 percent slopes, except that it contains large quantities of stones. The vegetation consists mainly of sagebrush but in places includes a few scattered small juniper trees. This soil is not suited to general irrigated farming. It is suited only to range. The carrying capacity is low but could be increased by good management.

Sigurd stony sandy loam, 2 to 5 percent slopes (Sda) (management group 2).—Except for slopes, this soil is similar to Sigurd stony sandy loam, 5 to 10 percent slopes. The vegetation consists of sagebrush and grasses. This soil is suited only to range.

Sigurd stony sandy loam, eroded, 2 to 5 percent slopes (Sga) (management group 2).—This soil occurs generally near the mouth of canyons or larger drainageways, mainly along the western front of the Canyon Mountains. It consists of areas of Sigurd stony sandy loam, 2 to 5 percent slopes, that have been severely gullied. Overgrazing on the higher mountains causes water to run off rapidly and to accumulate in the larger drainageways. All of this soil is used for range. The carrying capacity is low.

Sigurd gravelly loamy sand, 2 to 5 percent slopes (Sw) (management group 2).—This soil occurs in three different locations. Most of it is located about 2 miles west of Oak City. One small area is about 12 miles south of Oak City. Another is in the extreme southwestern part of the Area. This soil is closely associated with large areas of dune sand. The shallow surface soil is underlain by fairly clean stratified gravel and sand. This soil is not suited to crops. It is used for range.

Smooth stony land (Sla) (management group 12).—This miscellaneous land type is similar to Rough stony land, but generally the slopes are less steep and there is more soil material. The mapping unit consists of isolated buttes and ridges and portions of the western front of the Canyon and Pavant Mountains. The rock material consists of quartzite, limestone, sandstone, basalt, and tufa. This land type is very shallow. Generally it has developed in place over bedrock. Those parts of the buttes that were covered by the waters of Lake Bonneville have a mantle of lake sediments.

Sunset loam, 0 to 2 percent slopes (Sna) (management group 1).—This soil occurs on flood plains below the shorelines of prehistoric Lake Bonneville. It is rather widely distributed throughout the lower parts of Pavant Valley and is most extensive in the immediate vicinity of Pavant. It is closely associated with other Sunset soils.

The parent material was derived from a mixture of rocks, predominantly quartzite, sandstone, and limestone. The thick, dark-colored surface soil is from 7 to 26 inches deep and is underlain by a medium-textured subsoil and substratum. Permeability is moderate and the water-holding capacity is also moderate. Drainage is good. Runoff is very slow and internal drainage is medium. The vegetation consists mainly of greasewood and sagebrush and of greasewood alone on the more saline areas.

Profile description:

0 to 10 inches, grayish-brown loam; moderately calcareous; moderate to strong granular structure; slightly hard when dry and friable when moist; high in organic matter.
10 to 21 inches, light brownish-gray loam; moderately calcareous; weak granular structure; slightly hard when dry and friable when moist.
21 to 32 inches, light brownish-gray silt loam; strongly calcareous; contains faint veins and mottlings of lime; massive; hard when dry and friable when moist.
32 to 42 inches, pale-brown clay loam; strongly calcareous; massive; hard when dry and friable when moist.
42 to 72 inches, very pale brown to pale brown loam; strongly calcareous; contains some white flecks of lime; massive; slightly hard when dry and friable when moist.

At variable depths there are layers of dark-colored soil material similar to the material in the surface soil. The texture below the surface layer varies a great deal from place to place but is generally loam or silt loam.

Use and management.—This soil is used for general irrigated farming and for range. Near Pavant, it is used mainly for irrigated farming. Yields of alfalfa, small grains, corn, and potatoes are generally good. Drainage is good but, if surrounding higher lying areas are irrigated, a high water table may develop.

Sunset loam, poorly drained, 0 to 2 percent slopes (Soa) (management group 1).—This soil occurs in a narrow strip on each side of Meadow Creek, immediately northwest of Meadow. It is similar to the well-drained Sunset loam, 0 to 2 percent slopes, but the surface soil is generally higher in organic matter. The water table fluctuates to some extent but is always high. The vegetation is a luxuriant growth of sedges and water-loving grasses. This soil is used mainly for pasture. Some grass hay is harvested.

Sunset fine sandy loam, 0 to 2 percent slopes (Sma) (management group 1).—This nearly level soil occurs in low-lying positions mainly near Pavant. It is closely associated with Sunset loam, 0 to 2 percent slopes. Below the surface soil the profile is similar to that of the associated soil, but in a few areas the texture is somewhat coarser. This soil is used rather extensively for general irrigated farming. Crop yields are about the same as those obtained on Sunset loam, 0 to 2 percent slopes.

Sunset silty clay loam, 0 to 2 percent slopes (Sra) (management group 1).—This soil occurs in low positions. In places, it is closely associated with the Sunset loams. The surface soil is 6 to 26 inches thick and is underlain by brownish-gray to pale-brown massive silty clay loam. In many places, this soil is strongly saline. Permeability is moderate and the water-holding capacity is high. The water table is more than 6 feet below the surface; nevertheless, drainage problems may develop. Drainage facilities should be provided. This soil is used for general irrigated farming and for range.

Sunset silty clay loam, imperfectly drained, 0 to 2 percent slopes (Ssa) (management group 1).—This soil is similar to Sunset silty clay loam, 0 to 2 percent slopes,

except that its water table is within 6 feet of the surface. The water table fluctuates to some extent but is seldom less than 3 feet from the surface. This soil is used for pasture and for meadow hay.

Taylorsflat sandy loam, 0 to 2 percent slopes (Tb) (management group 4).—This soil occurs only on high delta terraces next to the Sevier River in the northern part of the Area. It is closely associated with the Preston soils and other Taylorsflat soils. The parent material was derived from a mixture of parent rock and was deposited by the Sevier River. The surface soil is underlain by a silty clay subsoil and substratum. Generally, the subsoil is moderately saline. Runoff is very slow, and internal drainage is slow to very slow. The vegetation is sagebrush, shadscale, and a few small junipers.

Profile description:

0 to 4 inches, very pale brown sandy loam; weak fine granular structure; hard when dry and friable when moist; undisturbed profiles are faintly platy; strongly calcareous; moderate content of organic matter.
4 to 14 inches, light-gray to very pale brown sandy loam; fine granular structure; hard when dry and friable when moist; strongly calcareous.
14 to 25 inches, very pale brown silty clay; has streaks and blotches of segregated white lime carbonate; weak subangular blocky structure; breaks to coarse granules that are hard when dry and plastic when wet.
25 to 72 inches, very pale brown to light-gray silty clay; compact; massive to weak coarse subangular blocky structure; hard to very hard when dry and plastic when wet; strongly calcareous.

The depth to the compact clay or silty clay layer varies somewhat. Below a depth of about 4 feet the deep substratum varies a great deal. In places the profile contains sandy clay or gravel.

Use and management.—Most of this soil is used for range. Some is used for irrigated farming. Yields of alfalfa and small grains are only fair. Because of its isolated location this soil is generally not suited to irrigated farming. The range has a low carrying capacity. Wind erosion might prove a severe problem on this soil but could probably be controlled.

Taylorsflat sandy loam, imperfectly drained, 0 to 2 percent slopes (Tc) (management group 4).—This inextensive soil occurs in two small areas near the west side of Fool Creek Reservoir. It is similar to Taylorsflat sandy loam, 0 to 2 percent slopes, except that the water table is within 6 feet of the surface. The high water table is probably caused by seepage of water from the reservoir. This soil is used for range.

Taylorsflat loam, 0 to 2 percent slopes (Ta) (management group 4).—This soil is similar to Taylorsflat sandy loam, 0 to 2 percent slopes, except that the surface soil ranges in texture from very fine sandy loam to silt loam and contains slightly more organic matter. The water-holding capacity of the surface soil is moderate, but the silty clay subsoil retains moisture well and might become waterlogged if improperly irrigated. This soil is only slightly eroded, and it would not erode seriously under irrigation. Areas of this soil that are free of soluble salts are fairly well suited to agriculture.

A small acreage has been irrigated from the Central Utah Canal, and yields of alfalfa and grain have been fair. Some alfalfa seed has been produced. Under good management, irrigated farming should be fairly successful. The vegetation is sagebrush and shadscale, but includes Russian-thistle, cheatgrass, and other weeds. Only about 25 percent of this soil is farmed. The rest is used for range.

Taylorsflat silty clay loam, 0 to 2 percent slopes (Td) (management group 4).—This soil occurs in the northern part of the Area and is closely associated with Harding silty clay loam, 0 to 2 percent slopes. It is similar to Taylorsflat loam, 0 to 2 percent slopes, but differs in having a silty clay loam surface soil. This soil is moderately to strongly saline. The vegetation is mainly shadscale but includes a little bud sage and white sage. All of this soil is used for range. The carrying capacity is low.

Terrace escarpments (Te) (management group 12).—This miscellaneous land type occurs where the channel of the Sevier River is 50 to 200 feet below the surrounding plain. The escarpments are narrow and steep. Many areas are severely eroded and gullied. The texture of the soil material varies from gravelly sandy loam to clay. The vegetation is mainly shadscale, greasewood, and rabbitbrush. The density of the vegetation varies widely from place to place, but generally it is of little value for grazing.

Woodrow silty clay loam, 0 to 2 percent slopes (Wl) (management group 4).—This soil occurs only on low lake terraces along the western side of the Area. It is most extensive between Hatton and McCornick. The parent materials are mixed lake-deposited sediments that have been reworked by local streams in many places. This soil is well drained. Runoff is very slow, and internal drainage is slow. The vegetation consists of greasewood, shadscale, and saltgrass.

Profile description:

0 to 3 inches, light-gray to very pale brown silty clay loam; moderately to strongly calcareous; thin platy structure that is vesicular in many places; soft when dry and very friable when moist; low in organic matter.
3 to 13 inches, very pale brown silty clay loam; strongly calcareous, but lime is disseminated; appears massive but breaks into weak medium to fine granules; hard when dry, firm to friable when moist.
13 to 72 inches, very pale brown to white silty clay loam; strongly calcareous; massive; hard when dry and friable when moist.

Use and management.—This is one of the more productive soils of the Area, although virgin areas are generally somewhat saline and alkali and artificial drainage is generally needed. Much of the good farmland near Flowell consists of this soil. It is used for general farming. Potatoes are the principal crop. Early fall frosts are likely to restrict yields and to prevent production of alfalfa seed and other late-maturing crops in many places. Water for irrigation is obtained mostly from artesian wells. Yields could be increased by applying barnyard manure and by improving tillage practices. The acreage used for crops is rather small. Most of this soil is used for range. The carrying capacity is very low.

Woodrow silty clay loam, deep, over Oasis soil material, 0 to 2 percent slopes (Wo) (management group 4).—This soil occurs in the northeastern part of the Area, mainly in the vicinity of Leamington. To a depth of about 42 inches it is similar to Woodrow silty clay loam, 0 to 2 percent slopes, but it is underlain by a substratum of stratified material, mainly loam and fine sandy loam, that resembles the substratum of the Oasis soils. Most of this soil is used for irrigated alfalfa and small grains. Under good management, crop yields are generally high.

Woodrow silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes (Wn) (management group 4).—This soil occurs on low lake terraces in the southwestern part of the Area about 6 miles west of Kanosh. To a depth of about 36 inches the soil resembles Woodrow silty clay loam, but below this depth the substratum consists of the white, chalky, diatomaceous material that is characteristic of the Boxelder soils. The substratum varies from a silt loam to a silty clay loam. This soil is moderately to strongly saline. The vegetation is mainly greasewood and shadscale. Nearly all of this soil is used for range. The carrying capacity is low. Reclaiming this soil would require drainage and leaching. Drainage would be difficult because of the low position of the soil.

Woodrow silty clay loam, eroded, 2 to 5 percent slopes (Wm) (management group 4).—This soil occurs in the northern part of the Area between Oak City and Delta and in the southwestern part of the Area. It resembles Woodrow silty clay loam, 0 to 2 percent slopes, except that it has been severely damaged by wind erosion, sheet erosion, and gullying. This soil is used for range. The carrying capacity is very low.

Woodrow loam, 0 to 2 percent slopes (Wd) (management group 4).—This soil occurs mainly on fairly low lake terraces, but some of it is on moderately high river terraces. It is widely distributed in the western part of the Area and is extensive in the vicinity of Greenwood, 4 or 5 miles west of Holden. Except for coarser surface texture, this soil is similar to Woodrow silty clay loam, 0 to 2 percent slopes.

Use and management.—This soil is used mainly for range. It occurs in areas where the rainfall is too low for successful dry farming and where irrigation water is not readily available. Many virgin areas are moderately to strongly saline and need leaching and draining. This soil is well suited to irrigated farming, but most of it is undeveloped because of a shortage of irrigation water. Reclaiming this soil would not be difficult if proper drainage facilities were provided. About 200 acres near Greenwood are irrigated and yield good crops of alfalfa and small grains.

Woodrow loam, 2 to 5 percent slopes (We) (management group 4).—This soil occurs mainly on terraces along the Sevier River in the northeastern part of the Area. To reclaim this soil would not be difficult because most of it has good natural drainage. However, it would need to be irrigated carefully to prevent accelerated erosion.

Woodrow loam, eroded, 2 to 5 percent slopes (Wf) (management group 4).—This soil occurs in two locations, one north of Leamington on gently sloping areas on the first terrace above the river bottom, and the other on a high terrace east of U. S. Highway No. 6 between Lynndyl and Delta. The area near Leamington has been badly gullied and has little value except for range. Two small areas east of Highway 6 have been severely wind eroded; low hummocks are quite numerous. All of this soil is used for range. The carrying capacity is very low and would be difficult to improve.

Woodrow loam, deep, over Oasis soil material, 0 to 2 percent slopes (Wg) (management group 4).—This soil occurs on a river terrace about 2 miles west-southwest of Leamington. To a depth of about 40 inches this soil is similar to Woodrow loam, 0 to 2 percent slopes, but the substratum consists of stratified, rapidly permeable fine sandy loam that resembles the Oasis soil material. In the deeper layers of the substratum there are a few pebbles. This soil is nearly all used for general irrigated farming. Alfalfa and small grains are the main crops. Yields are good.

Woodrow fine sandy loam, 0 to 2 percent slopes (Wa) (management group 4).—This soil occurs on river terraces, mainly about 1 mile southeast of Leamington and in the immediate vicinity of Lynndyl. It is associated with Oasis soils. It is similar to Woodrow loam, 0 to 2 percent slopes. In the Lynndyl area this soil has not been uniformly leached of soluble salts. Some saline spots still exist after many years of irrigation. This soil is used mainly for general irrigated farming.

Woodrow fine sandy loam, deep, over Hardy soil material, 0 to 2 percent slopes (Wb) (management group 4).—This inextensive soil occurs on low lake terraces about 7 miles west and 2 miles north of Holden. It is adjacent to and in the path of a slowly advancing area of dune sand. To a depth of about 40 inches this soil is like Woodrow fine sandy loam, 0 to 2 percent slopes, but it is underlain by a thick lime hardpan similar to that in the Hardy soils. This soil is used for range. The carrying capacity is low.

Woodrow fine sandy loam, deep, over Oasis soil material, 0 to 2 percent slopes (Wc) (management group 4).—This soil occurs in the northwestern part of the Area. Most of it is located 8 miles north of Delta, where it is associated with the Mellor loams. To a depth of about 40 inches this soil is like Woodrow fine sandy loam, 0 to 2 percent slopes, but it has a substratum of stratified loam and fine sandy loam that is characteristic of the Oasis soils. All of this soil is used for range.

Woodrow silty clay, 0 to 2 percent slopes (Wh) (management group 4).—This soil occurs in low-lying positions in the extreme northwestern part of the Area and on the western edge of the Area west of Fillmore and Meadow. The soil profile resembles that of Woodrow silty clay loam, 0 to 2 percent slopes. To reclaim this soil for irrigated farming would be difficult, because drainage is practically impossible. All of this soil is used for range. The carrying capacity is very low.

Soil Formation and Classification

Soil is the product of the forces of environment acting on soil materials deposited or accumulated by geologic processes. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the relief, or lay of the land, which influences the local, or internal, climate of the soil, its drainage, moisture content, aeration, and susceptibility to erosion; (4) the biologic forces that act upon the soil material; that is, vegetation and animals living on or in it; and (5) the length of time the climatic and biologic forces have acted on the soil material.

The climate is arid or semiarid throughout the East Millard Area. Vegetation is mainly grasses and shrubs. Relief and parent material, the factors that have most affected soil formation and that account for the major differences among the soils, are described in table 5.

Table 5 also shows how the soils are classified by orders and great soil groups. Representative soils of several of the great soil groups are described in detail in the follow-

TABLE 5.—*Soil series by orders and great soil groups, and some factors that have affected their formation*

Great soil group and series	Dominant relief	Internal drainage	Parent material
ZONAL			
Chestnut soils:			Material weathered from—
Flowell	Gently sloping and sloping	Very slow	Quartzite, limestone, and sandstone.
Brown soils:			
Millard	Gently sloping and sloping	Medium and rapid	Quartzite and some sandstone.
Santaquin	Gently sloping and sloping	Very slow to very rapid	Quartzite, sandstone, and some igneous material.
INTRAZONAL			
Calcisols:			
Boxelder	Nearly level and gently sloping	Medium	Diatomaceous, calcareous lake deposits.
Escalante	Nearly level	Slow and medium	Mixed lake deposits.
McCornick	Nearly level	Slow	Diatomaceous, calcareous lake deposits.
Palisade	Nearly level and gently sloping	Medium	Alluvium from mixed rock, mainly sandstone, limestone, and quartzite.
Sanpete	Gently sloping and sloping	Medium and rapid	Alluvium from mixed rock, mainly sandstone, limestone, and quartzite.
			Material weathered from—
Calita	Nearly level and gently sloping	Medium	Quartzite, limestone, and sandstone.
Fruita	Nearly level	Medium	Sandstone and limestone.
Holden	Gently sloping	Rapid	Quartzite, limestone, and sandstone.
Neola	Gently sloping and sloping	Very slow	Quartzite, limestone, and sandstone.
Pavant	Gently sloping and sloping	Very slow	Limestone, sandstone, and quartzite.
Pharo	Gently sloping and sloping	Medium	Mostly quartzite and limestone.
Wet Calcisols:			
Hardy	Nearly level	Very slow	Material weathered from mixed rocks.
Kanosh	Nearly level	Very slow to medium	Mixed, moderately coarse textured lake deposits.
Solonetz soils:			
Bullion	Nearly level	Slow	Alluvium mainly from quartzite, sandstone, and limestone.
Harding	Nearly level	Very slow	Mixed lake deposits.
			Material weathered from—
Mellor	Nearly level	Very slow	Mixed rocks.
Taylorsflat	Nearly level	Very slow and slow	Mixed rocks.
AZONAL			
Regosols:			Material weathered from—
Lynndyl	Nearly level	Medium to very rapid	Mixed rocks.
Preston	Undulating and rolling	Medium to very rapid	Basalt and sandstone.
Alluvial soils:			
Ebbs	Nearly level and gently sloping	Slow and medium	Quartzite and limestone.
Genola	Nearly level and gently sloping	Medium to rapid	Quartzite and sedimentary rock.
Highland	Sloping	Medium	Mainly sandstone, limestone, and quartzite.
Ivie	Gently sloping	Medium and rapid	Mostly quartzite, sandstone, and limestone.
Naples	Nearly level and gently sloping	Medium	Mostly quartzite.
Orem	Undulating and rolling	Very rapid	Mixed rocks.
Poganeab	Nearly level	Slow	Mixed rocks.
Red Rock	Nearly level and gently sloping	Medium	Mainly quartzite, some limestone and sandstone.
Sigurd	Nearly level and gently sloping	Medium and rapid	Quartzite, limestone, and sandstone.
Sunset	Nearly level	Slow and medium	Mixed rocks, mainly quartzite, limestone, and sandstone.
Abbott	Nearly level	Very slow and slow	Fine-textured lake deposits.
Deseret	Nearly level	Slow and medium	Mixed lake deposits.
Lahontan	Nearly level	Very slow	Fine-textured lake deposits.
Oasis	Nearly level to gently sloping	Slow to medium	Alluvium from mixed sources.
Woodrow	Nearly level	Slow	Mixed lake-deposited sediments, reworked by streams.

ing pages. Unless otherwise specified, the Munsell color notations are for dry soils.

Zonal Soils

Zonal soils reflect the normal influence of climate and vegetation, the active factors of soil formation. The zonal soils in this Area have developed by the process of calcification.

The zonal soils in the East Millard Area are in two great soil groups: Chestnut soils and Brown soils.

Chestnut soils

The Chestnut soils are represented in this Area by the Flowell series. The Flowell soils are extensive on old alluvial fans adjacent to the Pavant Mountains. They have developed from mixed sedimentary and quartzite rocks. They are associated with Pavant soils.

The following profile of Flowell clay loam is characteristic of the medial profile development of Chestnut soils in this Area.

A_{11} 0 to 5 inches, dark-brown (7.5YR 4/3; 7.5YR 3/2, moist) clay loam; mildly calcareous or noncalcareous; weakly laminated; moderate medium to fine granular; granules slightly hard to hard when dry and friable when moist; 1.7 to about 2.3 percent organic matter.

A_{12} 5 to 12 inches, dark-brown (7.5YR 4/3; 7.5YR 3/2, moist) clay loam; noncalcareous; weak blocky; breaks to coarse or medium granular; granules slightly hard when dry and friable when moist; moderate content of organic matter; moderately permeable; good water-holding capacity.

B_2 12 to 38 inches, reddish-brown (5YR 5/3; 5YR 4/3, moist) silty clay or heavy silty clay loam; noncalcareous; moderate fine blocky or, in some places, weakly prismatic; aggregates compact but larger ones break to coarse granules; very hard when dry, firm when moist, plastic when wet; slowly permeable; aggregates stained with colloidal material.

D_1 38 to 47 inches, white to pink (5YR 8/4) loam to clay loam, moderately to strongly cemented lime hardpan; when moist, pink to reddish yellow (5YR 7/5); slowly permeable; practically devoid of plant roots or organic matter.

D_2 47 to 72 inches, pink (5YR 7/4) loam or clay loam with many white splotches or mottlings of lime; when moist, reddish brown (5YR 4/5); strongly calcareous; massive; hard when dry and friable when moist; good water-holding capacity; moderately permeable.

Brown soils

The Brown soils are represented in this Area by the Millard and Santaquin series.

The Millard soils are extensive on somewhat older alluvial fans in somewhat lower positions than the Flowell soils. They are somewhat further from the Pavant Mountains and have less annual rainfall. The soils occur near and slightly above the highest shoreline of prehistoric Lake Bonneville. Generally, the alluvium was deposited after the highest shoreline, known as the Bonneville level, was formed. These soils have developed from mixed sedimentary rocks and quartzite. They are associated with Ebbs and Calita soils.

The following profile of Millard gravelly loam was observed in a range-site area about 3 miles southwest of Fillmore near United States Highway No. 91.

A_{11} 0 to 3 inches, brown (10YR 5/3) gravelly loam; when moist, dark brown (10YR 3/3); noncalcareous; medium platy to fine granular; friable; 1.8 to 2.3 percent organic matter.

A_{12} 3 to 10 inches, brown (10YR 5/3) gravelly loam; when moist, dark brown (10YR 3/3); noncalcareous; weakly developed coarse blocky; breaks to weak or moderate medium granules; friable.

B_2 10 to 17 inches, brown (7.5YR 5/2) gravelly heavy loam or light clay loam; when moist, dark brown (7.5YR 3/2); noncalcareous; moderate medium subangular blocky; friable.

B_{3ca} 17 to 32 inches, between reddish-brown and yellowish-red (5YR 4.5/5) gravelly light clay loam; when moist, reddish brown (5YR 4/4); weakly to moderately calcareous; contains a few faint white flecks of lime carbonate or similar accumulations on the bottom of water-worn pebbles; massive; friable.

C_{ca} 32 to 42 inches, light reddish-brown (5YR 6/4) gravelly loam; when moist, reddish brown (5YR 4/3); massive; friable; slightly more lime carbonate on the bottom of the pebbles than on pebbles in B_{3ca} horizon; lime veining common.

C 42 to 72 inches, reddish-yellow (5YR 6/6) gravelly to cobbly loam; when moist, yellowish red (5YR 4.5/6); massive; mildly calcareous between pebbles and cobblestones, but strongly calcareous on the bottom of each pebble or cobblestone.

Santaquin soils are minimal zonal Brown soils. They have developed in coarse-textured materials. They have a B horizon distinguishable by color and structure but not by texture.

Intrazonal Soils

The characteristics of intrazonal soils are influenced more by parent material or relief than by climate and vegetation. The intrazonal soils in the East Millard Area are in two great soil groups: Calcisols and Solonetz soils.

Calcisols

Calcisols occur on highly calcareous parent material in the arid and semiarid regions of the United States. They have developed through calcification. Part of the lime has been removed from the strongly calcareous surface soil and deposited in a lower horizon, where it forms an enriched prominent calcium carbonate horizon. These soils do not have a textural or a structural B_2 horizon.

Calcisols occur in the Chestnut, Brown, Sierozem, and Gray Desert soil zones.

The Calcisols are represented in this Area by the Boxelder, Calita, Escalante, Holden, Fruita, McCornick, Neola, Palisade, Pavant, Pharo, and Sanpete series.

The following profile of Boxelder clay loam is typical of maximal Calcisols in the East Millard Area.

A_1 0 to 3 inches, light-gray (10YR 7/2) clay loam; when moist, grayish brown (10YR 5/2); strongly calcareous; soft when dry, very friable when moist; weak thin platy; breaks to fine granules.

AC 3 to 7 inches, very pale brown (10YR 8/3) heavy loam or light clay loam; when moist, pale brown (10YR 6/3); strongly calcareous; weak coarse platy in place; breaks to fine granules; soft when dry, friable when moist; moderately permeable; many plant roots; about 1.7 percent organic matter.

C_{ca1} 7 to 26 inches, very pale brown (10YR 7/3, moist) clay loam; strongly calcareous; coarse blocky; hard when dry, friable when moist.

C_{ca2} 26 to 72 inches, white heavy silt loam; strongly calcareous; hard when dry, friable when moist; moderately permeable; coarse blocky; slightly stratified in places; some subangular lime nodules and shell fragments.

Boxelder soils are closely associated with McCornick soils, which have a lime hardpan within the prominent calcium horizon.

Escalante soils occur on low lake terraces. They are similar to McCornick soils but are coarse textured and have developed in somewhat different parent material.

Pavant soils occur on old alluvial fans on the uplands. They are characterized by a thick calcium carbonate hardpan that underlies a thin calcareous A_1 horizon. Neola soils are similar to Pavant soils but occur in a drier climate and have lighter colored surface soils. The Pavant soils occur in the Chestnut soil zone and in the Brown soil zone. The Neola soils occur in the Sierozem and Gray Desert soil zones.

Pharo soils are associated with Pavant soils. They are generally in somewhat lower positions on the old fans. Pharo soils have a marly lime carbonate subsoil that underlies a thin calcareous surface soil. Sanpete soils are similar to Pharo soils but occur in the Sierozem soil zone and are associated with Neola soils.

Holden soils have developed in gravelly materials on old lake beaches and bars.

Calita soils have developed in medium-textured materials on alluvial fans in the Brown soil zone. They are minimal Calcisols and have some characteristics of the zonal Brown soils.

Palisade soils are extensive in the Sierozem soil zone in the northeastern part of the Area, near the base of the Pavant Mountains. They have developed from strongly calcareous sedimentary rocks and are classified as minimal to medial Calcisols.

Fruita soils are similar to Palisade soils and differ principally because they have a somewhat browner color throughout.

"Wet" Calcisols.—"Wet" Calcisols are a subgroup of Calcisols. They have a prominent lime horizon but are imperfectly to poorly drained. The "Wet" Calcisols are represented in this Area by the Kanosh and Hardy series.

The Kanosh soils occur on low lake terraces in the Gray Desert and Sierozem soil zones. These soils developed under imperfect to poor drainage conditions. A prominent, softly to moderately cemented lime and gypsum horizon occurs at a depth of about 18 inches and extends to a depth of 30 inches. The underlying material is very high in gypsum. The surface soil is typically light brownish gray (10YR 6/2) when dry and grayish brown (10YR 4/2) when moist; it is low in organic matter.

Hardy soils generally occur on comparatively low flats and are kept wet by drainage water near the surface or by springs. These soils have a moderately to strongly lime cemented hardpan. The depth to the hardpan varies from place to place, but it is generally more than 20 inches. The surface soil is darker than that of the Kanosh soils, and the organic matter content is higher. The Hardy soils are similar to Humic Gley soils but generally contain much more lime in the surface and throughout the profile than typical Humic Gley soils.

Solonetz soils

The Solonetz soils are represented in this Area by Bullion, Harding, Mellor, and Taylorsflat soils. These soils have well-developed prismatic B_2 horizons.

The following profile of Harding clay loam is typical of Solonetz soils in this Area.

A_v 0 to 1 inch, very pale brown (10YR 7/3) clay loam; when moist, brown (10YR 5/3); moderately to strongly calcareous; moderate fine platy; strongly vesicular; friable; pH about 9.2.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Aa	Abbott silty clay, 0 to 2 percent slopes.	Nearly level old lake basins.	Light gray to light brownish gray, fine granular, slightly hard, strongly calcareous.	Light-gray to light brownish-gray, hard, massive, strongly calcareous clay or silty clay.	Light-gray to very pale brown, massive, hard, mottled clay or silty clay.	Imperfect
Ab	Abbott silty clay loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Bf	Boxelder loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Light gray or very pale brown, platy to granular, soft, strongly calcareous.	White, coarse, blocky, hard, strongly calcareous silty clay loam.	White, hard, strongly calcareous, coarse blocky, somewhat stratified silty clay loam; thin strata of black cinders in places.	Good
Bg	Boxelder loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Good
Bh	Boxelder loam, eroded, 0 to 5 percent slopes.	Nearly level to gently sloping old lake terraces.	Same	Same	Same	Good

See footnotes at end of table.

A_1 1 to 3 inches, light-brown (7.5YR 6/4) silty clay loam; when moist, brown (7.5YR 5/4); strongly calcareous; moderate to strong fine granular; firm; pH about 9.0.

B_{21} 3 to 8 inches, light-brown (7.5YR 6/4) silty clay; when moist, brown (7.5YR 5/4); moderately to strongly calcareous; moderate medium prismatic, breaks to moderate medium and fine blocky; thin patchy colloidal staining on aggregate surfaces; firm; pH about 9.2.

B_{22} 8 to 15 inches, very pale brown (10YR 8/3) clay; when moist, pale brown (10YR 6/3); strongly calcareous; weak to moderate medium prismatic; very firm; veins and mottlings of segregated lime; pH about 9.6.

C 15 to 72 inches, white (10YR 8/2) clay; when moist, pale brown (10YR 6/3); strongly calcareous with numerous streaks of segregated lime; massive with tendency to break to coarse platy; very firm; pH about 9.2.

Mellor soils have developed in somewhat coarser textured materials and generally have a coarse-textured substratum. The degree of profile development and the content of exchangeable sodium in the Harding series and the Mellor series are similar.

Taylorsflat soils are generally associated with Harding soils. Both series have developed in fine-textured lake sediments. Taylorsflat soils differ from Harding soils mainly in the structure of the B_2 horizon, which is weakly subangular blocky in the Taylorsflat soils.

Bullion soils have developed in reddish-brown sediments. The degree of development of the blocky B_2 horizon varies in this soil. It is strongest in the silty clay loams. The exchangeable sodium content of Bullion soils is also lower than that of the other three soils of this group.

Azonal Soils

The azonal soils in the East Millard Area are in two great soil groups: Regosols and Alluvial soils.

Regosols

The Regosols are represented in this Area by the Preston and Lynndyl soils. These soils are porous and calcareous. The Preston soils are wind-deposited and do not have clearly differentiated soil horizons. Lynndyl soils are sandy water-laid deposits that have a coarse sandy or gravelly substratum and a very weak A_1 horizon.

Alluvial soils

Alluvial soils are extensive in this Area. They occur as local alluvium, as fans near the base of the mountains, as general stream alluvium along the major streams, and as reworked delta deposits along the flood plain of the Sevier River. These soils have weakly developed profiles, which consist of an A_1 horizon over the C horizon, or parent material. The A_1 horizon is generally stronger in the Brown soil zone than in the Sierozem and Gray Desert soil zones.

Alluvial soils are represented in this Area by the following series: Abbott, Deseret, Ebbs, Genola, Highland, Ivie, Lahontan, Naples, Oasis, Orem, Poganeab, Red Rock, Sigurd, Sunset, and Woodrow.

Although these soils have similar genetic history, they vary in color of parent material, texture of soil material, drainage, and climate.

The Abbott soils show definite signs of gleying, but because they are low in organic matter they are considered Alluvial soils rather than Humic Gley soils.

Poganeab soils are frequently wet and also show evidence of gleying, but because they are so variable they are considered Alluvial soils.

OF THE SOILS OF EAST MILLARD AREA, UTAH

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow to ponded.	Slow to very slow.	Slightly to strongly saline.	High	Moderately deep.	Low	Slight	Saltgrass; greasewood.	Range.
Same	Same	Same	High	Moderately deep.	Low	Slight	Greasewood	Range.
Very slow	Medium	Moderately saline in substratum.	Moderate	Deep	Low	Moderate	Shadscale; greasewood; sagebrush; some grasses.	Range; dryland wheat; some irrigated crops.
Slow	Medium	Same	Moderate	Deep	Low	Moderate	Same	Range; dryland wheat.
Very slow to slow.	Medium	Same	Moderate	Deep	Low	Severe	Same	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Bm	Boxelder loam, deep, over Pavant soil material, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	White, hard, strongly calcareous, coarse blocky, somewhat stratified silty clay loam; thin strata of black cinders in places; layers of lime-cemented gravel at 36 to 60 inches.	Good
Bl	Boxelder loam, moderately deep and deep, over gravel, 0 to 2 percent slopes.	Same	Same	Same	White, hard, strongly calcareous, coarse blocky, somewhat stratified silty clay loam; thin strata of black cinders in places; beds of lime-coated but not cemented sand and gravel at 20 to 60 inches.	Good
Bd	Boxelder fine sandy loam, 0 to 2 percent slopes.	Same	Same	Same	White, hard, strongly calcareous, coarse blocky, somewhat stratified silty clay loam; thin strata of black cinders in places.	Good
Be	Boxelder fine sandy loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Good
Ba	Boxelder clay loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Good
Bc	Boxelder clay loam, moderately deep and deep, over gravel, 0 to 2 percent slopes.	Same	Same	Same	White, hard, strongly calcareous, coarse blocky, somewhat stratified silty clay loam; thin strata of black cinders in places; firmly imbedded gravel at 20 to 60 inches.	Good
Bb	Boxelder clay loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	White, hard, strongly calcareous, coarse blocky, somewhat stratified silty clay loam; thin strata of black cinders in places.	Good
Fl	Bullion silty clay loam, 0 to 2 percent slopes.	Nearly level slightly older alluvial fans.	Light brown, strongly calcareous, soft, platy to very coarse blocky crushing to granular.	Reddish-brown, hard, weak, very coarse blocky, strongly calcareous silty clay over a zone of segregated lime.	Pale-brown, massive, slightly hard, strongly calcareous fine sandy loam.	Good
Fh	Bullion loam, 0 to 2 percent slopes.	Same	Light brown to light reddish brown, strongly calcareous, soft, platy to very coarse blocky crushing to granular.	Reddish-brown, hard, weak, very coarse blocky, strongly calcareous silty clay loam or silt loam over a zone of segregated lime.	Same	Good
Cc	Calita loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Brown, noncalcareous to weakly calcareous, fine granular, soft.	Very pale brown, slightly hard, weakly lime cemented loam.	Very pale brown, soft, strongly calcareous, stratified loam to sandy loam.	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush	Range.
Very slow	Medium	Moderately saline in substratum.	Moderate	Moderately deep to deep.	Low	Moderate	Shadscale; greasewood.	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Severe	Greasewood	Range.
Slow	Medium	Same	Moderate	Deep	Low	Severe	Greasewood	Dryland wheat; irrigated alfalfa.
Very slow	Medium	Same	High	Deep	Low	Slight	Shadscale; sagebrush; greasewood.	Dryland wheat; range.
Very slow	Medium	Same	High	Moderately deep to deep.	Low	Slight	Same	Dryland wheat; range.
Slow	Medium	Same	High	Deep	Low	Moderate	Shadscale; greasewood.	Range.
Very slow	Slow	Slightly alkali.	High	Deep	Low	Slight	Sagebrush; shadscale; grasses.	Dryland wheat; range.
Very slow	Slow	Slightly alkali.	High	Deep	Low	Slight	Same	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	High	Moderate	Sagebrush; grasses.	Dryland wheat.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Cb	Calita loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Same	Same	Same	Good
Cd	Calita loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Good
Ca	Calita fine sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Very pale brown, slightly hard, weakly lime cemented loam to fine sandy loam.	Same	Good
Ce	Calita silty clay loam, 0 to 5 percent slopes.	Nearly level to gently sloping old alluvial fans.	Same	Very pale brown, slightly hard, weakly lime cemented loam to silty clay loam.	Very pale brown, soft, strongly calcareous, stratified loam to silty clay loam.	Good
Cf	Clay dunes	Low dunes	Fine-textured dune deposits.			Variable
Df	Deseret silty clay loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Light gray or very pale brown, strongly calcareous, soft to slightly hard, platy to fine granular.	Very pale brown to pink, strongly calcareous, strongly gypsiferous, massive silty clay loam.	Very pale brown to pink, mottled, weakly calcareous, massive, strongly gypsiferous silty clay loam.	Moderately good.
Dg	Deseret silty clay loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Moderately good.
Dh	Deseret silty clay loam, imperfectly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Da	Deseret loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Moderately good.
Db	Deseret loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Same
Dd	Deseret sandy loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Same
De	Deseret sandy loam, imperfectly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Ef	Ebbs loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Brown, soft, weakly calcareous, platy to fine granular.	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam.	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam.	Good
Eg	Ebbs loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Eh	Ebbs loam, 5 to 10 percent slopes.	Sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Ej	Ebbs loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam; Boxelder soil material at average depth of 24 inches.	Good
Ek	Ebbs loam, deep, over gravel, 0 to 2 percent slopes.	Same	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam; sand and gravel at about 40 inches.	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Medium	Free	Moderate	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat; irrigated crops.
Slow to medium.	Medium	Free	Moderate	Deep	High	Severe	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Very slow to slow.	Slow	Free	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat.
Variable	Variable	Variable	Variable	Variable	Low	Moderate	Shadscale	Range.
Very slow	Medium to slow.	Strongly saline.	High	Deep	Low	Moderate	Greasewood; shadscale.	Range.
Very slow	Medium to slow.	Strongly saline.	High	Deep	Low	Moderate	Greasewood; shadscale.	Range.
Very slow	Medium to slow.	Strongly saline.	High	Moderately deep to deep.	Low	Slight	Saltgrass; alkali sacaton; greasewood.	Range.
Very slow	Medium to slow.	Strongly saline.	Moderate	Deep	Low	Moderate	Same	Range.
Slow	Medium to slow.	Strongly saline.	Moderate	Deep	Low	Moderate	Same	Range.
Slow	Medium to slow.	Strongly saline.	Moderate	Deep	Low	Severe	Same	Range.
Slow	Medium to slow.	Strongly saline.	High	Moderately deep to deep.	Low	Slight	Saltgrass; alkali sacaton; rabbitbrush.	Range.
Slow	Medium	Free to slightly saline.	Moderate	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat; irrigated alfalfa; small grains.
Slow	Medium	Same	Moderate	Deep	High	Moderate	Sagebrush; grasses.	Same.
Slow to medium.	Medium	Same	Moderate	Deep	High	Moderate	Sagebrush; grasses.	Range; dryland wheat.
Very slow	Medium	Same	Moderate	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat.
Very slow	Medium	Same	Moderate	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat; range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
El	Ebb loam, deep, over gravel, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Ei	Ebbs loam, eroded, 10 to 20 percent slopes.	Moderately steep recent alluvial fans and flood plains.	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam.	Good
En	Ebbs silty clay loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silty clay loam.	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silty clay loam.	Good
Eo	Ebbs silty clay loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Er	Ebbs silty clay loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam; Woodrow soil material at about 30 inches.	Good
Es	Ebbs silty clay loam, moderately deep, over Woodrow soil material, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Eq	Ebbs silty clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam; Boxelder soil material at average depth of 30 inches.	Good
Ep	Ebbs silty clay loam, 5 to 10 percent slopes.	Sloping recent alluvial fans and flood plains.	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified silt loam or loam.	Good
Ea	Ebbs fine sandy loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified fine sandy loam.	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified fine sandy loam and loam.	Good
Eb	Ebbs fine sandy loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Ec	Ebbs fine sandy loam, 5 to 10 percent slopes.	Sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Ee	Ebbs fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified fine sandy loam and loam; Boxelder soil material at depths of 20 to 36 inches.	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow	Medium	Same	Moderate	Deep	High	Moderate	Sagebrush; grasses.	Dryland wheat.
Medium to rapid.	Medium	Same	Moderate	Deep	Moderate	Severe	Sagebrush; grasses.	Range.
Very slow	Slow	Same	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat; irrigated crops.
Slow	Slow	Same	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat.
Very slow	Slow	Same	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat.
Slow	Slow	Same	High	Deep	High	Slight	Sagebrush; grasses.	Irrigated crops; range.
Very slow	Slow	Same	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat; irrigated crops.
Slow to medium.	Slow	Same	High	Deep	High	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Very slow	Medium	Same	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Irrigated alfalfa; small grains.
Slow	Medium	Same	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Slow to medium.	Medium	Same	Moderate	Deep	Moderate	Severe	Sagebrush; grasses.	Range.
Very slow	Medium	Same	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Irrigated crops.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Ed	Ebbs fine sandy loam, eroded, 5 to 20 percent slopes.	Sloping to moderately steep recent alluvial fans and flood plains.	Same	Same	Light-brown to light yellowish-brown, strongly calcareous, massive, somewhat stratified fine sandy loam and loam.	Good
Em	Ebbs loamy fine sand, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Ey	Escalante sandy loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Light gray to very pale brown, strongly calcareous, soft, platy to granular.	White to very pale brown, very hard, weakly to strongly cemented loam.	Very pale brown, massive, slightly hard, strongly calcareous silt loam to clay loam.	Good
Ez	Escalante sandy loam, eroded, 0 to 5 percent slopes.	Hummocky old lake terraces.	Same	Same	Same	Good
Et	Escalante loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Good
Ev	Escalante loam, deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, massive, slightly hard, strongly calcareous silt loam to clay loam; Boxelder soil material at about 40 inches.	Good
Eu	Escalante loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, massive, slightly hard, strongly calcareous silt loam to clay loam; Lahontan soil material at about 30 inches.	Good
Ew	Escalante loamy sand, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, massive, slightly hard, strongly calcareous silt loam to clay loam.	Good
Ex	Escalante loamy sand, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Good
Fc	Flowell loam, 2 to 5 percent slopes.	Gently undulating old alluvial fans.	Dark brown, slightly calcareous to noncalcareous, soft, platy to granular.	Reddish-brown noncalcareous, hard, blocky silty clay over a white to pink, strongly lime cemented hardpan.	Reddish-yellow, strongly calcareous, hard, massive gravelly loam.	Good
Fd	Flowell loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Good
Fe	Flowell stony loam, 5 to 10 percent slopes.	Same	Same	Reddish-brown, noncalcareous, hard, blocky stony silty clay loam over a white to pink, strongly lime cemented hardpan.	Reddish-yellow, strongly calcareous, hard, massive gravelly loam.	Good
Ff	Flowell stony loam, 10 to 20 percent slopes.	Moderately steep old alluvial fans.	Same	Same	Same	Good
Fa	Flowell clay loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Reddish-brown, noncalcareous, hard, blocky silty clay over a white to pink, strongly lime cemented hardpan.	Same	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow to rapid.	Medium	Same	Moderate	Deep	Moderate	Severe	Sagebrush; grasses.	Range.
Very slow to slow.	Medium	Same	Moderate	Deep	Moderate	Severe	Sagebrush; grasses; oak brush.	Range.
Very slow	Medium to slow.	Slightly saline.	Moderate	Moderately deep to deep.	Low	Severe	Sagebrush	Irrigated alfalfa; small grains; range.
Very slow to slow.	Medium to slow.	Slightly saline.	Moderate	Same	Low	Severe	Sagebrush	Range.
Very slow	Medium to slow.	Slightly saline.	Moderate	Same	Low	Severe	Sagebrush	Range.
Very slow	Medium to slow.	Strongly saline.	Moderate	Same	Low	Severe	Shadscale; greasewood.	Range.
Very slow	Medium to slow.	Strongly saline.	Moderate	Same	Low	Severe	Shadscale	Range.
Very slow	Medium to slow.	Slightly saline.	Moderate	Same	Low	Severe	Sagebrush	Range.
Very slow	Medium to slow.	Slightly saline.	Moderate	Same	Low	Severe	Sagebrush	Range.
Slow	Very slow	Free	Moderate	Moderately deep.	Moderate	Slight	Sagebrush; grasses; oak brush.	Range; some dryland wheat; irrigated alfalfa; small grains.
Slow to medium.	Very slow	Free	Moderate	Moderately deep.	Moderate	Moderate	Same	Range.
Slow to medium.	Very slow	Free	Moderate	Moderately deep.	Moderate	Moderate	Same	Range.
Medium to rapid.	Very slow	Free	Moderate	Moderately deep.	Moderate	Severe	Same	Range.
Slow	Very slow	Free	Moderate	Moderately deep.	Moderate	Slight	Same	Range; dryland wheat.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Fb	Flowell gravelly loam, 10 to 20 percent slopes.	Moderately steep old alluvial fans.	Same	Reddish-brown, noncalcareous, hard, blocky gravelly silty clay loam over a white to pink, strongly lime cemented hardpan.	Same	Good
Fg	Fruita fine sandy loam, 0 to 2 percent slopes.	Gently sloping somewhat older alluvial fans.	Light reddish brown, moderately calcareous, soft, granular.	Pink, strongly calcareous, slightly hard, massive fine sandy loam.	Light reddish-brown, soft to slightly hard, strongly calcareous, massive, stratified loamy fine sand and fine sandy loam.	Good
Gd	Genola fine sandy loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans, flood plains, and terraces.	Light yellowish brown to very pale brown, soft, moderately to strongly calcareous, fine platy to massive.	Light yellowish-brown, soft to slightly hard, moderately to strongly calcareous, massive, stratified loamy fine sand to light clay loam.	Light yellowish-brown, massive, moderately to strongly calcareous, stratified loamy fine sand to light clay loam.	Good
Ge	Genola fine sandy loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Same	Good
Gf	Genola fine sandy loam, 5 to 10 percent slopes.	Sloping recent alluvial fans.	Same	Same	Same	Good
Gj	Genola fine sandy loam, deep, over sand, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified loamy fine sand to light clay loam; loamy sand at about 40 inches.	Good
Gk	Genola fine sandy loam, deep, over sand, 5 to 10 percent slopes.	Sloping recent alluvial fans.	Same	Same	Same	Good
Gh	Genola fine sandy loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified loamy fine sand to light clay loam; Boxelder soil material at 20 to 60 inches.	Good
Gn	Genola fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified loamy fine sand to light clay loam; Boxelder soil material at about 40 inches.	Good
Go	Genola fine sandy loam, deep, over Sanpete soil material, 2 to 5 percent slopes.	Same	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified loamy fine sand to light clay loam, over Sanpete soil material.	Good
Gg	Genola fine sandy loam, eroded, 5 to 20 percent slopes.	Sloping to moderately steep recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified loamy fine sand to light clay loam.	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Medium to rapid.	Very slow	Free	Moderate	Moderately deep.	Moderate	Severe	Oak brush; juniper; sagebrush; grasses.	Range.
Very slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Dryland wheat.
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Dryland wheat; range.
Slow to medium.	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; few junipers.	Range.
Slow to medium.	Medium	Free	Moderate	Deep	Low	Severe	Same	Range.
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Slow to rapid.	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Gl	Genola fine sandy loam, deep, over gravel, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified loamy fine sand to light clay loam; gravel at about 40 inches.	Good
Gm	Genola fine sandy loam, deep, over gravel, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	None	Same	Good
Gp	Genola loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Light yellowish-brown, soft to slightly hard, moderately to strongly calcareous, massive, stratified loam.	Light yellowish-brown, massive, moderately to strongly calcareous, stratified fine sandy loam to clay loam.	Good
Gr	Genola loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Same	Good
Gu	Genola loam, deep, over gravel, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified fine sandy loam to clay loam; gravel at 36 to 60 inches.	Good
Gt	Genola loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified fine sandy loam to clay loam; Boxelder soil material at 20 to 60 inches.	Good
Gv	Genola loam, deep, over gravel, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified fine sandy loam to clay loam; gravel at about 40 inches.	Good
Gs	Genola loam, 5 to 10 percent slopes.	Sloping recent alluvial fans.	Same	Same	Light yellowish-brown, massive, moderately to strongly calcareous, stratified fine sandy loam to clay loam.	Good
Ga	Genola clay loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Light yellowish-brown, soft to slightly hard, moderately to strongly calcareous, massive, stratified clay loam.	Light yellowish-brown, massive, moderately to strongly calcareous, stratified clay loam.	Good
Gb	Genola clay loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Same	Good
Gc	Genola clay loam, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Same	Same	Good
Gx	Genola loamy fine sand, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Light yellowish-brown, soft, massive, moderately to strongly calcareous, stratified loamy fine sand.	Light yellowish-brown, soft, massive, moderately to strongly calcareous, stratified loamy fine sand.	Somewhat excessive.

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range; irrigated crops.
Slow	Rapid	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Same.
Very slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Dryland wheat; range; irrigated alfalfa.
Slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Same.
Very slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Irrigated fruits; vegetables.
Very slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Range; irrigated crops.
Slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Irrigated crops; range.
Medium	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Range.
Very slow	Slow	Moderately to strongly saline in deep substratum.	High	Deep	Low	Slight	Sagebrush; shadscale; grasses.	Dryland wheat; range.
Slow	Slow	Same	High	Deep	Low	Slight	Same	Dryland wheat; range.
Very slow	Slow	Same	High	Deep	Low	Slight	Same	Dryland wheat.
Very slow	Rapid	Free	Low	Deep	Low	Severe	Sagebrush; grasses.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Gy	Genola loamy fine sand, 5 to 10 percent slopes.	Sloping recent alluvial fans.	Same	Same	Same	Same
Gw	Genola loamy fine sand, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Same	Same	Same
Gz	Genola loamy fine sand, moderately deep and deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Light yellowish-brown, soft, massive, moderately to strongly calcareous, stratified loamy fine sand; Boxelder soil material at about 30 inches.	Good
Hg	Harding silty clay loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Very pale brown to light brown, moderately to strongly calcareous, soft to slightly hard, platy and vesicular to fine granular.	Light-brown to very pale brown, moderately to strongly calcareous, hard to very hard, prismatic silty clay to clay; segregated lime in the lower part.	Very pale brown to white, very hard, strongly calcareous clay.	Good
Hh	Harding silty clay loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Ha	Harding loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Hb	Harding loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Hc	Harding loam, 2 to 5 percent slopes.	Gently sloping terraces.	Same	Same	Same	Good
Hd	Harding sandy loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Good
He	Harding sandy loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Hf	Harding silty clay, moderately deep, over Kanosh soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown to white, very hard, strongly calcareous clay; Kanosh soil material at 36 inches.	Good
Hm	Hardy loam, 0 to 2 percent slopes.	Same	Gray, strongly calcareous, hard, platy to fine granular.	White, strongly calcareous, massive, hard, heavy silt loam to silty clay loam; variable lime cementation.	White, very hard lime hardpan.	Moderately good.
Hn	Hardy loam, poorly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Poor
Ho	Hardy sandy loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Moderately good.
Hp	Hardy sandy loam, eroded, 0 to 2 percent slopes.	Hummocky old lake terraces.	Gray, strongly calcareous, hard, platy to fine granular.	Same	Same	Same
Hr	Hardy sandy loam, imperfectly drained, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Imperfect
Hl	Hardy clay loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Moderately good.

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow	Rapid	Free	Low	Deep	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Rapid	Free	Low	Deep	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Very slow	Strongly saline and alkali.	Low	Shallow	Low	Moderate	Greasewood; shadscale; bud sage; gray molly.	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Same	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Same	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Same	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Weeds	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Sagebrush; shadscale; greasewood.	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Same	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Moderate	Shadscale	Range.
Very slow	Very slow	Slightly to moderately saline.	Moderate	Moderately deep.	Moderate	Moderate	Saltgrass; alkali sacaton; rabbitbrush.	Irrigated alfalfa; small grains; range.
Very slow	Very slow	Same	High	Moderately deep.	Moderate	Slight	Same	Range.
Very slow	Very slow	Same	Moderate	Moderately deep.	Moderate	Severe	Same	Range.
Very slow	Very slow	Same	Low to moderate.	Very shallow to deep.	Low to moderate.	Severe	Same	Range.
Very slow	Very slow	Same	High	Moderately deep.	Moderate	Slight	Same	Range.
Very slow	Very slow	Same	High	Moderately deep.	Moderate	Slight	Same	Irrigated alfalfa; small grains; range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Hs	Highland loam, 5 to 10 percent slopes.	Sloping recent alluvial fans.	Dark grayish brown to grayish brown, slightly hard, weakly calcareous to noncalcareous, platy to medium granular.	Grayish-brown, weakly calcareous, granular, slightly hard, heavy silt loam.	Very pale brown, massive, slightly hard, moderately calcareous loam.	Good
Hu	Holden gravelly sandy loam, 2 to 5 percent slopes.	Gently sloping old bars and benches.	Pale brown, weakly to moderately calcareous, soft, platy to granular.	Light-gray, weakly lime cemented, very gravelly sandy loam.	Very pale brown, loose, single-grained, lime-coated gravel and sand.	Somewhat excessive.
Hv	Holden gravelly sandy loam, 5 to 20 percent slopes.	Sloping and moderately steep old bars and benches.	Same	Same	Same	Same
Ht	Holden gravelly loamy sand, 0 to 2 percent slopes.	Nearly level old bars and benches.	Same	Same	Same	Same
Hw	Holden sandy loam, 0 to 5 percent slopes.	Nearly level to gently sloping old bars and benches.	Same	Same	Same	Same
Id	Ivie loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Brown to light brown, weakly to moderately calcareous, soft, granular.	Light-brown to very pale brown, massive, soft, moderately calcareous loam or fine sandy loam.	Pale brown to very pale brown, moderately calcareous, massive, stratified gravelly sandy loam.	Good
Ie	Ivie loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
If	Ivie loam, 5 to 10 percent slopes.	Sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Ia	Ivie gravelly loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Light-brown to very pale brown, massive, soft, moderately calcareous, gravelly loam or fine sandy loam.	Light-brown to very pale brown, moderately calcareous, massive, stratified gravelly sandy loam; mostly gravel below 36 inches.	Somewhat excessive.
Ib	Ivie gravelly loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Same
Ic	Ivie gravelly loam, 5 to 20 percent slopes.	Sloping to moderately steep recent alluvial fans and flood plains.	Same	Same	Same	Same
Ig	Ivie stony loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Light-brown to very pale brown, massive, soft, moderately calcareous, stony loam or fine sandy loam.	Light-brown to very pale brown, moderately calcareous, massive, stratified stony loam or fine sandy loam; mostly gravel and stones below 36 inches.	Same
Ka	Kanosh loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Light-gray, platy to granular, soft, strongly calcareous, gypsum crystals.	White to very pale brown, massive, very hard loam; weakly lime and gypsum cemented.	White, massive, slightly hard, weakly calcareous, highly gypsiferous, mottled fine sandy loam.	Imperfect

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow to medium.	Medium	Free	Moderate	Deep	High	Moderate	Oak brush; sagebrush; grasses.	Range.
Slow	Rapid	Free	Low	Moderately deep.	Low	Moderate	Sagebrush; grasses; few junipers.	Range; gravel pits.
Slow to medium.	Rapid	Free	Low	Moderately deep.	Low	Moderate to severe.	Same	Range; gravel pits.
Very slow	Rapid	Free	Low	Moderately deep.	Low	Severe	Same	Range; gravel pits.
Very slow to slow.	Rapid	Free	Low	Moderately deep.	Low	Severe	Same	Range; gravel pits.
Very slow	Medium	Free	Moderate	Moderately deep.	Low	Moderate	Sagebrush; grasses.	Irrigated crops; vegetables; dry-farm wheat.
Slow	Medium	Free	Moderate	Moderately deep.	Low	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Slow to medium.	Medium	Free	Moderate	Moderately deep.	Low	Severe	Sagebrush; grasses.	Dryland wheat.
Very slow	Rapid	Free	Low	Moderately deep.	Low	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Slow	Rapid	Free	Low	Moderately deep.	Low	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Slow to rapid.	Rapid	Free	Low	Moderately deep.	Low	Moderate to severe.	Sagebrush; grasses.	Range.
Slow	Rapid	Free	Low	Moderately deep.	Low	Moderate	Sagebrush; grasses.	Range.
Very slow	Medium to slow.	Strongly saline.	Moderate	Moderately deep.	Low	Slight	Saltgrass; alkali sacaton; some greasewood.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Kf	Kanosh loam, poorly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Poor
Ke	Kanosh loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes.	Same	Same	Same	White, massive, slightly hard, weakly calcareous, highly gypsiferous, mottled fine sandy loam; Lahontan soil material at about 30 inches.	Imperfect
Kb	Kanosh loam, very shallow, 0 to 2 percent slopes.	Same	Same	Same	Gypsum from mineral springs.	Imperfect
Kc	Kanosh loam, very shallow, poorly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Poor
Kd	Kanosh loam, very shallow, 2 to 10 percent slopes.	Gently sloping to sloping old lake terraces.	Same	Same	Same	Imperfect
Kp	Kanosh silty clay loam, very shallow, 0 to 2 per cent slopes.	Nearly level old lake terraces.	Same	Same	Same	Imperfect
Kg	Kanosh sandy loam, 0 to 2 percent slopes.	Same	Same	Same	White, massive, slightly hard, weakly calcareous, highly gypsiferous, mottled fine sandy loam.	Imperfect
Kh	Kanosh sandy loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Kl	Kanosh sandy loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Imperfect
Km	Kanosh sandy loam, moderately deep, over Lahontan soil material, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	White, massive, slightly hard, weakly calcareous, highly gypsiferous, mottled fine sandy loam; Lahontan soil material at about 30 inches.	Imperfect
Kn	Kanosh sandy loam, moderately deep, over Woodrow soil material, 0 to 2 percent slopes.	Same	Same	Same	White, massive, slightly hard, weakly calcareous, highly gypsiferous, mottled fine sandy loam; Woodrow soil material at about 30 inches.	Imperfect
Ko	Kanosh sandy loam, poorly drained, 0 to 2 percent slopes.	Same	Same	Same	White, massive, slightly hard, weakly calcareous, highly gypsiferous, mottled fine sandy loam.	Poor
Lb	Lahontan silty clay, 0 to 2 percent slopes.	Nearly level lake-laid sediments.	Very pale brown, hard, strongly calcareous, weakly to moderately platy and vesicular.	Very pale brown, hard, strongly calcareous, massive clay.	Very pale brown to white, massive, very hard silty clay or clay; iron stained.	Moderately good.
Ld	Lahontan silty clay, imperfectly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Very slow	Strongly saline.	High	Moderately deep.	Low	Slight	Saltgrass; alkali sacaton.	Range.
Very slow	Very slow	Strongly saline.	Moderate	Moderately deep.	Low	Slight	Same	Range.
Very slow	Very slow	Strongly saline.	Low	Moderately deep.	Low	Slight	Pickleweed; samphire.	Range.
Very slow	Very slow	Strongly saline.	Low	Moderately deep.	Low	Slight	Same	Range.
Slow to medium.	Very slow	Strongly saline.	Low	Moderately deep.	Low	Moderate	Same	Range.
Very slow	Very slow	Strongly saline.	Low	Moderately deep.	Low	Slight	Same	Range.
Very slow	Medium to slow.	Strongly saline.	Moderate	Moderately deep.	Low	Moderate	Saltgrass; alkali sacaton; squirreltail.	Range.
Very slow	Medium to slow.	Strongly saline.	Moderate	Moderately deep.	Low	Severe	Same	Range.
Slow	Medium to slow.	Strongly saline.	Moderate	Same	Low	Severe	Same	Irrigated alfalfa; small grains; corn; range.
Very slow	Very slow	Strongly saline.	Moderate	Same	Low	Moderate	Same	Range.
Very slow	Slow	Strongly saline.	Moderate	Same	Low	Moderate	Same	Range.
Very slow	Very slow	Strongly saline.	Moderate	Same	Low	Slight	Saltgrass; alkali sacaton.	Range.
Very slow to occasionally ponded.	Very slow	Strongly saline-alkali.	Low	Shallow	Low	Slight	Greasewood; shadscale; some rabbitbrush.	Range.
Same	Very slow	Same	Moderate	Same	Low	Slight	Saltgrass; alkali sacaton.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Lc	Lahontan silty clay, poorly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Poor
Le	Lahontan silty clay loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Moderately good.
Lf	Lahontan silty clay loam, eroded, 0 to 5 percent slopes.	Nearly level to gently sloping lake-laid sediments.	Same	Same	Same	Same
La	Lahontan loam, deep, over Hardy soil material, 0 to 2 percent slopes.	Nearly level lake-laid sediments.	Same	Same	Very pale brown to white, massive, very hard iron-stained silty clay or clay; Hardy soil material at about 42 inches.	Same
Lg	Lava flows	Lava flows	Extremely jagged and rough dark-brown to black basalt and cinder cones.		Little or no subsoil	Variable
Ll	Lynndyl loamy sand, 0 to 2 percent slopes.	Nearly level old stream and lake terraces.	Pale brown, massive to granular, loose, moderately calcareous.	Light-gray, strongly calcareous, massive, soft loamy fine sand; some gravel.	Stratified layers of loose gravel and sand.	Somewhat excessive.
Lm	Lynndyl loamy sand, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Same
Ln	Lynndyl loamy sand, 2 to 5 percent slopes.	Gently sloping old stream and lake terraces.	Same	Same	Same	Same
Lo	Lynndyl loamy sand, 5 to 20 percent slopes.	Sloping to moderately steep old stream and lake terraces.	Same	Same	Same	Same
Lp	Lynndyl sandy loam, 0 to 2 percent slopes.	Nearly level old stream and lake terraces.	Same	Light-gray, strongly calcareous, massive, soft sandy loam; some gravel.	Same	Same
Lr	Lynndyl sandy loam, 2 to 5 percent slopes.	Gently sloping old stream and lake terraces.	Same	Same	Same	Same
Ls	Lynndyl sandy loam, 5 to 10 percent slopes.	Sloping old stream and lake terraces.	Same	Same	Same	Same
Lh	Lynndyl loam, 0 to 2 percent slopes.	Nearly level old stream and lake terraces.	Same	Light-gray, strongly calcareous, massive, soft loam; some gravel.	Same	Same
Mb	McCornick fine sandy loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Light gray to very pale brown, platy to granular, soft, strongly calcareous.	White, weakly to strongly cemented lime hardpan.	White, coarse blocky, hard, strongly calcareous silty clay loam to silt loam; diatomaceous.	Good
Mc	McCornick fine sandy loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Md	McCornick fine sandy loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Good
Me	McCornick loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Good
Mf	McCornick loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Same	Very slow	Same	High	Same	Low	Slight	Salt sage; pickleweed; gray molly; greasewood.	Range.
Same	Very slow	Same	Low	Same	Low	Slight	Greasewood; shadscale.	Range.
Very slow to slow.	Very slow	Same	Low	Same	Low	Moderate	Same	Range.
Very slow	Very slow	Same	Low	Same	Low	Moderate	Saltgrass; pickleweed; alkali sacaton.	Range.
Variable	Variable	Free	Low	Very shallow.	Low	Slight	Almost none	Limited use; low-grade road surfacing; building blocks; turkey litter.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Galletagrass; sagebrush.	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow to slow.	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.
Slow to medium.	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow	Rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow to slow.	Rapid	Free	Low	Deep	Low	Severe	Same	Range.
Slow to medium.	Rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow	Medium	Moderately saline.	Low	Deep	Low	Severe	Shadscale	Range.
Very slow	Slow	Same	Low	Shallow to moderately deep.	Low	Severe	Shadscale; greasewood; some sagebrush.	Dryland wheat; irrigated alfalfa; small grains; range.
Very slow	Slow	Same	Low	Same	Low	Severe	Same	Range.
Slow	Slow	Same	Low	Same	Low	Severe	Same	Range.
Very slow	Slow	Moderately to strongly saline.	Low	Same	Low	Severe	Shadscale; greasewood; some grasses.	Dryland wheat; range.
Very slow	Slow	Same	Low	Same	Low	Severe	Same	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Ma	McCornick clay loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Mg	McCornick loamy fine sand, eroded, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Good
Mj	Mellor loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Very pale brown, platy and vesicular, soft, strongly calcareous.	Pale-brown, strongly calcareous, very hard, prismatic silty clay.	Very pale brown, stratified, massive, soft, moderately calcareous sandy loam to loamy sand.	Good
Mk	Mellor loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Ml	Mellor loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Good
Mn	Mellor silty clay loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Good
Mo	Mellor silty clay loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Mp	Mellor silty clay loam, 2 to 5 percent slopes.	Gently sloping old lake terraces.	Same	Same	Same	Good
Mh	Mellor fine sandy loam, 0 to 2 percent slopes.	Nearly level old lake terraces.	Same	Same	Same	Good
Mi	Mellor fine sandy loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Mm	Mellor loamy fine sand, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Mu	Millard gravelly loam, 2 to 5 percent slopes.	Gently sloping somewhat older alluvial fans.	Brown, noncalcareous, slightly hard, platy to granular.	Pale-brown, noncalcareous, subangular blocky, hard gravelly heavy loam or light clay loam.	Pale-brown, moderately to strongly calcareous, massive, slightly hard gravelly sandy loam.	Good
Mt	Millard gravelly loam, 0 to 2 percent slopes.	Nearly level fairly recent alluvial fans.	Same	Same	Same	Good
Mw	Millard loam, 2 to 5 percent slopes.	Gently sloping fairly recent alluvial fans.	Same	Same	Same	Good
Mv	Millard loam, 0 to 2 percent slopes.	Nearly level fairly recent alluvial fans.	Same	Same	Same	Good
Ms	Millard fine sandy loam, 2 to 5 percent slopes.	Gently sloping fairly recent alluvial fans.	Same	Same	Same	Good
Mr	Millard clay loam, 0 to 2 percent slopes.	Nearly level fairly recent alluvial fans.	Same	Same	Same	Good
My	Millard stony loam, 2 to 5 percent slopes.	Gently sloping fairly recent alluvial fans.	Same	Same	Same	Good
Mx	Millard stony loam, 0 to 2 percent slopes.	Nearly level fairly recent alluvial fans.	Same	Same	Same	Good
Mz	Millard stony sandy loam, 5 to 10 percent slopes.	Sloping fairly recent alluvial fans.	Same	Same	Same	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Slow	Same	Low	Same	Low	Moderate	Sagebrush; shadscale.	Dryland wheat; irrigated crops.
Very slow	Very slow	Moderately saline.	Low	Shallow	Low	Severe	Sagebrush; Russian-thistle.	Range.
Very slow to ponded.	Very slow	Strongly saline-alkali.	Low	Shallow	Low	Severe	Shadscale; greasewood; bud sage; gray molly.	Range.
Same	Very slow	Same	Low	Shallow	Low	Severe	Same	Range.
Slow	Very slow	Slightly saline, strongly alkali.	Low	Shallow	Low	Severe	Same	Range.
Very slow	Very slow	Strongly saline-alkali.	Low	Shallow	Low	Moderate	Same	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Moderate	Shadscale; greasewood.	Range.
Slow	Very slow	Same	Low	Shallow	Low	Moderate	Shadscale; seepweed; white sage.	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Shadscale; greasewood.	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Same	Range.
Very slow	Very slow	Same	Low	Shallow	Low	Severe	Same	Range.
Slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Range; dryland wheat.
Very slow	Medium	Free	Moderate	Deep	Moderate	Slight	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Very slow	Medium	Free	Moderate	Deep	Moderate	Slight	Sagebrush; grasses.	Dryland wheat; range.
Slow	Rapid	Free	Moderate	Deep	Moderate	Severe	Sagebrush; grasses.	Dryland wheat; range.
Very slow	Medium	Free	Moderate	Deep	Moderate	Slight	Sagebrush; grasses.	Dryland wheat.
Slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Range.
Very slow	Medium	Free	Moderate	Deep	Moderate	Slight	Sagebrush; grasses.	Range.
Slow	Rapid	Free	Low	Deep	Low	Severe	Sagebrush; grasses.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Nc	Naples loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Light brown, soft, platy to massive, strongly calcareous.	Light-brown, strongly calcareous, slightly hard, massive sandy loam.	Light-brown, strongly calcareous, stratified sandy loam to light silty clay loam.	Good
Nd	Naples loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Na	Naples fine sandy loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Light-brown, strongly calcareous, slightly hard, massive fine sandy loam.	Same	Good
Nb	Naples fine sandy loam, deep, over gravel, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
No	Neola sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Very pale brown, moderately to strongly calcareous, slightly hard, granular.	White, strongly lime cemented hardpan.	Very pale brown, strongly calcareous gravelly sand.	Good
Np	Neola sandy loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Good
Nn	Neola sandy loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Same	Same	Same	Good
Nf	Neola gravelly sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Good
Ng	Neola gravelly sandy loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Good
Nt	Neola stony sandy loam, 10 to 20 percent slopes.	Moderately steep old alluvial fans.	Same	Same	Same	Good
Ns	Neola stony sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Good
Nu	Neola stony sandy loam, eroded, 5 to 20 percent slopes.	Sloping to moderately steep old alluvial fans.	Same	Same	Same	Good
Nh	Neola loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Good
Nl	Neola loam, 5 to 20 percent slopes.	Sloping to moderately steep old alluvial fans.	Same	Same	Same	Good
Nm	Neola loamy sand, 2 to 10 percent slopes.	Gently sloping to sloping old alluvial fans.	Yellowish brown, noncalcareous, loose, single grained.	Same	Same	Good
Ne	Neola gravelly loamy sand, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Good
Nr	Neola stony loamy sand, 5 to 10 percent slopes.	Same	Same	Same	Same	Good
Oa	Oasis fine sandy loam, 0 to 2 percent slopes.	Nearly level lake terraces.	Very pale brown, platy to granular, soft, strongly calcareous.	Very pale brown, soft, massive, strongly calcareous fine sandy loam.	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam.	Good
Ob	Oasis fine sandy loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Oc	Oasis fine sandy loam, 2 to 5 percent slopes.	Gently sloping lake terraces.	Same	Same	Same	Good

See footnotes at end of table.

OF THE SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Irrigated alfalfa; small grains; range.
Slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Dryland wheat.
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses	Range.
Slow	Medium	Free	Moderate to low.	Deep	Low	Severe	Sagebrush; grasses.	Range.
Slow	Very slow	Free	Low	Shallow	Low	Severe	Sagebrush; scattered junipers.	Range.
Slow to medium.	Very slow	Free	Low	Shallow	Low	Severe	Same	Range.
Very slow	Very slow	Free	Low	Shallow	Low	Severe	Sagebrush	Range.
Slow	Very slow	Free	Low	Shallow	Low	Severe	Sagebrush; scattered junipers.	Range.
Slow to medium.	Very slow	Free	Low	Shallow	Low	Severe	Same	Range.
Medium	Very slow	Free	Low	Very shallow.	Low	Severe	Same	Range.
Slow	Very slow	Free	Low	Very shallow.	Low	Severe	Same	Range.
Slow to medium.	Very slow	Free	Low	Very shallow.	Low	Severe	Same	Range.
Slow	Very slow	Free	Low	Shallow	Low	Moderate	Same	Range.
Slow to medium.	Very slow	Free	Low	Shallow	Low	Severe	Same	Range.
Slow	Very slow	Free	Low	Very shallow to shallow.	Low	Severe	Same	Range.
Slow	Very slow	Free	Low	Same	Low	Severe	Same	Range.
Slow	Very slow	Free	Low	Very shallow.	Low	Severe	Same	Range.
Very slow	Medium	Moderately to strongly saline.	Moderate	Deep	Low	Severe	Greasewood; shadscale; saltgrass.	Irrigated alfalfa; small grains; range.
Very slow	Medium	Same	Moderate	Deep	Low	Severe	Same	Range.
Slow	Medium	Same	Moderate	Deep	Low	Severe	Same	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Od	Oasis fine sandy loam, eroded, 2 to 5 percent slopes.	Same	Same	Same	Same	Good
Oh	Oasis fine sandy loam, deep, over Woodrow soil material, 0 to 2 percent slopes.	Nearly level lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Woodrow soil material at about 36 inches.	Good
Oi	Oasis fine sandy loam, deep, over Woodrow soil material, 2 to 5 percent slopes.	Gently sloping lake terraces.	Same	Same	Same	Good
Og	Oasis fine sandy loam, deep, over Escalante soil material, 0 to 2 percent slopes.	Nearly level lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Escalante soil material at about 36 inches.	Good
Oe	Oasis fine sandy loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Boxelder soil material at about 30 inches.	Good
Of	Oasis fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Boxelder soil material at 36 to 60 inches.	Good
Oj	Oasis loam, 0 to 2 percent slopes.	Same	Same	Very pale brown, soft, massive, strongly calcareous loam.	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam.	Good
Om	Oasis loam, imperfectly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Ok	Oasis loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
On	Oasis loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Boxelder soil material at about 30 inches.	Good
Oo	Oasis loam, deep, over gravel, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; gravel at about 42 inches.	Good
Oq	Oasis loam, deep, over Woodrow soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Woodrow soil material at 36 to 60 inches.	Good

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow	Medium	Same	Moderate	Deep	Low	Severe	Same	Range.
Slow	Medium	Same	Moderate	Deep	Low	Severe	Same	Range.
Slow	Medium	Same	Moderate	Deep	Low	Severe	Same	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Severe	Saltgrass; greasewood; rabbitbrush.	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Severe	Greasewood; shadscale.	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Severe	Saltgrass; greasewood; rabbitbrush.	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Severe	Greasewood; shadscale; some sagebrush; rabbitbrush.	Irrigated alfalfa; range.
Very slow	Medium	Same	Moderate	Deep	Low	Moderate	Same	Same.
Very slow	Medium	Same	Moderate	Deep	Low	Moderate	Same	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Moderate	Greasewood; shadscale.	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Moderate	Same	Irrigated alfalfa; range.
Very slow	Medium	Same	Moderate	Deep	Low	Moderate	Greasewood; shadscale; some sagebrush; rabbitbrush.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Or	Oasis loam, deep, over Woodrow soil material, 2 to 5 percent slopes.	Gently sloping lake terraces.	Same	Same	Same	Good
Op	Oasis loam, deep, over Hardy soil material, 0 to 2 percent slopes.	Nearly level lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Hardy soil material at about 42 inches.	Good
Ol	Oasis loam, 2 to 5 percent slopes.	Gently sloping lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam.	Good
Ox	Oasis silty clay loam, 0 to 2 percent slopes.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loam.	Same	Good
Oy	Oasis silty clay loam, 5 to 10 percent slopes.	Sloping lake terraces.	Same	Same	Same	Good
Oz	Oasis silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Boxelder soil material at about 42 inches.	Good
Oaa	Oasis silty clay loam, deep, over Woodrow soil material, 0 to 5 percent slopes.	Nearly level to gently sloping lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Woodrow soil material at about 42 inches.	Good
Ov	Oasis silty clay, 0 to 2 percent slopes.	Nearly level lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified sandy loam.	Good
Ow	Oasis silty clay, imperfectly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Os	Oasis loamy fine sand, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Ot	Oasis loamy fine sand, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Ou	Oasis loamy sand, moderately deep, over Boxelder soil material, 2 to 5 percent slopes.	Gently sloping lake terraces.	Same	Same	Very pale brown, soft, massive, strongly calcareous, stratified loamy sand to light clay loam; Boxelder soil material at about 30 inches.	Good
Oba	Orem loamy fine sand, 2 to 5 percent slopes.	Gently sloping stabilized dunes.	Brown, noncalcareous, loose, single grained.	Light-brown, moderately to strongly calcareous, soft, single-grained loamy fine sand.	Light-brown, loose, strongly calcareous, single-grained loamy fine sand.	Somewhat excessive.
Oca	Orem loamy fine sand, 5 to 10 percent slopes.	Sloping stabilized dunes.	Same	Same	Same	Excessive

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow	Medium	Strongly saline.	Moderate	Deep	Low	Severe	Greasewood; shadscale.	Range.
Slow	Slow	Moderately to strongly saline.	Moderate	Deep	Low	Moderate	Same	Range.
Slow	Medium	Same	Moderate	Deep	Low	Severe	Same	Irrigated alfalfa; small grains; range.
Very slow	Medium	Same	Moderate	Deep	Low	Slight	Same	Irrigated alfalfa; small grains; potatoes.
Medium	Medium	Same	High	Deep	Low	Severe	Sagebrush	Range.
Very slow	Medium	Slightly to strongly saline.	High	Deep	Low	Slight	Greasewood; shadscale.	Range.
Very slow	Medium	Moderately to strongly saline.	High	Deep	Low	Slight	Same	Range.
Very slow	Slow	Strongly saline.	High	Deep	Low	Slight	Greasewood	Range.
Very slow	Slow	Strongly saline.	High	Deep	Low	Slight	Greasewood	Range.
Very slow	Medium	Moderately to strongly saline.	Moderate	Deep	Low	Severe	Greasewood; shadscale.	Range.
Very slow	Medium	Same	Low	Deep	Low	Severe	Same	Range.
Very slow	Medium	Same	Moderate	Deep	Low	Severe	Same	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Sagebrush; rabbitbrush; grasses.	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Pb	Palisade fine sandy loam, 0 to 2 percent slopes.	Nearly level, somewhat older alluvial fans.	Very pale brown, platy to granular, soft, strongly calcareous.	Very pale brown to nearly white, slightly hard, weakly lime cemented light fine sandy loam.	Very pale brown, massive, soft, strongly calcareous light fine sandy loam to loamy fine sand.	Good
Pc	Palisade fine sandy loam, eroded, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Pg	Palisade fine sandy loam, deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, massive, soft, strongly calcareous light fine sandy loam to loamy fine sand; Boxelder soil material at about 36 inches.	Good
Ph	Palisade fine sandy loam, deep, over Boxelder soil material, 2 to 5 percent slopes.	Gently sloping, somewhat older alluvial fans.	Same	Same	Same	Good
Pd	Palisade fine sandy loam, 2 to 5 percent slopes.	Same	Same	Same	Very pale brown, massive, soft, strongly calcareous light fine sandy loam to loamy fine sand.	Good
Pe	Palisade fine sandy loam, eroded, 2 to 5 percent slopes.	Same	Same	Same	Same	Good
Pf	Palisade fine sandy loam, 5 to 10 percent slopes.	Sloping, somewhat older alluvial fans.	Same	Same	Same	Good
Pi	Palisade loam, 0 to 2 percent slopes.	Nearly level, somewhat older alluvial fans.	Same	Same	Same	Good
Pk	Palisade loam, deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown, massive, soft, strongly calcareous light fine sandy loam to loamy fine sand; Boxelder soil material at about 40 inches.	Good
Pl	Palisade loam, deep, over Boxelder soil material, 2 to 5 percent slopes.	Gently sloping, somewhat older alluvial fans.	Same	Same	Same	Good
Pj	Palisade loam, 2 to 5 percent slopes.	Same	Same	Same	Same	Good
Pm	Palisade loamy fine sand, 2 to 5 percent slopes.	Same	Same	Same	Same	Good
Pp	Palisade loamy fine sand, deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level, somewhat older alluvial fans.	Same	Same	Very pale brown, massive, soft, strongly calcareous light fine sandy loam to loamy fine sand; Boxelder soil material at about 36 inches.	Good
Pn	Palisade loamy fine sand, eroded, 2 to 5 percent slopes.	Gently sloping, somewhat older alluvial fans.	Same	Same	Very pale brown, massive, soft, strongly calcareous light fine sandy loam to loamy fine sand.	Good

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Dry-farm wheat; range.
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Slow to medium.	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Dryland wheat.
Very slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Dryland wheat; irrigated alfalfa; small grains; ensilage.
Very slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Dryland wheat.
Slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Range; dryland wheat.
Slow	Medium	Free	Moderate	Deep	Low	Moderate	Sagebrush; grasses.	Range.
Very slow	Medium	Free	Low	Deep	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Medium	Free	Moderate	Deep	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Medium	Free	Low	Deep	Low	Severe	Sagebrush; grasses.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Po	Palisade loamy fine sand, 5 to 10 percent slopes.	Sloping, somewhat older alluvial fans.	Same	Same	Same	Good
Pa	Palisade clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level, somewhat older alluvial fans.	Same	Same	Very pale brown, massive, soft, strongly calcareous light fine sandy loam to loamy fine sand; Boxelder soil material at about 36 inches.	Good
Pr	Pavant gravelly sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Pale brown, strongly calcareous, platy to granular, soft.	Light-gray to white strongly cemented lime hardpan.	Stratified gravel and stones, and some fine material.	Good
Pq	Pavant gravelly sandy loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Pale brown, noncalcareous to weakly calcareous, platy to granular, soft.	Same	Same	Good
Ps	Pavant gravelly sandy loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Pale brown, strongly calcareous, platy to granular, soft.	Same	Same	Good
Pt	Pavant gravelly sandy loam, 10 to 20 percent slopes.	Moderately steep old alluvial fans.	Same	Same	Same	Good
Paa	Pavant stony sandy loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Good
Pz	Pavant stony sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Good
Pba	Pavant stony sandy loam, 10 to 20 percent slopes.	Moderately steep old alluvial fans.	Same	Same	Same	Good
Py	Pavant sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Good
Pv	Pavant loam, 2 to 5 percent slopes.	Same	Same	Same	Same	Good
Pu	Pavant loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Same	Same	Same	Good
Pw	Pavant loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Good
Px	Pavant loam, 10 to 20 percent slopes.	Moderately steep old alluvial fans.	Same	Same	Same	Good
Pga	Pharo loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Pale brown, weakly calcareous, soft to slightly hard, platy to granular.	Very pale brown, hard, weakly lime cemented loam.	Very pale brown, slightly hard, strongly calcareous, stratified, medium-textured material and gravel.	Somewhat excessive.
Pha	Pharo loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Same
Pca	Pharo gravelly loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Same	Same	Same	Same
Pda	Pharo gravelly loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Same
Pfa	Pharo gravelly loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Same
Pla	Playas	Nearly level basins	Flat, strongly saline or saline-alkali basins			Very poor
Pva	Poganeab soils, undifferentiated, poorly drained, 0 to 2 percent slopes.	Nearly level alluvial deposits.	Variable colors and textures from sand to clay in short distances.	Similar to surface soil	Similar to surface soil	Poor

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow	Medium	Free	Low	Deep	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Medium	Free	High	Deep	Low	Slight	Sagebrush; grasses.	Dryland wheat.
Slow	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Dryland wheat; range.
Very slow	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Dryland wheat; range.
Slow to medium.	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Dryland wheat; range.
Medium	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Range.
Slow to medium.	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Range.
Slow	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Range.
Medium	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Range.
Slow	Very slow	Free	Low	Shallow	Low	Severe	Grasses	Dryland wheat; range.
Slow	Very slow	Free	Low	Shallow	Low	Severe	Same	Dryland wheat; range.
Very slow	Very slow	Free	Low	Shallow	Low	Moderate	Same	Dryland wheat.
Slow to medium.	Very slow	Free	Low	Shallow	Low	Severe	Same	Dryland wheat; range.
Medium to rapid.	Very slow	Free	Low	Shallow	Low	Severe	Same	Range.
Very slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	Moderate	Severe	Sagebrush; grasses.	Dryland wheat.
Very slow	Medium	Free	Moderate	Deep	Moderate	Moderate	Sagebrush; grasses.	Range; dryland wheat.
Slow	Medium	Free	Moderate	Deep	Moderate	Severe	Sagebrush; grasses.	Dryland wheat; range.
Slow to medium.	Medium	Free	Moderate	Deep	Moderate	Severe	Sagebrush; grasses.	Range.
Ponded	Very slow to none.	Strongly saline-alkali.	Variable	Variable	Variable	Slight	Few scattered greasewood; shadscale.	Migratory wildlife.
Very slow	Slow	Moderately saline.	High	Variable	Variable	Slight	Saltgrass; greasewood; some plants that grow in water.	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Pma	Preston fine sand, duny.	Dunes 3 to 12 feet high.	Light brown, loose, weakly to moderately calcareous.	Similar	Similar to surface soil	Excessive
Pna	Preston fine sand, hummocky.	Hummocks 1 to 3 feet high.	Same	Same	Similar to surface soil	Excessive
Poa	Preston fine sand, moderately deep, over Boxelder soil material, 1 to 5 percent slopes.	Gently sloping sand deposit over lake-laid material.	Same	Same	Similar to surface soil; Boxelder soil material at 20 to 36 inches.	Good
Ppa	Preston and Escalante soils and sand dunes.	Wind-reworked old sandy deposits.	Undifferentiated coarse-textured Preston and Escalante soils and sand dunes.			Excessive
Psa	Preston and Lynndyl soils, 2 to 5 percent slopes.	Gently sloping, wind-reworked old sandy deposits.	Undifferentiated coarse-textured Preston and Lynndyl soils			Excessive
Pra	Preston and Lynndyl soils, 0 to 2 percent slopes.	Nearly level, wind-reworked old sandy deposits.	Undifferentiated coarse-textured Preston and Lynndyl soils			Excessive
Pta	Preston and Taylorsflat soils and sand dunes.	Same	Undifferentiated coarse-textured Preston and Taylorsflat soils and sand dunes.			Variable
Rd	Red Rock loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Brown, noncalcareous, granular, slightly hard.	Pale-brown, noncalcareous, slightly hard, massive clay loam.	Pale-brown, massive, slightly hard, strongly calcareous clay loam; some segregated lime in places.	Good
Re	Red Rock loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Same	Good
Rg	Red Rock loam, moderately deep, over Boxelder soil material, 2 to 5 percent slopes.	Same	Same	Same	Pale-brown, strongly calcareous clay loam; some segregated lime in places; Boxelder soil material at about 30 inches.	Good
Rf	Red Rock loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Same	Same	Good
Rc	Red Rock fine sandy loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans and flood plains.	Same	Same	Pale-brown, strongly calcareous clay loam; some segregated lime in places.	Good
Ra	Red Rock clay loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans and flood plains.	Same	Same	Same	Good
Rb	Red Rock clay loam, moderately deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Pale-brown, strongly calcareous clay loam; some segregated lime in places; Boxelder soil material at about 30 inches.	Good
Rh	Riverwash	Streambeds and flooded areas.	Stony and gravelly streambeds and flooded areas			Excessive
Rl	Rough gullied land, Ebbs soil material.	Gullied areas	Gullied Ebbs soil material			Excessive

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Squawberry; rabbitbrush.	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow	Medium	Free	Low	Deep	Low	Severe	Same	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Rabbitbrush; greasewood; sagebrush.	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow	Variable	Free	Low	Deep	Low	Severe	Sagebrush; scattered juniper; rabbitbrush; grasses.	Range.
Very slow	Medium	Free	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat.
Slow	Medium	Free	High	Deep	High	Moderate	Sagebrush; grasses.	Dryland wheat; range.
Slow	Medium	Free	Moderate	Deep	High	Moderate	Sagebrush; grasses.	Dryland wheat.
Very slow	Medium	Free	Moderate	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat.
Slow	Medium	Free	Moderate	Deep	High	Severe	Sagebrush; grasses.	Dryland wheat.
Very slow	Medium	Free	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat; irrigated crops.
Very slow	Medium	Free	High	Deep	High	Slight	Sagebrush; grasses.	Dryland wheat.
Very slow	Very rapid	Free	Low	Variable	Low	Slight	Almost none	Range.
Very rapid	Variable	Free	Low	Variable	Low	Severe	Almost none	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Rm	Rough gullied land, Sigurd soil material.	Gullied areas	Gullied Sigurd soil			Excessive
Rn	Rough gullied land, Woodrow soil material.	Gullied areas	Gullied Woodrow soil material			Excessive
Ro	Rough stony land	Steep and mountainous areas.	Steep, rocky mountain slopes			Excessive
S	Sand dunes	Unstabilized sand dunes 3 to 20 feet high.	Very pale brown, loose sand			Excessive
Sf	Sanpete gravelly sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Very pale brown, platy to granular, moderately to strongly calcareous, soft.	White, weakly lime cemented, very gravelly sandy loam.	Pale-yellow, loose, strongly calcareous gravel and sand.	Somewhat excessive.
Se	Sanpete gravelly sandy loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Same	Same	Same	Same
Sg	Sanpete gravelly sandy loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Same
Sk	Sanpete stony sandy loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	White, weakly lime cemented, stony sandy loam.	Pale-yellow, loose, strongly calcareous, stony gravel and sand.	Same
Sl	Sanpete stony sandy loam, 5 to 20 percent slopes.	Sloping to moderately steep old alluvial fans.	Same	Same	Same	Same
Sm	Sanpete stony sandy loam, eroded, 5 to 20 percent slopes.	Same	Same	Same	Same	Same
Sa	Sanpete fine sandy loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Same	White, weakly lime cemented, very gravelly sandy loam.	Pale-yellow, loose, strongly calcareous gravel and sand.	Same
Sb	Sanpete fine sandy loam, moderately deep, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Same
Sc	Sanpete fine sandy loam, shallow, 2 to 5 percent slopes.	Same	Same	Same	Same	Same
Sd	Sanpete fine sandy loam, shallow, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Same
Sh	Sanpete loam, 0 to 2 percent slopes.	Nearly level old alluvial fans.	Same	Same	Same	Same
Si	Sanpete loam, 2 to 5 percent slopes.	Gently sloping old alluvial fans.	Same	Same	Same	Same
Sj	Sanpete loam, 5 to 10 percent slopes.	Sloping old alluvial fans.	Same	Same	Same	Same
Sp	Santaquin loamy fine sand, 2 to 5 percent slopes.	Gently sloping old lake beaches and terraces.	Brown, granular, soft to loose, noncalcareous.	Yellowish-red, massive, soft, noncalcareous to very weakly calcareous loamy fine sand; weakly lime cemented in places.	Pink, strongly calcareous, soft, massive loamy fine sand.	Somewhat excessive.
Sq	Santaquin loamy fine sand, 5 to 10 percent slopes.	Sloping old lake beaches and terraces.	Same	Same	Same	Same
Ss	Santaquin sandy loam, 2 to 5 percent slopes.	Gently sloping old lake beaches and terraces.	Same	Same	Same	Same
Sr	Santaquin sandy loam, 0 to 2 percent slopes.	Nearly level old lake beaches and terraces.	Same	Same	Same	Same

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very rapid	Variable	Free	Low	Variable	Low	Severe	Almost none	Range.
Very rapid	Variable	Variable	Low	Variable	Low	Severe	Almost none	Range.
Very rapid	Variable	Free	Low	Very shallow.	Low	Severe	Scattered juniper; sagebrush.	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Almost none	Range.
Slow	Medium	Free	Low	Moderately deep.	Low	Severe	Sagebrush; grasses.	Range.
Very slow	Medium	Free	Low	Moderately deep.	Low	Severe	Sagebrush; grasses.	Range.
Slow to medium.	Medium	Free	Low	Moderately deep.	Low	Severe	Sagebrush; grasses.	Range.
Slow	Same	Free	Low	Moderately deep.	Low	Severe	Sagebrush; scattered junipers.	Range.
Slow to medium.	Same	Free	Low	Moderately deep.	Low	Severe	Same	Range.
Slow to medium.	Same	Free	Low	Moderately deep.	Low	Severe	Same	Range.
Very slow	Medium	Free	Low	Moderately deep.	Low	Severe	Sagebrush; grasses.	Range; some dryland wheat.
Slow	Medium	Free	Low	Moderately deep.	Low	Severe	Sagebrush; grasses.	Same.
Slow	Medium	Free	Low	Moderately deep.	Low	Severe	Sagebrush; grasses.	Range.
Slow to medium.	Medium	Free	Low	Moderately deep.	Low	Severe	Sagebrush; scattered junipers.	Range.
Very slow	Medium	Free	Moderate	Moderately deep.	Low	Moderate	Sagebrush; grasses.	Dryland wheat.
Slow	Medium	Free	Moderate	Moderately deep.	Low	Severe	Sagebrush; juniper.	Range.
Slow to medium.	Medium	Free	Moderate	Moderately deep.	Low	Severe	Sagebrush; juniper.	Range.
Very slow	Very rapid	Free	Low	Deep	Low	Severe	Juniper; sagebrush; bitterbrush; grasses.	Range.
Slow	Very rapid	Free	Low	Deep	Low	Severe	Same	Range.
Very slow	Rapid	Free	Low	Deep	Low	Severe	Same	Range
Very slow	Rapid	Free	Low	Deep	Low	Severe	Same	Range.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Sn	Santaquin fine sandy loam, moderately deep, over Pavant soil material, 5 to 10 percent slopes.	Sloping old lake beaches and terraces.	Same	Same	Pink, strongly calcareous, soft, massive loamy fine sand; Pavant soil material at about 30 inches.	Good
So	Santaquin fine sandy loam, moderately deep, over Pharo soil material, 2 to 5 percent slopes.	Gently sloping old lake beaches and terraces.	Same	Same	Pink, strongly calcareous, soft, massive loamy fine sand; Pharo soil material at about 30 inches.	Good
St	Scabland	Lava flows partially covered by lake sediments.	Variable old lake sediments over lava bedrock			Variable
Sv	Sigurd fine sandy loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Very pale brown, strongly calcareous, granular, soft.	Very pale brown, strongly calcareous, loose, massive gravelly loamy sand.	Very pale brown, strongly calcareous, loose sand and gravel.	Somewhat excessive.
Su	Sigurd fine sandy loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Same	Same	Same
Sba	Sigurd loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Same
Sca	Sigurd loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Same	Same
Sy	Sigurd gravelly sandy loam, 2 to 5 percent slopes.	Same	Same	Same	Same	Same
Sx	Sigurd gravelly sandy loam, 0 to 2 percent slopes.	Nearly level recent alluvial fans.	Same	Same	Same	Same
Sz	Sigurd gravelly sandy loam, 5 to 10 percent slopes.	Sloping recent alluvial fans.	Same	Same	Same	Same
Saa	Sigurd gravelly sandy loam, moderately deep, over Boxelder soil material, 0 to 5 percent slopes.	Nearly level to gently sloping recent alluvial fans.	Same	Same	Very pale brown, strongly calcareous, loose sand and gravel; Boxelder soil material at about 30 inches.	Same
Sfa	Sigurd stony sandy loam, 5 to 10 percent slopes.	Sloping recent alluvial fans.	Same	Very pale brown, strongly calcareous, loose, massive stony loamy sand.	Very pale brown, strongly calcareous, loose stony sand and gravel.	Same
Sda	Sigurd stony sandy loam, 2 to 5 percent slopes.	Gently sloping recent alluvial fans.	Same	Same	Same	Same
Sga	Sigurd stony sandy loam, eroded, 2 to 5 percent slopes.	Same	Same	Same	Same	Same
Sw	Sigurd gravelly loamy sand, 2 to 5 percent slopes.	Same	Same	Same	Very pale brown, strongly calcareous, loose sand and gravel.	Same
Sla	Smooth stony land	Stony land	Variable, stony		Bedrock	Excessive
Sna	Sunset loam, 0 to 2 percent slopes.	Nearly level flood plains.	Grayish brown, moderately calcareous, granular, slightly hard.	Light brownish-gray, strongly calcareous, hard, massive silt loam.	Very pale brown to pale brown, strongly calcareous, massive, slightly hard loam.	Good
Soa	Sunset loam, poorly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Poor
Sma	Sunset fine sandy loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Good

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Slow to medium.	Very slow	Free	Low	Moderately deep.	Moderate	Severe	Same	Irrigated alfalfa; potatoes.
Slow	Medium	Free	Moderate	Deep	Moderate	Severe	Same	Range.
Variable	Variable	Variable	Variable	Variable	Low	Variable	Shadscale; rabbitbrush; grasses.	Range.
Slow	Rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range; irrigated fruits; vegetables.
Very slow	Rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Same.
Very slow	Medium	Free	Low	Moderately deep.	Low	Moderate	Grasses; sagebrush.	Same.
Slow	Medium	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Dryland wheat; range.
Slow	Rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range.
Very slow	Rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range.
Slow to medium.	Rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range.
Very slow to slow.	Medium	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range.
Slow to medium.	Rapid	Free	Low	Moderately deep.	Low	Severe	Sagebrush; few junipers.	Range.
Slow	Rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range.
Slow	Rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range.
Very slow	Very rapid	Free	Low	Moderately deep.	Low	Severe	Grasses; sagebrush.	Range.
Variable	Variable	Free	Low	Very shallow	Low	Severe	Variable	Range.
Very slow	Medium	Free to strongly saline.	Moderate	Deep	High	Moderate	Greasewood; sagebrush.	Irrigated alfalfa; small grains; corn; potatoes; range.
Very slow	Slow	Same	High	Moderately deep.	High	Slight	Sedges and water-tolerant grasses.	Range.
Very slow	Medium	Same	Moderate	Deep	High	Severe	Greasewood; sagebrush.	Irrigated crops.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Sra	Sunset silty clay loam, 0 to 2 percent slopes.	Same	Same	Brownish-gray, strongly calcareous, hard, massive silty clay loam.	Same	Good
Ssa	Sunset silty clay loam, imperfectly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Tb	Taylorsflat sandy loam, 0 to 2 percent slopes.	Nearly level old terraces.	Very pale brown, granular, hard, strongly calcareous.	Very pale brown, hard, subangular blocky silty clay with segregated lime.	Very pale brown to light-gray, blocky, hard to very hard, strongly calcareous silty clay.	Good
Tc	Taylorsflat sandy loam, imperfectly drained, 0 to 2 percent slopes.	Same	Same	Same	Same	Imperfect
Ta	Taylorsflat loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Td	Taylorsflat silty clay loam, 0 to 2 percent slopes.	Same	Same	Same	Same	Good
Te	Terrace escarpments.	Terrace escarpments.	Variable gravelly sandy loam to clay			Excessive
Wl	Woodrow silty clay loam, 0 to 2 percent slopes.	Nearly level lake sediments.	Light gray to very pale brown, moderately to strongly calcareous, platy to granular, soft.	Very pale brown to white, strongly calcareous, hard, massive silty clay loam.	Similar to subsoil	Good
Wo	Woodrow silty clay loam, deep, over Oasis soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam; Oasis soil material at about 42 inches.	Good
Wn	Woodrow silty clay loam, deep, over Boxelder soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam; Boxelder soil material at about 36 inches.	Good
Wm	Woodrow silty clay loam, eroded, 2 to 5 percent slopes.	Gently sloping lake sediments.	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam.	Good
Wd	Woodrow loam, 0 to 2 percent slopes.	Nearly level lake sediments.	Same	Same	Same	Good
We	Woodrow loam, 2 to 5 percent slopes.	Gently sloping lake sediments.	Same	Same	Same	Good
Wf	Woodrow loam, eroded, 2 to 5 percent slopes.	Gently sloping lake sediments.	Same	Same	Same	Good
Wg	Woodrow loam, deep, over Oasis soil material, 0 to 2 percent slopes.	Nearly level lake sediments.	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam; Oasis soil material at about 40 inches.	Good

See footnotes at end of table.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Medium	Same	High	Deep	High	Slight	Same	Irrigated crops; range.
Very slow	Medium	Same	High	Deep	High	Slight	Same	Range.
Very slow	Slow to very slow.	Moderately saline in subsoil.	Moderate	Deep	Moderate	Severe	Sagebrush; shadscale; few junipers.	Range; irrigated alfalfa; irrigated small grains.
Very slow	Same	Same	High	Deep	Moderate	Severe	Same	Range.
Very slow	Same	Same	Moderate	Deep	Moderate	Moderate	Same	Range; irrigated alfalfa; irrigated small grains.
Very slow	Same	Moderately to strongly saline.	High	Deep	Moderate	Slight	Shadscale; bud sage; white sage.	Range.
Very rapid	Variable	Variable	Low	Variable	Low	Severe	Shadscale; greasewood; rabbitbrush.	Range.
Very slow	Slow	Moderately to strongly saline.	High	Deep	Low	Slight	Greasewood; shadscale; saltgrass.	Range; irrigated alfalfa; small grains; wheat.
Very slow	Slow	Same	High	Deep	Low	Slight	Same	Irrigated alfalfa; small grains.
Very slow	Slow	Same	High	Deep	Low	Slight	Same	Range.
Slow	Slow	Same	High	Deep	Low	Moderate	Same	Range.
Very slow	Slow	Same	Moderate	Deep	Low	Moderate	Same	Range; irrigated alfalfa; irrigated small grains.
Slow	Slow	Same	Moderate	Deep	Low	Moderate	Same	Same.
Slow	Slow	Same	Moderate	Deep	Low	Moderate	Same	Range.
Very slow	Slow	Same	Moderate	Deep	Low	Moderate	Same	Irrigated alfalfa; irrigated small grains.

SUMMARY OF IMPORTANT CHARACTERISTICS OF THE

Map symbol	Mapping unit	Topographic position	Soil profile (dry)			Drainage
			Surface soil	Subsoil	Substratum or parent material	Total [1]
Wa	Woodrow fine sandy loam, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam.	Good
Wb	Woodrow fine sandy loam, deep, over Hardy soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam; Hardy soil material at about 40 inches.	Good
Wc	Woodrow fine sandy loam, deep, over Oasis soil material, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam; Oasis soil material at about 40 inches.	Good
Wh	Woodrow silty clay, 0 to 2 percent slopes.	Same	Same	Same	Very pale brown to white, strongly calcareous, massive to granular, hard silty clay loam.	Good

[1] The total natural drainage of the soil profile, taking into account runoff and internal drainage.
[2] The rate at which water is removed by flow over the surface.
[3] The rate of downward movement of moisture through the soil.
[4] Soils classified as "free" contain no salt or alkali or so little that crops are not detrimentally affected.
[5] Amount of water available to plants within the depth that roots can readily penetrate, or to a depth of 5 feet, if no root-inhibiting factor is present. Effects of salt and alkali are disregarded. The ratings are based on the amount of water which would be available to plants at field capacity, that is, the moisture content of the soil 2 or 3 days after wetting. Ratings are (1) low—less than 4 surface inches; (2) moderate—4 to 9 surface inches, and (3) high—more than 9 surface inches. Soils of low capacity require frequent but light irrigations, using a large head and short runs; those of high capacity can be irrigated less frequently with larger quantities of water, a smaller head, and longer runs.

SOILS OF EAST MILLARD AREA, UTAH—Continued

Drainage—Continued		Soluble salts or alkali or both [4]	Water-holding capacity [5]	Depth of root penetration [6]	Natural fertility [7]	Erodibility [8]	Dominant native vegetation	Principal uses
Runoff [2]	Internal [3]							
Very slow	Slow	Same	Moderate	Deep	Low	Severe	Same	Same.
Very slow	Slow	Same	Moderate	Deep	Low	Severe	Same	Range.
Very slow	Slow	Same	Moderate	Deep	Low	Severe	Same	Range.
Very slow	Slow	Same	Moderate	Deep	Low	Slight	Same	Range.

[6] Depth to which plant roots readily penetrate. Chemical factors such as salts and alkali, which are subject to change, are not considered. The principal physical root-restraining factors are lime hardpans, gravel, gravel and stones, bedrock, or high water tables. The depth classes are (1) very shallow—0 to 10 inches; (2) shallow—10 to 20 inches; (3) moderately deep—20 to 36 inches; and (4) deep—36 to 60 inches or more.

[7] Relative ability to provide plant nutrients in the proper amounts and balance for crop growth. In general, a high rating indicates more than 2 percent of organic matter, a moderate rating 1 to 2 percent, and a low rating less than 1 percent.

[8] Tendency of soil to erode if improperly cultivated or heavily grazed.

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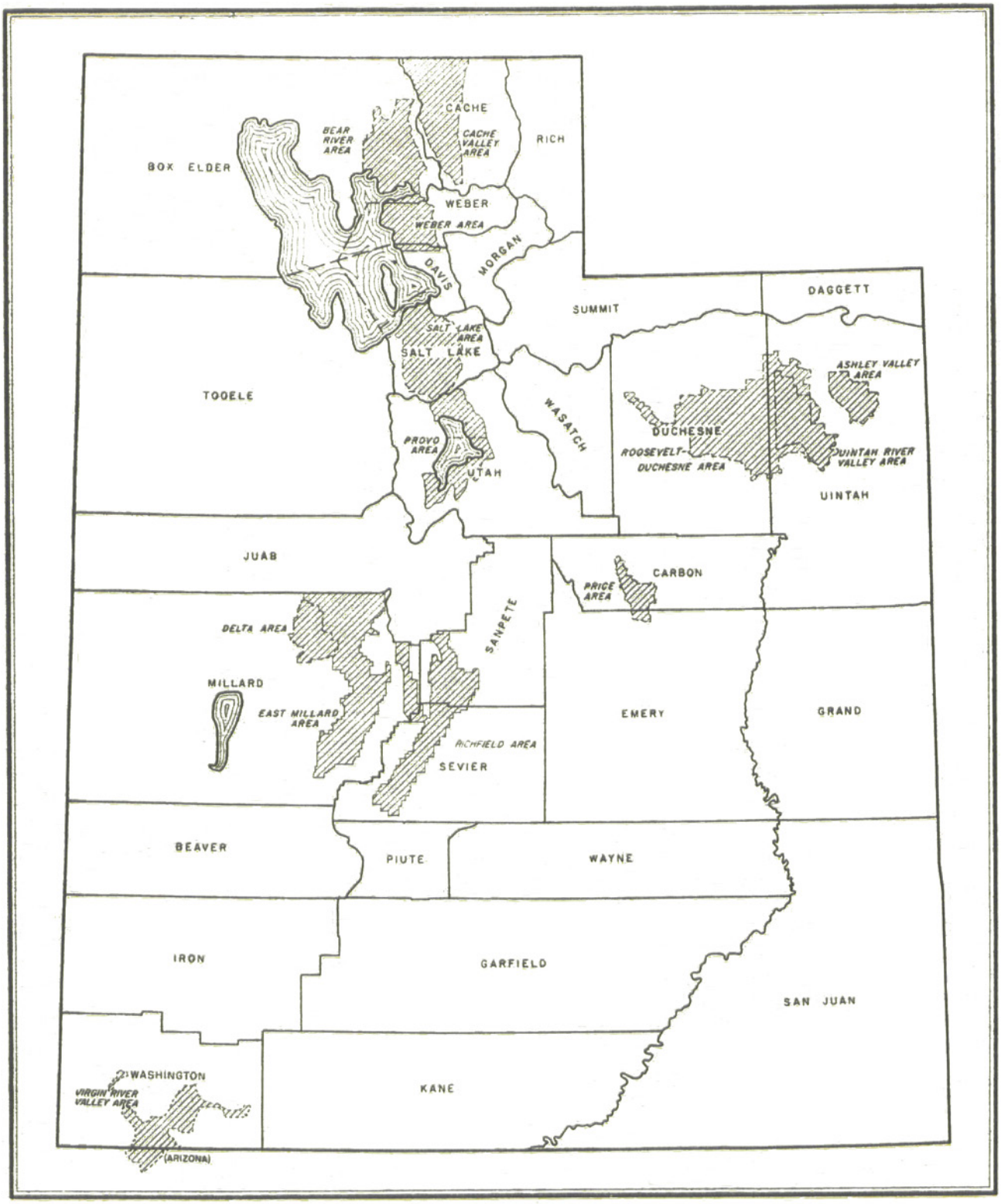

Areas surveyed in Utah shown by shading.

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