United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with United States Department of Agriculture, Forest Service; United States Department of the Interior, Bureau of Land Management and Bureau of Indian Affairs; United States Department of the Air Force; United States Department of the Army; and Utah Agricultural Experiment Station

# Soil Survey of Tooele Area, Utah

## Tooele County and Parts of Box Elder, Davis, and Juab Counties, Utah, and Parts of White Pine and Elko Counties, Nevada

# How To Use This Soil Survey

## General Soil Map

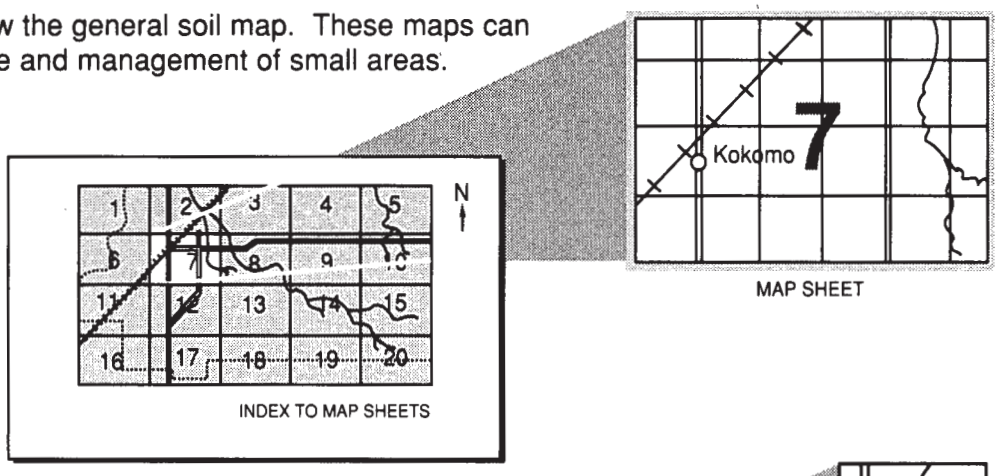
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

## Detailed Soil Maps

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

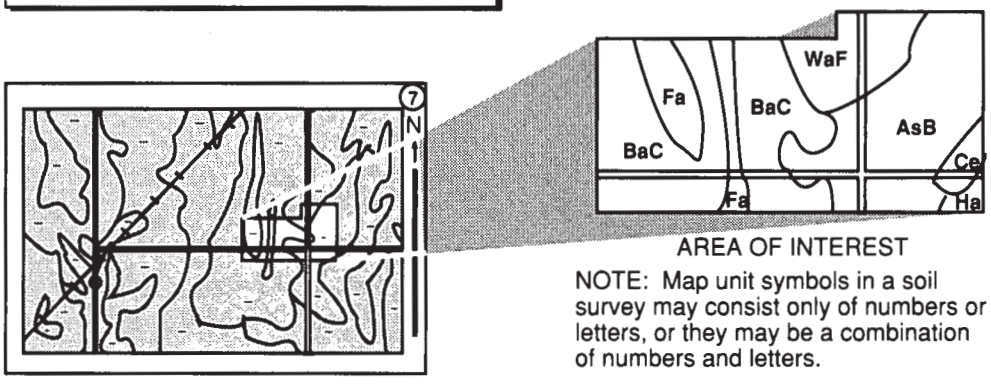
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

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



MAP SHEET

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1992. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1992. This survey was made cooperatively by the Natural Resources Conservation Service, the Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, the Department of the Air Force, the Department of the Army, and the Utah Agricultural Experiment Station. It is part of the technical assistance furnished to the Grantsville and Shambip Soil Conservation Districts.



**Cover: The Tooele Valley and the city of Tooele below the Settlement Reservoir. Most of the farmland consists of areas of Lakewin, Erda, and Birdow soils. These soils are used mainly for irrigated alfalfa, barley, and pasture or for nonirrigated winter wheat.**

# Contents



Issued 2000

# Index to Map Units

# Summary of Tables

# Foreword

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

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

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

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

Phillip J. Nelson
State Conservationist
Natural Resources Conservation Service

# Soil Survey of Tooele Area, Utah

Fieldwork by Darryl L. Trickler, Darrell T. Hall, Carol D. Franks, Scott K. Ferguson, Ludene B. Campbell, Patrick J. Savage, and James E. Brewer, Natural Resources Conservation Service, and Paul Winkelaar, Forest Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the United States Department of Agriculture, Forest Service; the United States Department of the Interior, Bureau of Land Management and Bureau of Indian Affairs; the Department of the Air Force; the Department of the Army; and the Utah Agricultural Experiment Station

## General Nature of the Survey Area

The survey area is mainly in northwestern Utah (fig. 1). It consists of Tooele County, Utah; the portion of the Goshute Indian Reservation in Juab County, Utah, and White Pine County, Nevada; and the portion of the military land in Box Elder County, Utah, and Elko County, Nevada. It also includes Antelope Island in Davis County, Utah. The survey area is bordered on the north by Box Elder County, on the east by Salt Lake County and Utah County, to the south by Juab County, and to the west by Elko County and White Pine County in Nevada.

The survey area has about 4,781,157 acres of land and 528,697 acres of water, most of which is the Great Salt Lake. The lowest elevation in the county fluctuates around 4,200 feet at the surface level of the Great Salt Lake. The highest elevations are 10,589 feet at Lowe Peak in the Oquirrh Mountains; 10,748 feet at Rocky Peak in the Deep Creek Mountains; and 11,031 feet at Deseret Peak in the Stansbury Mountains.

The survey area is used mainly for rangeland, cropland, wildlife habitat, military training and testing sites, mining, or small urban areas. The major cities are Tooele, Grantsville, and Wendover.

Mountain ranges in the survey area run north and south. Precipitation is higher in the mountains than in the valleys, and thus the types and production of vegetation are different. The drier areas are unsuitable for rangeland seeding. Management of the native plants is required for rangeland production in these areas.

### History

The settlement of Tooele County began in 1849 by Mormon pioneers. The Goshute, Paiute, and Shoshone Indians were the major tribes in the area at that time. Good pasture was available for the cattle that were raised for local consumption.

In 1869, the advent of the railroad in the area made eastern markets available for products from the west. The largest demand in the east was for wool and mutton. Consequently, sheep herds were built up in the survey area. During the peak years from 1905 to 1925, about 225,000 head of sheep trailed across the Tooele Valley each spring and fall.

In 1934, the Tooele Valley was known as "Utah's Dust Bowl." From that time on, the area has been under a "controlled grazing system." The area has been reseeded, and brush-control measures have been applied.

### Land Use

Nearly 1,745,000 acres of the survey area is administered by the Bureau of Land Management. Grazing of domestic livestock is the main land use on this acreage.

The Department of Defense controls 1,738,000

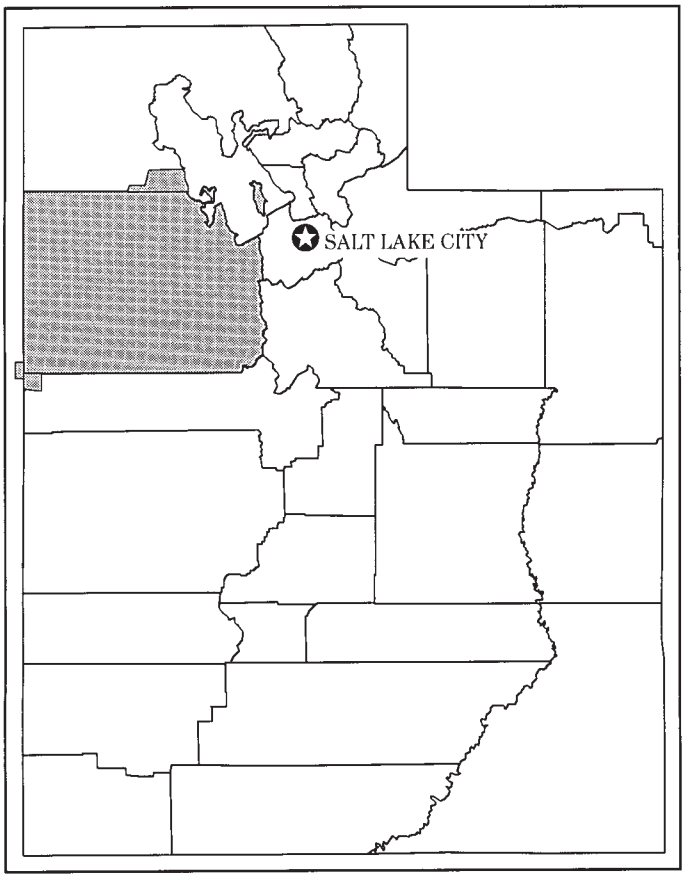



**Figure 1.—Location of the survey area.**

acres, most of which is a bombing range. This area is principally salt flats and has only minimum value for grazing. Wild horses and other species of wildlife are the only animals on most of the military land.

The Forest Service manages about 153,000 acres in the survey area. These lands are in parts of the Stansbury and Sheeprock mountain ranges. These areas receive the heaviest winter snowpack, which is the major source of culinary, industrial, and irrigation water. Also, these areas are some of the most productive native rangelands.

About 1,000,000 acres in the survey area is privately owned or State owned. All of the crops are produced on privately owned, nonirrigated or irrigated lands. Nearly 633,000 acres of non-Federal land is used as rangeland. About 26,000 acres is used for irrigated alfalfa, small grain, and corn silage; 10,000 acres is used for irrigated pasture; and 7,000 acres is used for nonirrigated small grain and alfalfa.

## Water Supply

During periods of high runoff, Deep Creek, Government Creek, and other drainageways enter the west desert mud flats. The Skull Valley and Tooele Valley drainageways empty into the Great Salt Lake. Vernon Creek and other drainageways empty into Rush Lake.

The Settlement Canyon, Grantsville, and Vernon Creek Reservoirs provide irrigation water. Farmers in many areas use water from wells and springs for their irrigation systems. Culinary water also is supplied by springs and wells.

More reservoirs could be developed in the survey area. Ground water is also available.

## Industry

Mining has been the major industry since the 1850's. Millions of dollars' worth of precious metals were mined from Ophir, Mercur Barren, and Gold Hill mines, all of which are now ghost towns. Mining has been resumed at the Mercur mine.

Mining has produced more income than any other resource in the area. Gold, silver, lead, and zinc mines were once rich and active in the Oquirrh Mountains. Other important mineral developments were in the Sheeprock, Dugway, Fish Springs, and Deep Creek Mountains. The mountains at Gold Hill also produced much metal ore at one time.

Nonmetallic mining and recovery have been important industries for decades. Lime and calcite are obtained from the northern end of the Stansbury Mountain range. Large quantities of aragonite are produced on the northern part of Cedar Mountain. Salt and potassium have long been available from brines in the salt desert between Cedar Mountain and Wendover. Mud flats between Burmester and Lakepoint are an important source of salt, potassium, and magnesium. The Bonneville Salt Flats cover 150 square miles and are a good source of brine for these minerals.

## Physiography and Geology

The survey area is in the Great Basin section of the Basin and Range physiographic province. This province is characterized by uplifted block faulted mountain ranges and down-dropped faulted basin valleys. The mountain ranges in the area are composed primarily of Paleozoic-age sedimentary rocks of marine origin and small exposures of volcanic and intrusive Tertiary igneous rocks. Exceptions are the ranges that form Antelope Island in the Great Salt Lake (in the northeast

corner of the survey area) and Granite, Simpson, and Sheeprock Mountains (in the south-central part of the survey area). These ranges are composed mainly of Precambrian-age metamorphic and igneous rocks.

The basin valleys are filled with thick wedges of sediment derived from long-term erosion of the uplifted mountain ranges. These sediments consist of alluvial, colluvial, lacustrine, and volcanic materials of Tertiary and Quaternary age that were deposited as interfingering sediments, thus making correlation of the deposits difficult. The alluvial and colluvial deposits generally occurred as an alluvial slope of coalescing fans consisting of medium grained to coarse grained sediment from the main mountain masses to the valley floors. The valley floors developed in the form of old lakebed deposits from Lake Bonneville and poorly developed alluvial flood plains. The lakebed deposits consist mainly of clay and silt and some sand and gravel. Flood-plain deposits include a more evenly distributed range of sediment sizes of clay, silt, and sand and some gravel. Much of the survey area is in the Great Salt Lake Desert and includes the shoreline of prehistoric Lake Bonneville. Thus, playa deposits of saline evaporites and mud flats and eolian sediments or dune deposits are included in the valley sediments. Dune deposits made up almost entirely of dolomite and gypsum crystals are south of Knolls in the central part of the survey area.

The Basin and Range province has been undergoing active tectonic uplift since the middle Miocene age (approximately 10 million years ago). The faults are generally located at the base of the ranges and are considered to be active in a geologic sense. The return period for actual earthquake events is between 450 and 5,000 years for these faults. No major earthquakes have occurred in the survey area since the time of settlement. This active geologic process, however, has been responsible for the uplifting of the mountains in the region and the consequent ongoing building of active alluvial fans.

The survey area is characterized by the active and recently active geologic processes of block faulting and uplift, volcanism, igneous intrusion, erosion, sedimentation, and deposition.

### Climate

Summers are warm or hot in most valleys and much cooler in the mountains. Winters are cold in the mountains. Valleys are colder than the lower slopes of adjacent mountains because of cold air drainage. Precipitation occurs in the mountains throughout the year, and a deep snowpack accumulates during the winter. Snowmelt supplies water for agriculture in the area. In the valleys, precipitation in summer occurs as showers; some thunderstorms also occur. In winter the ground is covered with snow much of the time. Warm, dry Chinook winds, which blow downslope, often cause the snow to melt and evaporate.

Table 1 gives data on temperature and precipitation at Dugway, Ibapah, and Tooele for the period from 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

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

## How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

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

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between

the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

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

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

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

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

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

# General Soil Map Units

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

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

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

The general soil map units in this soil survey have been grouped for purposes of broad interpretations. Each of the broad groups of soils and the map units in each group are described on the following pages.

## Map Unit Descriptions

**Very Deep, Poorly Drained and Somewhat Poorly Drained, Nearly Level Soils, Playas, and Salt Flats; on Lake Plains, Flood Plains, Low Lake Terraces, and Stream Terraces**

These map units make up about 38 percent of the survey area. The native vegetation is shrubs and grasses. The Playas and the Salt flats are mostly barren of vegetation.

These areas are used mainly for military training sites, solar evaporation ponds, rangeland, or wildlife habitat.

### 1. Playas-Saltair-Salt Flats

*Playas, salt flats, and poorly drained soils on lake plains in a desert climatic regime*

This map unit is in the Great Salt Lake Desert. Slopes are 0 to 1 percent. The Playas and the Salt flats are barren of vegetation. The native vegetation on the Saltair soils is mainly pickleweed and saltgrass. Elevation ranges from 4,200 to 4,300 feet. The average annual precipitation is about 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This map unit makes up about 37 percent of the survey area. It is about 76 percent Playas, 15 percent Saltair soils, 7 percent Salt flats, and 2 percent soils of minor extent (fig. 2).

The surface of the Playas is smooth. It is commonly thinly covered by salt crystals and is patterned by cracks when dry. The soil materials are strongly calcareous, stratified lake sediments of silt, clay, and sand. They contain sufficient amounts of salts to prohibit the growth of plants.

Saltair soils formed in alluvium and lake sediments derived from mixed rock sources. Typically, the surface layer is very pale brown silt loam. The subsoil to a depth of 60 inches is white silt loam or silty clay loam.

Salt flats are barren, undrained basins. The surface is covered with a thick layer of salt.

Of minor extent are Skumpah, Dynal, Kanosh, Yenrab, Logan, and Tooele soils.

This unit is used mainly as military training and testing areas or as wildlife habitat. The Salt flats and Playas are used as sources of salt from solar evaporating ponds.

### 2. Kanosh-Bramwell-Logan

*Somewhat poorly drained and poorly drained soils on flood plains, low lake terraces, and stream terraces in a semidesert climatic regime*

This map unit is in the eastern and southwestern parts of the survey area. Slopes range from 0

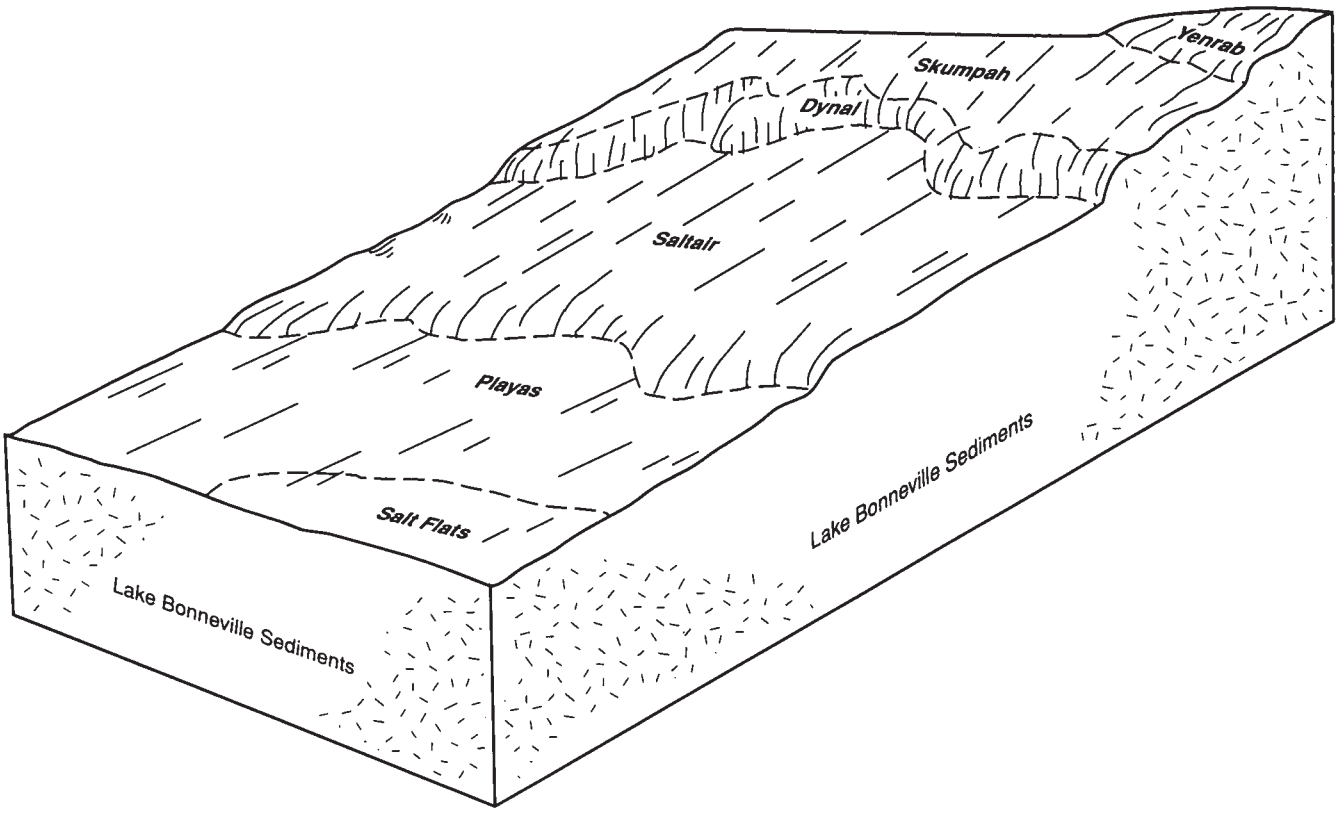



**Figure 2.—Typical pattern of soils and parent material in the Playas-Saltair-Salt flats and Skumpah-Yenrab-Dynal general soil map units.**

to 2 percent. The native vegetation is mainly saltgrass, sedges, and greasewood. Elevation ranges from 4,200 to 5,500 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 46 to 54 degrees F, and the average frost-free period is 110 to 180 days.

This unit makes up about 1 percent of the survey area. It is about 36 percent Kanosh soils, 21 percent Bramwell soils, 20 percent Logan soils, and 23 percent components of minor extent.

Kanosh soils are somewhat poorly drained and are on low lake terraces. Slopes range from 0 to 2 percent. The soils formed in lacustrine sediments derived from mixed rock sources. Typically, the surface layer is light brownish gray loam. The subsoil to a depth of 60 inches or more is very pale brown to white loam and fine sandy loam.

Bramwell soils are somewhat poorly drained and are on low lake terraces and stream terraces. Slopes range from 0 to 2 percent. The soils formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is light brownish gray silt loam. The subsoil is light brownish gray and light gray silt loam and silty clay loam. The substratum to a depth of 60 inches or more is light gray silty clay loam.

Logan soils are poorly drained and are on flood plains. Slopes are 0 to 1 percent. The soils formed in alluvium derived from mixed rock sources. Typically, the surface layer is dark grayish brown to dark gray silt loam. The subsoil to a depth of 60 inches or more is gray to white silty clay loam.

Of minor extent are Skumpah, Saltair, Yenrab, Birdow, and Taylorsflat soils and Playas.

This unit is used mainly for irrigated alfalfa, small grain, pasture, or meadow hay or as rangeland or wildlife habitat. Controlling grazing is necessary to maintain forage production. The unit is poorly suited to nonirrigated crops because of salt and alkali and because of low precipitation. The Kanosh and Bramwell soils are suited to irrigated crops. Drainage and the leaching of salts and alkali improve crop production. The Logan soils are suited to wet meadow hay.

**Shallow and Very Deep, Well Drained and Somewhat Excessively Drained, Nearly Level to Moderately Steep Soils; On Lake Terraces, Fan Terraces, and Stabilized Sand Dunes**

These map units make up about 41 percent of the survey area. The native vegetation is shrubs, grasses, and some juniper trees.

These areas are used mainly as rangeland, wildlife habitat, or irrigated cropland.

### 3. Skumpah-Yenrab-Dynal

*Very deep, well drained and somewhat excessively drained, nearly level to moderately sloping soils on lake terraces and stabilized sand dunes in a desert climatic regime*

This map unit is in the central part of the survey area. Slopes range from 0 to 15 percent. The native vegetation is mainly shadscale, greasewood, bottlebrush squirreltail, Indian ricegrass, and fourwing saltbush. Elevation ranges from 4,200 to 5,050 feet. The average annual precipitation is about 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit makes up about 11 percent of the survey area. It is about 61 percent Skumpah soils, 12 percent Yenrab soils, 11 percent Dynal soils, and 16 percent components of minor extent (fig. 2).

Skumpah soils are well drained and are on low lake terraces. Slopes range from 0 to 2 percent. The soils formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is light gray silt loam. The subsoil is light yellowish brown and pale brown silty clay loam and silt loam. The substratum to a depth of 60 inches or more is pale brown, light gray, or white silty clay loam and silt loam.

Yenrab soils are somewhat excessively drained and are on stabilized sand dunes. Slopes range from 2 to 15 percent. The soils formed in sand derived from mixed rock sources. Typically, the surface layer is pale brown fine sand. The underlying material to a depth of 60 inches or more is light yellowish brown fine sand.

Dynal soils are somewhat excessively drained and are on stabilized sand dunes. Slopes range from 2 to 15 percent. The soils formed in oolitic eolian sand derived dominantly from lacustrine sediments. Typically, the surface layer is very pale brown sand. The underlying material to a depth of 60 inches or more is very pale brown and light gray sand.

Of minor extent are Tooele, Timpie, and Saltair soils, Playas, and Dune land.

This unit is used mainly as rangeland or wildlife habitat. Controlling grazing is necessary to maintain forage production.

### 4. Tooele-Cliffdown-Timpie

*Very deep, well drained and somewhat excessively drained, nearly level to moderately sloping soils on lake terraces and fan terraces in a desert climatic regime*

This map unit is in the central part of the survey area. Slopes range from 0 to 15 percent. The native vegetation is mainly shadscale, greasewood, Indian ricegrass, horsebrush, and bottlebrush squirreltail. Elevation ranges from 4,200 to 6,000 feet. The average annual precipitation is about 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit makes up about 15 percent of the survey area. It is about 35 percent Tooele soils, 27 percent Cliffdown soils, 23 percent Timpie soils, and 15 percent components of minor extent (fig. 3).

Tooele soils are well drained and are on lake terraces and fan terraces. Slopes range from 0 to 5 percent. The soils formed in lacustrine sediments and alluvium derived from mixed rock sources. Typically, the surface layer is pale brown and very pale brown fine sandy loam. The underlying material to a depth of 60 inches or more is very pale brown fine sandy loam and fine sand.

Cliffdown soils are somewhat excessively drained and are on fan terraces. Slopes range from 2 to 15 percent. The soils formed in alluvium derived dominantly from sedimentary rocks. Typically, the surface layer is pale brown gravelly sandy loam. The underlying material to a depth of 60 inches or more is very pale brown very gravelly sandy loam.

Timpie soils are well drained and are on lake terraces and fan terraces. Slopes range from 0 to 4 percent. The soils formed in alluvium and lacustrine sediments derived dominantly from limestone and quartzite. Typically, the surface layer is pale brown silt loam. The subsoil to a depth of 60 inches or more is very pale brown silt loam.

Of minor extent are Izamatch, Yenrab, Hiko Springs, Skumpah, and Amtoft soils and Badlands, Dune land, and Rock outcrop.

This unit is used mainly as rangeland or wildlife habitat. A few areas are used for irrigated alfalfa hay, small grain, or pasture. Controlling grazing is necessary to maintain forage production. The soils are suited to irrigated crops. The main limitation is an inadequate supply of irrigation water in most areas.

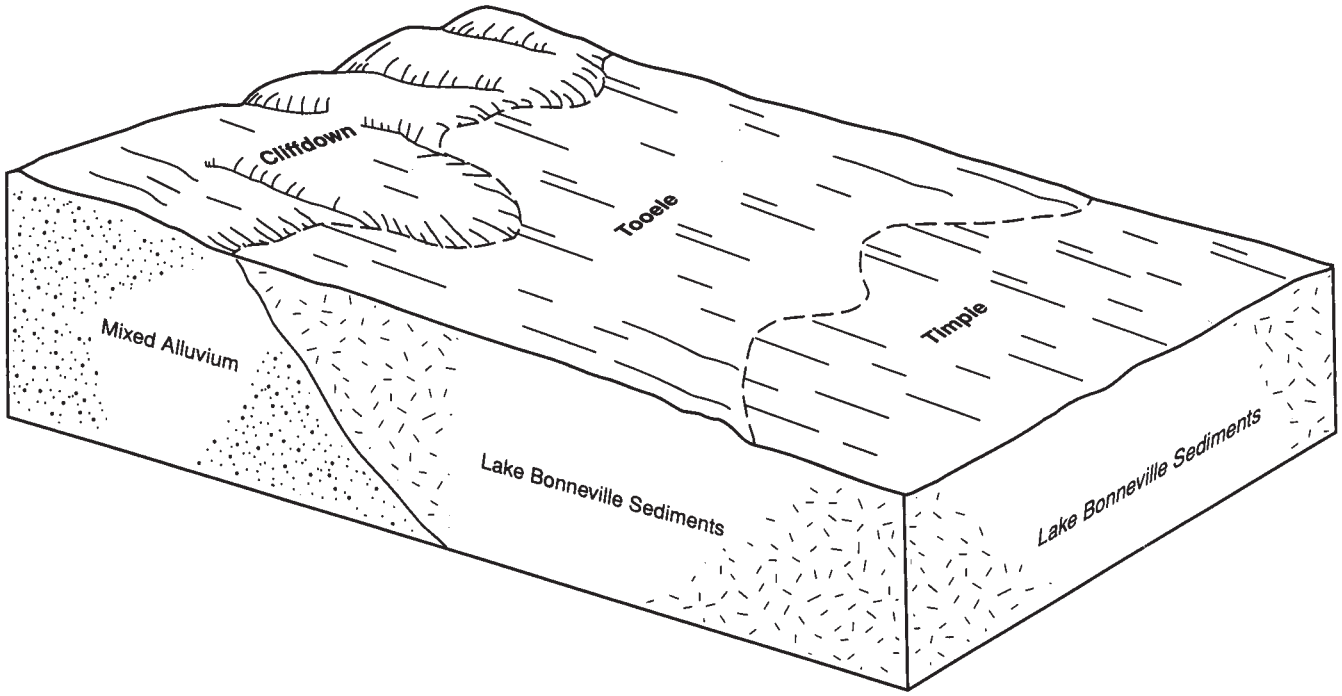



**Figure 3.—Typical pattern of soils and parent material in the Tooele-Cliffdown-Timple general soil map unit.**

### 5. Hiko Peak-Taylorsflat-Medburn

*Very deep, well drained, nearly level to moderately sloping soils on fan terraces and lake terraces in a semidesert climatic regime*

This map unit is mainly in the central, eastern, and southwestern parts of the survey area. Slopes range from 0 to 15 percent. The native vegetation is mainly Wyoming big sagebrush, rabbitbrush, Indian ricegrass, greasewood, and bluebunch wheatgrass. Elevation ranges from 4,300 to 6,000 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 100 to 140 days.

This unit makes up about 8 percent of the survey area. It is about 41 percent Hiko Peak soils, 27 percent Taylorsflat soils, 14 percent Medburn soils, and 18 percent components of minor extent (fig. 4).

Hiko Peak soils are on fan terraces. Slopes range from 2 to 15 percent. The soils formed in alluvium derived from mixed rock sources. Typically, the surface layer is pale brown gravelly loam. The subsoil to a depth of 60 inches or more is light yellowish brown and very pale brown very gravelly loam.

Taylorsflat soils are on fan terraces and lake terraces. Slopes range from 0 to 5 percent. The soils formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is pale brown loam. The subsoil and the substratum to a depth of 60 inches or more are light yellowish brown and very pale brown loam.

Medburn soils are on lake terraces and fan terraces. Slopes range from 2 to 8 percent. The soils formed in alluvium and lacustrine sediments derived dominantly from sedimentary rocks. Typically, the surface layer is pale brown and light yellowish brown fine sandy loam. The subsoil is light yellowish brown fine sandy loam. The substratum to a depth of 60 inches or more is very pale brown fine sandy loam.

Of minor extent are Spager, Berent, Manassa, Checkett, Birdow, and Amtoft soils and Rock outcrop.

This unit is used mainly as rangeland or wildlife habitat or for irrigated alfalfa hay, small grain, or pasture. Controlling grazing is necessary to maintain forage production. The soils are suited to irrigated crops. The main limitation is an inadequate supply of irrigation water in most areas.

### 6. Jericho-Scalade-Medburn

*Shallow to a hardpan and very deep, well drained, gently sloping to moderately sloping soils on fan terraces in a semidesert climatic regime*

This map unit is in the southwestern and

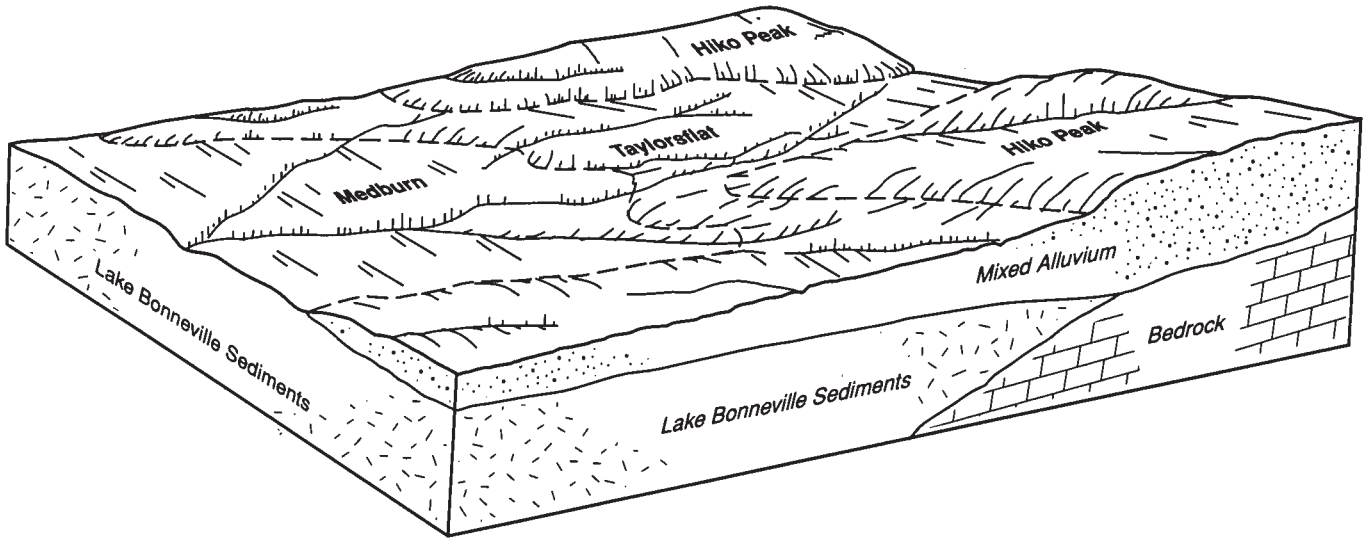



**Figure 4.—Typical pattern of soils and parent material in the Hiko Peak-Taylorsflat-Medburn general soil map unit.**

southeastern parts of the survey area. Slopes range from 2 to 15 percent. The native vegetation is mainly black sagebrush, Wyoming big sagebrush, Utah juniper, rabbitbrush, and Indian ricegrass. Elevation ranges from 5,000 to 6,100 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 120 days.

This unit makes up about 2 percent of the survey area. It is about 39 percent Jericho soils, 36 percent Scalade soils, 10 percent Medburn soils, and 15 percent soils of minor extent.

Jericho soils are shallow to a hardpan. Slopes range from 2 to 15 percent. The soils formed in alluvium derived dominantly from igneous rocks. Typically, the surface layer is pale brown gravelly sandy loam. The subsoil is very pale brown gravelly sandy loam and very gravelly sandy loam. A hardpan is at a depth of about 14 inches.

Scalade soils are shallow to a hardpan. Slopes range from 2 to 5 percent. The soils formed in alluvium derived dominantly from igneous rocks. Typically, the surface layer is pale brown very fine sandy loam. The subsoil is pale brown and very pale brown very fine sandy loam. A hardpan is at a depth of about 17 inches.

Medburn soils are very deep. Slopes range from 2 to 8 percent. The soils formed in alluvium derived dominantly from sedimentary rocks. Typically, the surface layer is pale brown fine sandy loam. The subsoil is light yellowish brown fine sandy loam. The substratum to a depth of 60 inches or more is very pale brown fine sandy loam.

Of minor extent are Junkett, Hiko Peak, Tooele, Taylorsflat, and Checkett soils.

This unit is used as rangeland or wildlife habitat. The Medburn soils have potential for use as irrigated cropland. Controlling grazing is necessary to maintain forage production.

### 7. Borvant-Abela-Kapod

*Shallow to a hardpan and very deep, well drained, gently sloping to moderately steep soils on fan terraces in an upland climatic regime*

This map unit is in the eastern and southwestern parts of the survey area. Slopes range from 2 to 30 percent. The native vegetation is mainly black sagebrush, Utah juniper, mountain big sagebrush, and bluebunch wheatgrass. Elevation ranges from 4,600 to 6,500 feet. The average annual precipitation is 12 to 16 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 100 to 160 days.

This unit makes up about 4 percent of the survey area. It is about 29 percent Borvant soils, 25 percent Abela soils, 21 percent Kapod soils, and 25 percent soils of minor extent (fig. 5).

Borvant soils are shallow to a hardpan. Slopes range from 2 to 15 percent. The soils formed in alluvium derived dominantly from limestone. Typically, the surface layer is brown gravelly loam. The subsoil is pale

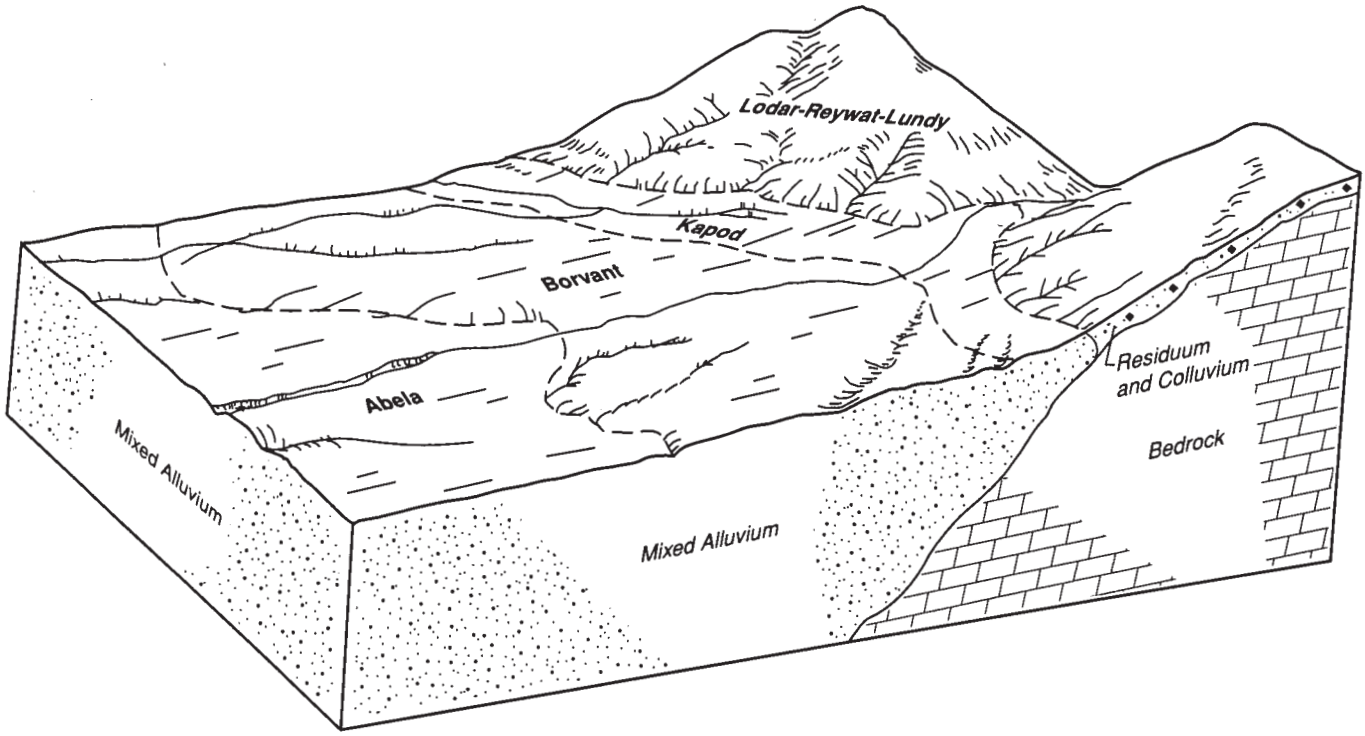



**Figure 5.—Typical pattern of soils and parent material in the Borvant-Abela-Kapod general soil map unit (adjacent to the Lodar-Reywat-Lundy general soil map unit).**

brown very gravelly loam. A hardpan is at a depth of about 18 inches.

Abela soils are very deep. Slopes range from 2 to 8 percent. The soils formed in alluvium derived dominantly from limestone and quartzite. Typically, the surface layer is grayish brown gravelly loam. The subsoil to a depth of 60 inches or more is pale brown and very pale brown gravelly loam and very gravelly loam.

Kapod soils are very deep. Slopes range from 2 to 30 percent. The soils formed in alluvium derived dominantly from sandstone and limestone. Typically, the surface layer is brown or dark grayish brown gravelly loam, stony loam, or very cobbly loam. The upper part of the subsoil is brown to yellowish brown very cobbly clay loam or very cobbly sandy clay loam. The lower part to a depth of 60 inches or more is light yellowish brown to very pale brown very cobbly sandy loam or very cobbly sandy clay loam.

Of minor extent are Erda, Birdow, Yeates Hollow, Doyce, Holmes, and Springmeyer soils.

This unit is used mainly as rangeland, wildlife habitat, or cropland. Controlling grazing is necessary to maintain good forage production. The Borvant soils are not suited to crops because of the restricted rooting depth. The Abela and Kapod soils are poorly suited to crops because of rock fragments, the slope, and a lack of irrigation water.

### 8. Lakewin-Erda-Kapod

*Very deep, well drained, nearly level to moderately steep soils on fan terraces and lake terraces in an upland climatic regime*

This map unit is in the northeastern part of the survey area. Slopes range from 1 to 30 percent. The native vegetation is mainly big sagebrush, bluebunch wheatgrass, rabbitbrush, and Utah juniper. Elevation ranges from 4,250 to 6,500 feet. The average annual precipitation is 12 to 16 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 100 to 170 days.

This unit makes up about 1 percent of the survey area. It is about 36 percent Lakewin soils, 25 percent Erda soils, 24 percent Kapod soils, and 15 percent soils of minor extent (fig. 6).

Lakewin soils are on lake terraces. Slopes range from 1 to 5 percent. The soils formed in alluvium and lacustrine sediments derived dominantly from quartzite and limestone. Typically, the surface layer is dark

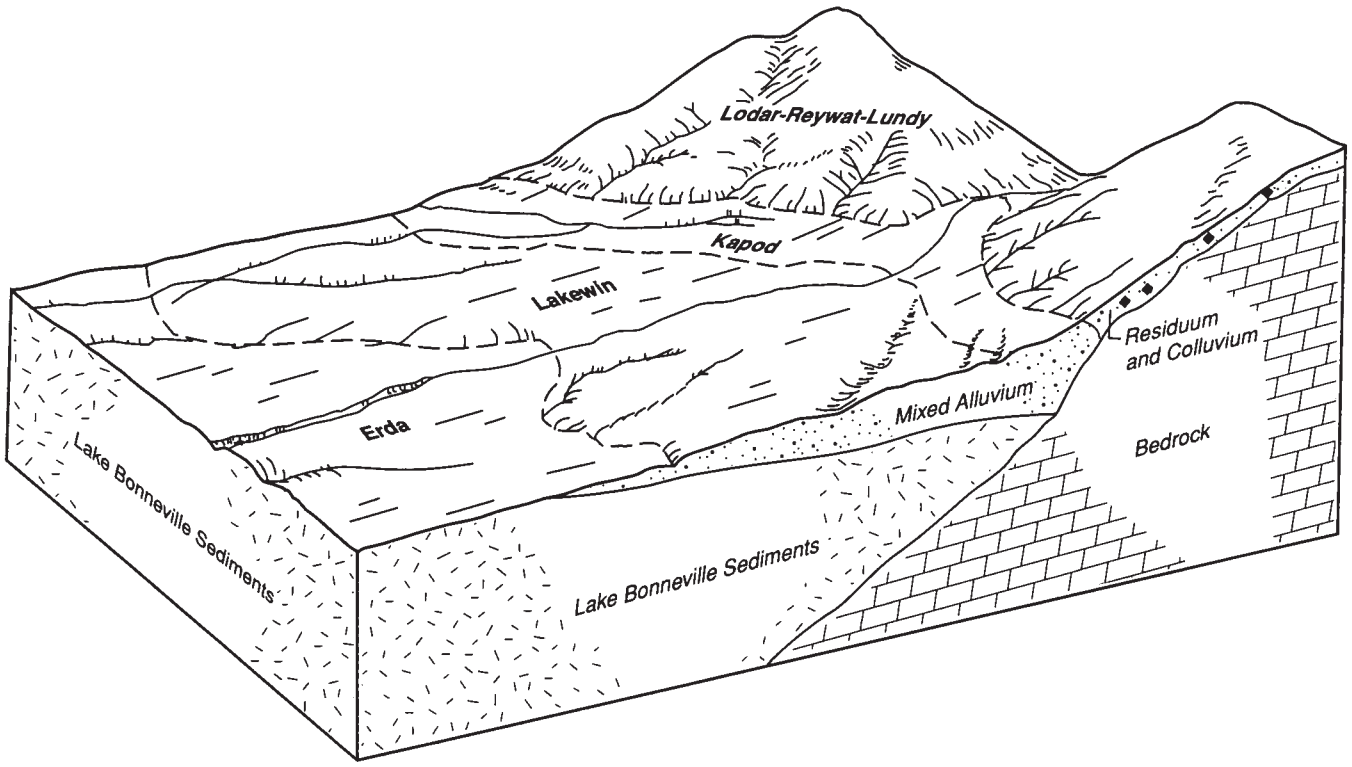



**Figure 6.—Typical pattern of soils and parent material in the Lakewin-Erda-Kapod general soil map unit (adjacent to the Lodar-Reywat-Lundy general soil map unit).**

grayish brown gravelly loam. The upper part of the subsoil is brown and pale brown gravelly sandy clay loam and very gravelly sandy loam. The lower part to a depth of 60 inches or more is pale brown very gravelly sand.

Erda soils are on fan terraces and lake terraces. Slopes range from 1 to 5 percent. The soils formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is grayish brown and brown silt loam. The subsoil is pale brown and very pale brown silt loam. The substratum to a depth of 60 inches or more is very pale brown silt loam.

Kapod soils are on fan terraces. Slopes range from 2 to 30 percent. The soils formed in alluvium derived dominantly from sandstone and limestone. Typically, the surface layer is dark grayish brown gravelly loam, very cobbly loam, or stony loam. The upper part of the subsoil is brown to light yellowish brown very cobbly sandy clay loam or very cobbly clay loam. The lower part to a depth of 60 inches or more is light yellowish brown to very pale brown very cobbly sandy loam or very cobbly sandy clay loam.

Of minor extent are Birdow and Yeates Hollow soils.

This unit is used as rangeland or wildlife habitat or for irrigated and nonirrigated crops, such as small grain and alfalfa. Controlling grazing is necessary to maintain forage production. Most areas are suited to nonirrigated small grain and alfalfa in a crop-fallow rotation, but production is generally low because of low precipitation. The soils are generally suited to irrigated crops. The Lakewin soils require light, frequent applications of irrigation water. Some areas of the Kapod soils are not suited to crops because of rock fragments.

### Shallow to Very Deep, Well Drained to Excessively Drained, Gently Sloping to Very Steep Soils and Rock Outcrop; On Lake Terraces, Fan Terraces, Hillsides, and Mountainsides

These map units make up about 21 percent of the survey area. The native vegetation is shrubs, grasses, and trees.

These areas are used mainly as rangeland or wildlife habitat.

### 9. Amtoft-Rock Outcrop-Checkett

*Shallow, well drained and somewhat excessively drained, moderately sloping to very steep soils and Rock outcrop*

*on hillsides and mountainsides in a semidesert climatic regime*

This map unit is in the western and central parts of the survey area. Slopes range from 10 to 70 percent. The native vegetation is mainly black sagebrush, Utah juniper, bluebunch wheatgrass, Indian ricegrass, and salmon wildrye. Elevation ranges from 4,250 to 7,000 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 49 degrees F, and the average frost-free period is 100 to 140 days.

This unit makes up about 10 percent of the survey area. It is about 59 percent Amtoft soils, 23 percent Rock outcrop, 12 percent Checkett soils, and 6 percent soils of minor extent.

Amtoft soils are somewhat excessively drained. Slopes range from 30 to 70 percent. The soils formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is light brownish gray very cobbly loam. The subsoil is pale brown and very pale brown very cobbly loam and extremely cobbly loam. Bedrock is at a depth of about 16 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Checkett soils are well drained. Slopes range from 10 to 40 percent. The soils formed in residuum and colluvium derived dominantly from igneous and metamorphic rocks. Typically, the surface layer is pale brown very cobbly loam. The subsoil is light yellowish brown very cobbly clay loam and very cobbly loam. Bedrock is at a depth of about 14 inches.

Of minor extent are Hiko Peak, Spager, Cliffdown, Lodar, and Reywat soils.

This unit is used mainly as rangeland or wildlife habitat. The suitability for livestock grazing is poor because of the slope. Controlling grazing is necessary to maintain forage production.

### 10. Ridd-Kilburn-Wasatch

*Moderately deep and very deep, well drained to excessively drained, gently sloping to very steep soils on lake terraces, fan terraces, hillsides, and mountainsides in an upland climatic regime*

This map unit is in the northeastern part of the survey area on Antelope Island. Slopes range from 2 to 70 percent. The native vegetation is mainly foxtail fescue and threeawn. Elevation ranges from 4,200 to 6,500 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 140 to 180 days.

This unit makes up about 1 percent of the survey area. It is about 40 percent Ridd soils, 31 percent Kilburn soils, 11 percent Wasatch soils, and 18 percent components of minor extent.

Ridd soils are moderately deep and are well drained. They are on hillsides and mountainsides. Slopes range from 6 to 70 percent. The soils formed in residuum and colluvium derived dominantly from gneiss, schist, and quartzite. Typically, the surface layer is brown very stony sandy loam. The subsoil is yellowish brown very stony sandy loam. The substratum is light olive brown very stony sandy loam. Bedrock is at a depth of about 36 inches.

Kilburn soils are very deep and are somewhat excessively drained. They are on lake terraces and fan terraces. Slopes range from 2 to 10 percent. The soils formed in alluvium and colluvium derived dominantly from gneiss, schist, and quartzite. Typically, the surface layer is grayish brown gravelly sandy loam. The subsoil is pale brown very gravelly sandy loam. The substratum to a depth of 60 inches or more is pale brown very cobbly loamy sand.

Wasatch soils are very deep and are excessively drained. They are on fan terraces. Slopes range from 6 to 25 percent. The soils formed in alluvium derived from mixed rock sources. Typically, the surface layer is brown loamy coarse sand. The underlying material to a depth of 60 inches or more is pale brown sand.

Of minor extent are Reywat, Birdow, Dynal, and Logan soils and Rock outcrop.

This unit is used mainly as rangeland or wildlife habitat. The suitability for livestock grazing ranges from poor in the more sloping areas of the Ridd soils to good in areas of the Kilburn soils. Controlling grazing is necessary to maintain forage production.

### 11. Lodar-Reywat-Lundy

*Shallow, well drained, steep and very steep soils on hillsides and mountainsides in an upland or mountain climatic regime*

This map unit is in the southwestern, central, and eastern parts of the survey area. Slopes range from 30 to 60 percent. The native vegetation is mainly bluebunch wheatgrass, pinyon, Utah juniper, black sagebrush, and cliffrose. Elevation ranges from 5,200 to 8,000 feet. The average annual precipitation is 12 to 18 inches, the mean annual air temperature is 40 to 52 degrees F, and the average frost-free period is 80 to 140 days.

This unit makes up about 6 percent of the survey area. It is about 25 percent Lodar soils, 23 percent Reywat soils, 20 percent Lundy soils, and 32 percent components of minor extent (fig. 7).

Lodar soils are on mountainsides. They formed in

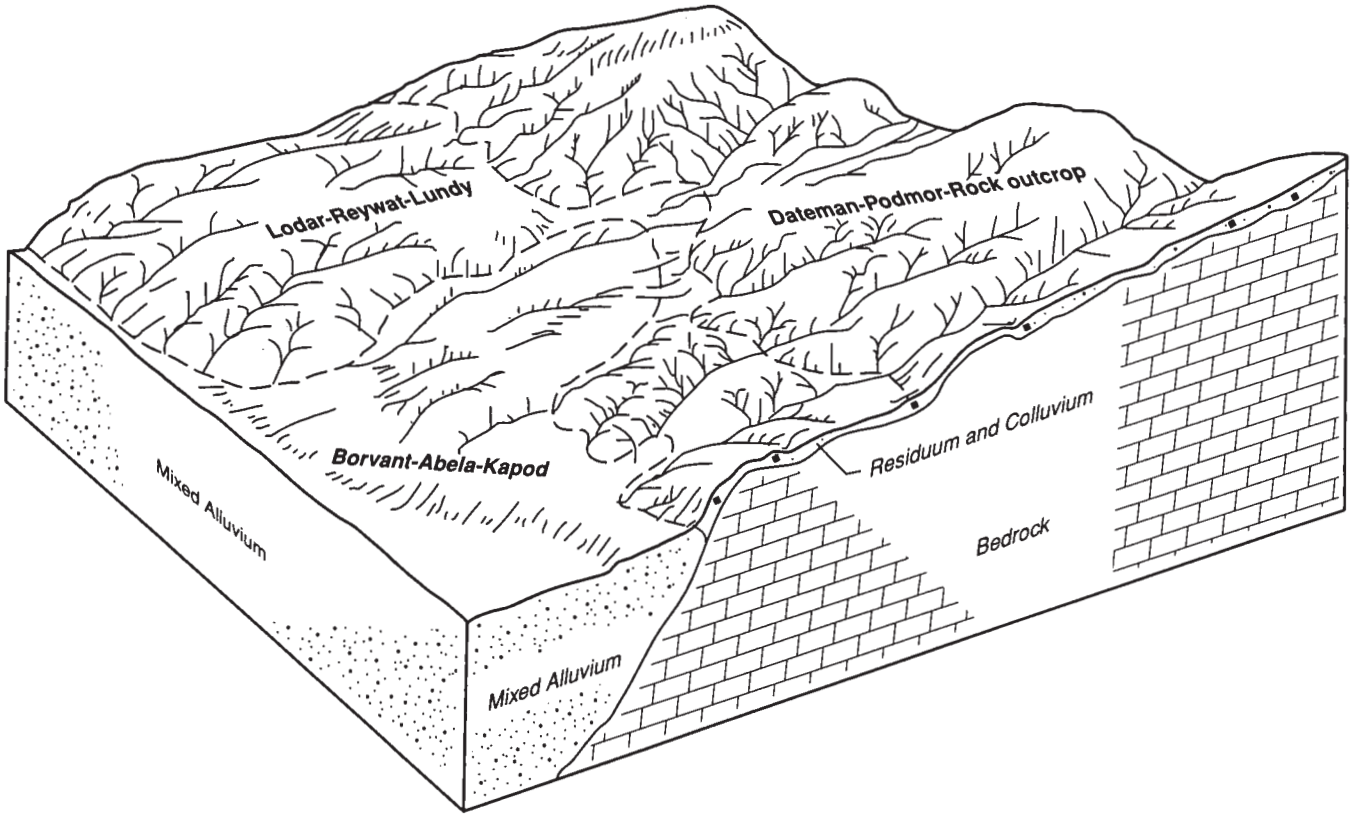



**Figure 7.—Typical pattern of soils and parent material in the Lodar-Reywat-Lundy and Dateman-Podmor-Rock outcrop general soil map units (adjacent to the Borvant-Abela-Kapod general soil map unit).**

residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown very cobbly loam. The subsoil is pale brown very cobbly loam. Bedrock is at a depth of about 16 inches.

Reywat soils are on hillsides and mountainsides. They formed in residuum and colluvium derived dominantly from quartzite and igneous rocks. Typically, the surface layer is grayish brown very cobbly loam. The subsoil is grayish brown or brown very gravelly clay loam. Bedrock is at a depth of about 11 inches.

Lundy soils are on mountainsides. They formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown very cobbly loam. The subsoil is yellowish brown very cobbly loam. Bedrock is at a depth of about 18 inches.

Of minor extent are Broad, Abela, Dateman, Podmor, Cristo, and Yeates Hollow soils and Rock outcrop.

This unit is used mainly as rangeland or wildlife habitat. In a few areas the juniper and pinyon trees are harvested for firewood, fence posts, or Christmas trees. The suitability for livestock grazing is poor because of the slope. Controlling grazing is necessary to maintain forage production.

### 12. Dateman-Podmor-Rock Outcrop

*Moderately deep, well drained, steep and very steep soils and Rock outcrop on mountainsides in a mountain or high mountain climatic regime*

This map unit is in the eastern and southwestern parts of the survey area. Slopes range from 30 to 70 percent. The native vegetation is mainly fir trees, mountain brome, mountain big sagebrush, and bluebunch wheatgrass. Elevation ranges from 6,000 to 10,000 feet. The average annual precipitation is 16 to 35 inches, the mean annual air temperature is 35 to 45 degrees F, and the average frost-free period is 70 to 90 days.

This unit makes up about 4 percent of the survey area. It is about 23 percent Dateman soils, 20 percent Podmor soils, 19 percent Rock outcrop, and 38 percent soils of minor extent (fig. 7).

Dateman soils formed in residuum and colluvium derived dominantly from limestone. Slopes range from 30 to 70 percent. Typically, the surface layer is very dark grayish brown to dark brown gravelly loam. The subsoil is brown very cobbly loam. Bedrock is

at a depth of about 36 inches.

Podmor soils formed in colluvium and residuum derived dominantly from quartzite. Slopes range from 30 to 60 percent. Typically, the surface layer is brown very cobbly loam to very gravelly loam. The subsoil is brown very cobbly loam. Bedrock is at a depth of about 23 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Of minor extent are Onaqui, Broad, Lundy, Cristo, and Flygare soils.

This unit is used mainly as rangeland or wildlife habitat. The suitability for livestock grazing is poor because of the slope. Controlling grazing is necessary to maintain forage production.

## Broad Land Use Considerations

The soils in the survey area vary widely in their potential for various land uses. About 26,000 acres is used for irrigated crops, mainly alfalfa, small grain, and corn silage. About 10,000 acres is used for irrigated pasture and sod. This irrigated land is scattered throughout the survey area but is mainly in the Grantsville, Erda, and Tooele areas in general soil map units 2, 4, 5, 7, and 8. Some areas of these map units have a high potential for irrigated crops where irrigation water is available.

About 7,000 acres in the survey area is used for nonirrigated crops, mainly small grain and alfalfa. Most of this nonirrigated cropland is in the Hickman Bench, Tooele, and Erda areas in general soil map units 7 and 8. A shortage of moisture is the most limiting factor affecting the production of nonirrigated crops. Wheat-fallow rotations are generally necessary.

The majority of the survey area is used as rangeland. Parts of each general soil map unit are grazed. General soil map units 1, 2, 7, 8, and 10 are used as summer and winter range for cattle and sheep. They are limited mainly by a lack of moisture in the summer. General soil map units 3, 4, 5, 6, and 9 are used mainly as winter range for cattle and sheep. They are also limited mainly by a lack of moisture. General soil map units 11 and 12 are used mainly as summer range for cattle and sheep. They are limited mainly by a short growing season.

About 14 percent of the survey area is woodland. Approximately 640,000 acres in general soil map units 6, 7, 9, and 11 support juniper and pinyon trees. About 35,000 acres in map unit 12 support mostly Douglas-fir and white fir. The soils in this unit are poorly suited to woodland because of low production and the slope.

About 2,000 acres in the survey area is used as urban land. The areas best suited to this use are in general soil map units 3, 4, 5, 6, 7, and 8. Map units 1 and 2 are poorly suited because of wetness. Some areas in map units 6 and 7 are poorly suited because of the shallow depth to a hardpan. Most areas of map units 9, 10, 11, and 12 are poorly suited to urban uses because of bedrock and the slope.

Some areas in map units 1 and 2 are poorly suited to recreational development because of flooding. Most areas of map units 3 through 12 are suited to various types of recreational development. The slope limits the use of map units 9 through 12 for most kinds of recreational development, but these areas provide excellent opportunities for camping, hiking, and horseback riding.

About 30 percent of the survey area consists of miscellaneous areas. These include about 1,335,000 acres of Playas, 125,000 acres of Salt flats, 30,000 acres of Dune land, 2,000 acres of Pits, and 1,500 acres of Slickens and mine dumps. Most of the Playas and Salt flats are in general soil map unit 1 in the Great Salt Lake Desert. This unit is used mainly as sites for military testing and training. Most of the Dune land is in map unit 3. The Pits and the Slickens and mine dumps are scattered throughout the survey area. These miscellaneous areas are mostly barren.

# Detailed Soil Map Units

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

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

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

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

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

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

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Skumpah silt loam, 0 to 2 percent slopes, is a phase of the Skumpah series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or associations.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Kanosh-Saltair-Logan complex, 0 to 2 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes, is an example.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. The map unit Playas is an example.

This survey area was mapped at two levels of detail. At the more detailed level, map units are narrowly defined. Map unit boundaries were plotted and verified at closely spaced intervals. At the less detailed level, map units are broadly defined. Boundaries were plotted and verified at wider intervals. The most detailed units are in agricultural and urban areas. The detail of mapping was selected to meet the anticipated long-term use of the survey, and the map units were designed to meet the needs for that use.

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

## Map Unit Descriptions

**1—Abela gravelly loam, 2 to 8 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from limestone and quartzite. Slopes are medium in length and are convex. The present vegetation in most areas is mountain big sagebrush, rabbitbrush, snakeweed, yellowbrush, cheatgrass, and bluebunch wheatgrass. Elevation is 4,600 to 6,000 feet. The average annual precipitation is 12 to 14 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is grayish brown and brown gravelly loam about 10 inches thick. The upper 10 inches of the subsoil is pale brown gravelly loam. The lower part of the subsoil to a depth of 60 inches or more is very pale brown very gravelly loam. In some areas the surface layer is loam, stony loam, or very gravelly loam.

Included with this soil in mapping are small areas of Borvant soils on the less sloping parts of fan remnants. These soils are shallow to a hardpan. They support juniper and black sagebrush. Also included are the loamy Birdow soils in drainageways. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Abela soil. Available water capacity is moderate (about 5 to 7 inches). The water-supplying capacity is 7 to 9 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used for rangeland, irrigated pasture (fig. 8), irrigated cropland, nonirrigated cropland, or building site development.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, bluegrass, mountain big sagebrush, and antelope bitterbrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitations are rock fragments in the surface layer and low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species. Because of the rock fragments, the use of specialized equipment is necessary.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, field corn, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, and furrow. The design of irrigation systems should not exceed the intake rate of the soil. The soil is suited to nonirrigated crops. Soil moisture is too low for annual cropping. A suitable rotation is 1 year of small grain followed by 1 year of summer fallow. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion and conserve soil moisture.

If good management practices are applied, irrigated alfalfa can yield about 5 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre. Nonirrigated winter wheat can yield about 22 bushels per acre, and nonirrigated alfalfa can yield about 2 tons per acre.

This soil is well suited to building site development. Frost action is a moderate limitation affecting roads. The removal of rock fragments in disturbed areas is needed for landscaping, particularly in areas used for lawns. Topsoil should be stockpiled and used to reclaim

**Figure 8.—Irrigated pasture in an area of Abela gravelly loam, 2 to 8 percent slopes. The town of Tooele and the Oquirrh Mountains are in the background.**

areas disturbed during construction.

The land capability classification is IIIe, irrigated, and VIs, nonirrigated. The range site is Upland Gravelly Loam (Mountain Big Sagebrush).

**2—Abela very gravelly loam, 5 to 15 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from limestone and quartzite. Slopes are medium in length and are convex. The present vegetation in most areas is bluebunch wheatgrass, cheatgrass, mountain big sagebrush, Utah juniper, and yellowbrush. Elevation is 5,000 to 6,000 feet. The average annual precipitation is 12 to 14 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is grayish brown and brown very gravelly loam about 11 inches thick. The upper 11 inches of the subsoil is pale brown very gravelly loam. The lower part of the subsoil to a depth of 60 inches or more is very pale brown extremely gravelly sandy loam. In some areas the surface layer is gravelly loam, stony loam, or very stony loam. In other areas slopes are more than 15 percent.

Included with this soil in mapping are small areas of Borvant soils. These soils are shallow to a hardpan. They support juniper and black sagebrush. Also included are the loamy Birdow soils in drainageways.

Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Abela soil. Available water capacity is moderate (about 4 to 6 inches). The water-supplying capacity is 6.5 to 8.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used as rangeland or for wildlife habitat. A few areas are used for the production of juniper trees for fence posts and firewood. In some areas the juniper trees have been removed by fire and mechanical treatment.

The potential plant community is an overstory of pinyon and Utah juniper with about 50 percent canopy cover. The understory vegetation is about 45 percent perennial grasses, 5 percent forbs, and 50 percent shrubs. Important plant species are mountain big sagebrush, black sagebrush, bluebunch wheatgrass, bluegrass, and antelope bitterbrush.

The site index for pinyon and Utah juniper is 50. Average productivity is low. Average annual yields are 1 to 2 cords of wood per acre. The potential for Christmas tree production is poor.

The suitability for livestock grazing is poor because of low forage production.

The suitability for rangeland seeding is poor. The main limitation is rock fragments in the surface layer. Because of the rock fragments, the use of specialized equipment is necessary.

If this unit is used for roads or for building site development, the main limitations are the slope and the potential for frost action. Topsoil should be stockpiled and used to reclaim areas disturbed during construction.

The land capability classification is VIs, nonirrigated. The woodland site is Upland Stony Loam (Pinyon-Utah Juniper).

**3—Amtoft, dry-Rock outcrop complex, 30 to 70 percent slopes.** This map unit is on mountainsides and hillsides. Slopes are short and convex. The present vegetation in most areas is salina wildrye, black sagebrush, and Utah juniper. Elevation is 4,250 to 7,000 feet. The average annual precipitation is 8 to 10 inches, the mean annual air temperature is 45 to 48 degrees F, and the average frost-free period is 100 to 140 days.

This unit is about 60 percent Amtoft very cobbly loam, dry, 30 to 70 percent slopes; 20 percent Rock outcrop; and 20 percent other soils. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Amtoft soil is shallow and somewhat excessively drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is light brownish gray and pale brown very cobbly loam about 11 inches thick. The subsoil is very pale brown extremely cobbly loam. Fractured limestone bedrock is at a depth of about 17 inches. In some areas, especially in the Grassy Mountains, slopes are less than 30 percent.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the very deep Hiko Peak soils on the upper fan remnants and in drainageways. Also included are the very deep Cliffdown soils on low fan remnants and Spager soils on high fan remnants. Spager soils are shallow to a hardpan.

Permeability is moderately rapid in the Amtoft soil. Available water capacity is very low (about 1.0 to 1.5 inches). The water-supplying capacity is 1.0 to 2.5 inches. Effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat. A few areas are used for the production of Utah juniper trees for fence posts and firewood.

The potential plant community on the Amtoft soil is an overstory of Utah juniper with about 30 percent canopy cover. The understory is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are black sagebrush, salina wildrye, Indian ricegrass, and shadscale.

The site index for Utah juniper is 30. Average productivity is low. Average yields are less than 1 cord of wood per acre. The potential for post production is poor.

The suitability for livestock grazing on the Amtoft soil is poor because of low forage production and the slope.

The suitability of the Amtoft soil for rangeland seeding is very poor. The main limitations are the slope, the restricted rooting depth, the rock fragments, and the available water capacity. Seeding is not recommended.

This unit is poorly suited to roads and to building site development. The main limitations are the slope, the stoniness, and the depth to bedrock.

The land capability classification of the Amtoft soil is VIIe, nonirrigated. The woodland site is Semidesert Shallow Loam (Utah Juniper-Salina Wildrye). The land capability classification of the Rock outcrop is VIII. No woodland site is assigned for the Rock outcrop.

**4—Amtoft-Rock outcrop complex, 30 to 70 percent slopes.** This map unit is on mountainsides and hillsides. Slopes are short and convex. The present vegetation in most areas is Utah juniper, bluebunch wheatgrass, black sagebrush, and Indian ricegrass. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 48 degrees F, and the average frost-free period is 100 to 140 days.

This unit is about 65 percent Amtoft very cobbly loam, 30 to 70 percent slopes; 15 percent Rock outcrop; and 20 percent other soils. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Amtoft soil is shallow and somewhat excessively drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is light brownish gray and pale brown very cobbly loam about 9 inches thick. The subsoil is very pale brown extremely cobbly loam. Fractured limestone bedrock is at a depth of about 16 inches.

Rock outcrop consists of exposures of barren limestone, mainly on escarpments and ridges.

Included in mapping are small areas of the shallow Lodar and Lundy soils on the upper slopes under Utah juniper and pinyon; the shallow Checkett soils under black sagebrush; the very deep Hiko Peak soils on the upper fan remnants and in drainageways; Spager soils, which are shallow to a hardpan and are on high fan remnants; and the very deep Cliffdown soils on low fan remnants.

Permeability is moderately rapid in the Amtoft soil. Available water capacity is very low (about 1.0 to 1.5 inches). The water-supplying capacity is 1.5 to 3.0 inches. Effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. The content of organic matter in the surface layer is about 1 to 2 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat (fig. 9). A few areas are used for the production of Utah juniper trees for fence posts and firewood.

The potential plant community on the Amtoft soil is an overstory of Utah juniper with about 30 percent canopy cover. The understory is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are black sagebrush, bluebunch wheatgrass, and Indian ricegrass.

The site index for Utah juniper is 30. Average productivity is low. Average yields are less than 1 cord of wood per acre. The potential for post production is poor.

The suitability for livestock grazing on the Amtoft soil is poor because of low forage production and the slope.

The suitability of the Amtoft soil for rangeland seeding is very poor. The main limitations are the slope, the restricted rooting depth, the rock fragments, and the available water capacity. Seeding is not recommended.

This unit is poorly suited to roads and to building site development. The main limitations are the slope, the stoniness, and the depth to bedrock.

The land capability classification of the Amtoft soil is VIIe, nonirrigated. The woodland site is Semidesert Shallow Loam (Utah Juniper-Bluebunch Wheatgrass). The land capability classification of the Rock outcrop is VIII. No woodland site is assigned for the Rock outcrop.

**5—Berent-Hiko Peak complex, 2 to 15 percent slopes.** This map unit is on stabilized sand dunes and fan remnants. Slopes are hummocky. The present vegetation in most areas of the Berent soil is Utah juniper, Wyoming big sagebrush, needleandthread, and cheatgrass, and that in most areas of the Hiko Peak soil is Wyoming big sagebrush, rabbitbrush, Indian ricegrass, and cheatgrass. Elevation is 4,500 to 5,800 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 140 days.

This unit is about 60 percent Berent loamy fine sand, 2 to 15 percent slopes, on sand dunes; 20 percent Hiko Peak gravelly loam, 2 to 15 percent slopes, in interdune areas; and 20 percent other soils and Dune land. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Berent soil is very deep and is somewhat excessively drained. It formed in eolian sands derived from lacustrine deposits. Typically, the surface layer is pale brown loamy fine sand about 6 inches thick. The underlying material to a depth of 60 inches or more is pale brown and light yellowish brown fine sand. In some areas the surface layer is fine sandy loam, fine sand, or sand. In other areas slopes are more than 15 percent.

The Hiko Peak soil is very deep and is well drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The subsoil to a depth of 60 inches or more is very pale brown and light yellowish brown very gravelly loam.

Included in mapping are small areas of the loamy Medburn soils along drainageways, the loamy Taylorsflat soils on low fan remnants, Dune land, Rock outcrop, and the shallow Amtoft soils on ridges.

Permeability is rapid in the Berent soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 4.0 to 6.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent.

**Figure 9.—An area of Amtoft-Rock outcrop complex, 30 to 70 percent slopes, in the Cedar Mountains. This map unit is used as rangeland or for wildlife habitat.**

Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is severe.

Permeability is moderately rapid in the Hiko Peak soil. Available water capacity is moderate (about 5 to 7 inches). The water-supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Berent soil is an overstory of Utah juniper with about 30 percent canopy cover. The understory vegetation is about 45

percent perennial grasses, 20 percent forbs, and 35 percent shrubs. Important plant species are needleandthread, Indian ricegrass, and fourwing saltbush.

The site index for Utah juniper is 25 on the Berent soil. Average productivity is low. Average yields are less than 1 cord of wood per acre. The potential for post production is poor.

The potential plant community on the Hiko Peak soil is about 45 percent perennial grasses, 15 percent forbs, and 40 percent shrubs. Important plant species are Wyoming big sagebrush, bluebunch wheatgrass, and Indian ricegrass.

The suitability for livestock grazing on the Berent soil is poor because of low forage production. The suitability for livestock grazing on the Hiko Peak soil is good.

The suitability of the Berent soil for rangeland seeding is poor. The main limitations are the texture of the surface layer and low precipitation. The suitability of the Hiko Peak soil for rangeland seeding is fair. The main limitation is low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

If the Berent soil is used for roads or for building site development, the main limitations are the slope; a poor filtering capacity, which affects septic tank absorption fields; and a severe hazard of soil blowing. The Hiko Peak soil is well suited to roads and to building site development.

The land capability classification of the Berent soil is VIIs, nonirrigated. The woodland site is Semidesert Sand (Utah Juniper). The land capability classification of the Hiko Peak soil is VIs, nonirrigated. The range site is Semidesert Gravelly Loam (Wyoming Big Sagebrush) North.

**6—Birdow loam, 1 to 4 percent slopes.** This very deep, well drained soil is on flood plains, stream terraces, and alluvial fans. It formed in alluvium derived dominantly from limestone and quartzite. Slopes are long and are linear or slightly concave. The present vegetation in most areas is basin big sagebrush, bluebunch wheatgrass, rabbitbrush, and basin wildrye. Elevation is 4,250 to 6,200 feet. The average annual precipitation is 10 to 14 inches, the mean annual air temperature is 45 to 48 degrees F, and the average frost-free period is 100 to 170 days.

Typically, the surface layer is grayish brown and brown loam about 28 inches thick. The subsoil is pale brown loam about 22 inches thick. Below this to a depth of 60 inches or more is a buried surface layer of brown loam. In some areas the soil is sandy loam. In other areas slopes are more than 4 percent.

Included with this soil in mapping are small areas of the gravelly Abela soils and the silty Erda soils. These soils are on convex fan remnants. Also included are the gravelly Lakewin soils on lake terraces. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderate in the Birdow soil. Available water capacity is high (about 9 to 10 inches). The water-supplying capacity is 7.0 to 10.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is about 2 to 4 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate. This soil is subject to rare flooding.

This unit is used for rangeland, wildlife habitat, building site development, irrigated pasture, or irrigated cropland.

The potential plant community is about 70 percent perennial grasses, 10 percent forbs, and 20 percent shrubs. Important plant species are basin wildrye, western wheatgrass, and basin big sagebrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitation is low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, furrow, and controlled flooding. The design of irrigation systems should not exceed the intake rate of the soil. In areas of higher precipitation, this soil is suitable for nonirrigated crops. A suitable rotation is 1 year of small grain followed by a year of summer fallow. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion and conserve soil moisture.

If good management practices are applied, irrigated alfalfa can yield about 7 tons per acre, irrigated barley can yield about 100 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre. Areas that have a shorter frost-free period can yield about 4 tons per acre of irrigated alfalfa and 70 bushels per acre of irrigated barley.

If this soil is used for roads or for building site development, the potential for frost action and a slow percolation rate are moderate limitations. Maintaining drainage channels helps to control spring runoff.

The land capability classification is IIe, irrigated, and VIs, nonirrigated. The range site is Loamy Bottom (Basin Wildrye).

**7—Borvant gravelly loam, 2 to 15 percent slopes.** This well drained soil is on fan remnants. It is shallow over a petrocalcic horizon. It formed in alluvium derived dominantly from limestone. Slopes are short or medium in length and are convex. The present vegetation in most areas is Utah juniper, black sagebrush, pinyon, bluebunch wheatgrass, and Wyoming big sagebrush (fig. 10). Elevation is 5,200 to 6,500 feet. The average annual precipitation is 12 to 14 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is brown gravelly loam about 7 inches thick. The subsoil is pale brown very gravelly loam about 11 inches thick. A carbonate-cemented hardpan is at a depth of about 18 inches. The underlying layers, extending from a depth of 25 inches to a depth of 60 inches or more, are stratified very gravelly sandy loam, very gravelly loamy sand, and cemented hardpan. In some areas the surface layer is gravelly sandy loam, cobbly loam, or very gravelly loam. In other areas the hardpan is at a depth of more than 20 inches. In places slopes are more than 15 percent.

Included with this soil in mapping are small areas of the very deep Abela and Kapod soils on the upper fan remnants; the loamy Birdow soils in drainageways; and Spager and Hiko Peak soils on the lower fan remnants. Spager soils are shallow to a hardpan. Hiko Peak soils are very deep. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderate in the Borvant soil. Available water capacity is very low (about 1.5 to 2.0 inches). The water-supplying capacity is 3.0 to 4.5 inches. Effective rooting depth is limited by a hardpan at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

This unit is used as rangeland or woodland or for wildlife habitat.

The potential plant community is an overstory of pinyon and Utah juniper with about 40 percent canopy cover. The understory vegetation is about 40 percent perennial grasses, 10 percent forbs, and 50 percent shrubs. Important plant species are black sagebrush, Indian ricegrass, bluebunch wheatgrass, and antelope bitterbrush.

The site index for pinyon and Utah juniper is 40. Average productivity is low. Average yields are 1 to 2 cords of wood per acre. Some areas are used for the production of posts, firewood, or Christmas trees.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitations are the restricted rooting depth and the available water capacity. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

This unit is poorly suited to roads and to building site development. The main limitation is the depth to a hardpan.

The land capability classification is VIIs, nonirrigated. The woodland site is Upland Shallow Hardpan (Pinyon-Utah Juniper).

**8—Bramwell silt loam, 0 to 2 percent slopes.** This very deep, somewhat poorly drained soil is on low lake terraces and stream terraces. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are medium in length and are linear to concave. The vegetation in areas that are not cultivated is mainly inland saltgrass, alkali sacaton, alkali bluegrass, sedges, and black greasewood. Elevation is 4,200 to 5,300 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 49 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is light brownish gray silt loam about 6 inches thick. The upper 14 inches of the subsoil is light brownish gray silt loam, and the lower 16 inches is light gray silty clay loam. The substratum to a depth of 60 inches or more is light gray silty clay loam. In some areas the surface layer is loam. In other areas the subsoil and the substratum are fine sandy loam or very fine sandy loam. Areas that have been leached by irrigation water are less saline.

Included with this soil in mapping are small areas of the poorly drained Logan soils in low lying areas under inland saltgrass and rushes, the well drained Manassa soils on ridges under greasewood and sagebrush, the well drained Taylorsflat soils on low lake terraces under greasewood, and the loamy Kanosh soils in landscape positions similar to those of the Bramwell soil. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is slow in the Bramwell soil. Available water capacity is moderate or high (about 6.5 to 9.0 inches). Effective rooting depth is limited by a seasonal high water table at a depth of 2.5 to 3.5 feet from March through July. In drained areas the high water table is at a depth of 3.5 to 5.0 feet. The content of organic matter in the surface layer is 2 to 5 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used mainly for irrigated crops or pasture (fig. 11). Some areas are used as rangeland or for building site development.

**Figure 10.—Utah juniper and pinyon in an area of Borvant gravelly loam, 2 to 15 percent slopes. The Simpson Mountains are in the background.**

The potential plant community is about 70 percent perennial grasses, 10 percent forbs, and 20 percent shrubs. Important plant species are inland saltgrass, alkali sacaton, alkali bluegrass, and basin wildrye.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by paying careful attention to seedbed conditions, by seeding prior to periods of high soil moisture, and by seeding adapted species.

This soil is suited to irrigated crops if the content of salt and alkali is reduced by incorporating a drainage and leaching program. Suitable crops are small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line, handline, furrow, and controlled flooding. Because of the slow intake rate in

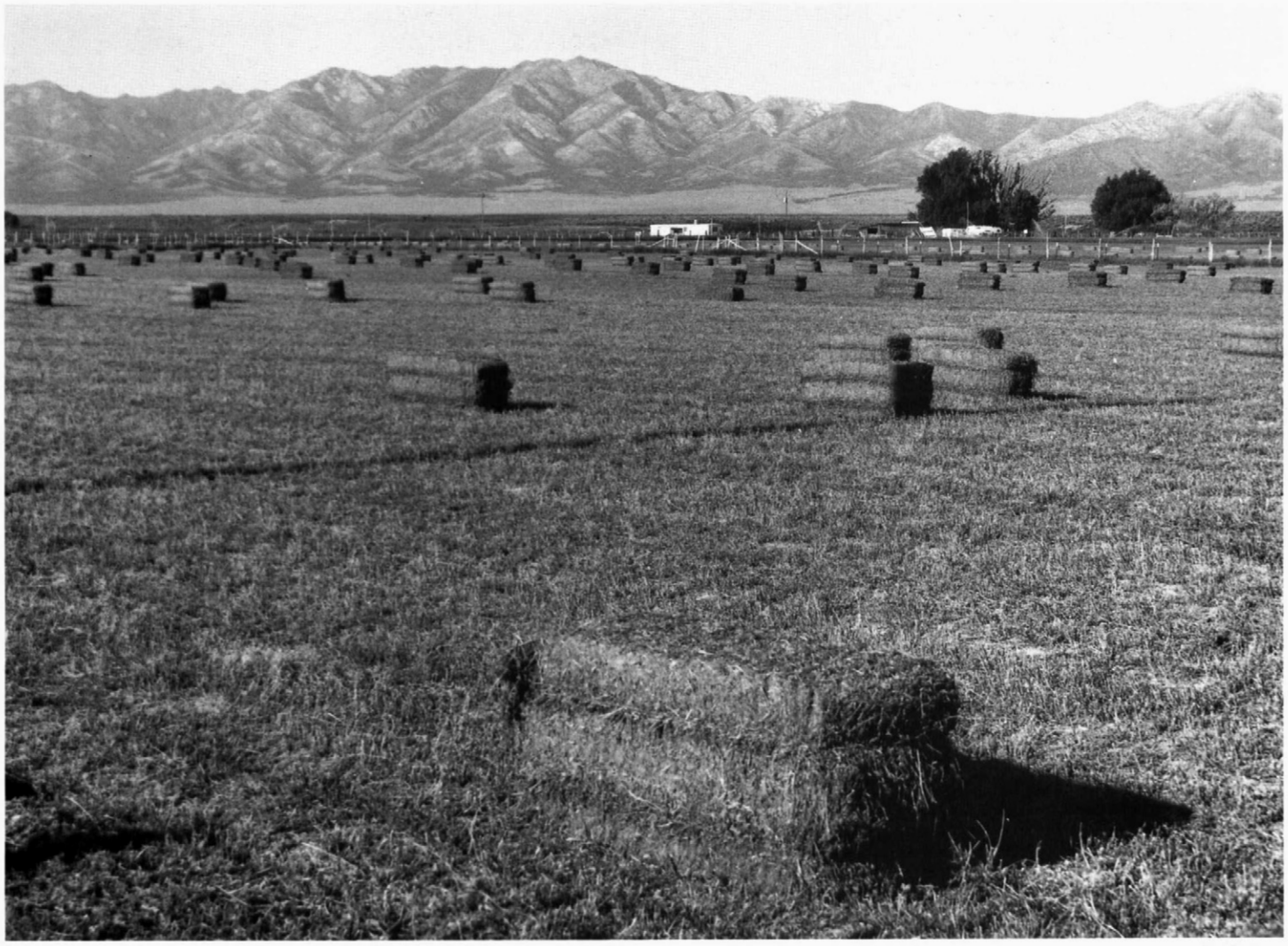


**Figure 11.—Irrigated alfalfa in an area of Bramwell silt loam, 0 to 2 percent slopes, near Vernon.**

the surface layer, caution is needed if the installation of a center-pivot system is considered. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low soil moisture.

If good management practices are applied, irrigated alfalfa can yield about 7 tons per acre, irrigated pasture can yield about 8 animal unit months per acre, and irrigated barley can yield about 90 bushels per acre.

This soil is poorly suited to roads and to building site development. The main limitations are the shrink-swell potential, the potential for frost action, low strength, and wetness.

The land capability classification is IVw, irrigated, and VIIw, nonirrigated. The range site is Alkali Bottom (Alkali Sacaton).

**10—Broad, moist-Reywat, moist-Rock outcrop association, 30 to 60 percent slopes.** This map unit is on hillsides and mountainsides. Slopes are short and convex. The present vegetation in most areas of the Broad soil is Gambel oak, bluebunch wheatgrass, mountain big sagebrush, mulesear dock, Sandberg bluegrass, and cutleaf filaree. The present vegetation in most areas of the Reywat soil is bluebunch wheatgrass, Sandberg bluegrass, threeawn, black sagebrush, mountain big sagebrush, and cheatgrass. Elevation is 5,200 to 7,200 feet. The average annual precipitation is 13 to 19 inches, the mean annual air temperature is 43

to 52 degrees F, and the average frost-free period is 100 to 140 days.

This unit is about 40 percent Broad gravelly loam, moist, 30 to 60 percent slopes, mainly on north-facing slopes; 30 percent Reywat very gravelly loam, moist, 30 to 60 percent slopes, mainly on south-facing slopes; 10 percent Rock outcrop; and 20 percent other soils and talus.

The Broad soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from quartzite and sandstone. Typically, the surface layer is dark grayish brown gravelly loam about 10 inches thick. The upper 10 inches of the subsoil is yellowish brown and brown very gravelly clay loam, and the lower 18 inches is pale brown extremely cobbly loam. Sandstone bedrock is at a depth of about 38 inches. In some areas the surface layer is gravelly sandy loam, very gravelly loam, or loam. In other areas bedrock is at a depth of more than 40 inches.

The Reywat soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from quartzite and igneous rocks. Typically, the surface layer is grayish brown very gravelly loam about 4 inches thick. The subsoil is brown very gravelly clay loam. Quartzite bedrock is at a depth of about 13 inches. In some areas the surface layer is very cobbly loam. In other areas the depth to bedrock is less than 10 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the very deep Yeates Hollow soils on fan remnants under bluebunch wheatgrass and mountain big sagebrush; areas of very deep, loamy soils in drainageways under bigtooth maple, chokecherry, and willows; talus slopes in the steeper areas below the Rock outcrop; and the moderately deep Dateman soils on north-facing slopes under fir trees.

Permeability is moderately slow in the Broad soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 7.0 to 9.5 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 3 to 5 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderately slow in the Reywat soil. Available water capacity is very low (about 1.0 to 1.5 inches). The water-supplying capacity is 2.0 to 3.5 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Broad soil is about 35 percent perennial grasses, 10 percent forbs, and 55 percent shrubs. Important plant species are Gambel oak, bearded wheatgrass, bluebunch wheatgrass, and mountain big sagebrush.

The potential plant community on the Reywat soil is about 55 percent perennial grasses, 10 percent forbs, and 35 percent shrubs. Important plant species are bluebunch wheatgrass and black sagebrush.

The suitability for livestock grazing is poor because of the slope.

The suitability for rangeland seeding is very poor. The main limitations are the slope, the rock fragments, and the restricted rooting depth. Seeding is not recommended.

The land capability classification for the Broad and Reywat soils is VIIe, nonirrigated. The range site for the Broad soil is Mountain Gravelly Loam (Oak). The range site for the Reywat soil is Upland Shallow Loam (Black Sagebrush). The land capability classification of the Rock outcrop is VIII. No range site is assigned for the Rock outcrop.

**11—Checkett-Rock outcrop complex, 10 to 40 percent slopes.** This map unit is on hillsides and mountainsides. Slopes are short and convex. The present vegetation in most areas is black sagebrush, cheatgrass, Nevada bluegrass, and Indian ricegrass. Elevation is 4,400 to 6,700 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 49 degrees F, and the average frost-free period is 100 to 140 days.

This unit is about 75 percent Checkett very cobbly loam, 10 to 40 percent slopes; 10 percent Rock outcrop; and 15 percent other soils. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Checkett soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from igneous and metamorphic rocks. Typically, the surface layer is pale brown very cobbly loam about 3 inches thick. The subsoil is light yellowish brown very cobbly clay loam and very cobbly loam. Fractured quartzite bedrock is at a depth of about 14 inches. In some areas the surface layer is very gravelly loam, very stony loam, or gravelly loam.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the very deep Hiko Peak soils on fan remnants and in drainageways, the shallow Reywat soils on north-facing mountainsides, and areas that have slopes of more than 40 percent.

Permeability is moderate in the Checkett soil. Available water capacity is very low (about 1.0 to 1.5

inches). The water-supplying capacity is 1 to 3 inches. Effective rooting depth is limited by bedrock at a depth of 14 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Checkett soil is about 45 percent perennial grasses, 5 percent forbs, and 50 percent shrubs. Important plant species are bluebunch wheatgrass, black sagebrush, Indian ricegrass, and horsebrush.

The suitability for livestock grazing on the Checkett soil is only fair because of moderate forage production and the slope.

The suitability of the Checkett soil for rangeland seeding is very poor. The main limitations are the restricted rooting depth, the available water capacity, and the slope. Seeding is not recommended.

This unit is poorly suited to roads and to building site development. The main limitations are the slope and the depth to bedrock.

The land capability classification of the Checkett soil is VIIs, nonirrigated. The range site is Semidesert Shallow Loam (Black Sagebrush). The land capability classification of the Rock outcrop is VIII. No range site is assigned for the Rock outcrop.

**12—Cliffdown gravelly sandy loam, 2 to 15 percent slopes.** This very deep, somewhat excessively drained soil is on fan remnants. It formed in alluvium derived dominantly from sedimentary rocks. Slopes are medium in length or long and are linear to convex. The present vegetation in most areas is shadscale, Indian ricegrass, rabbitbrush, spiny horsebrush, and cheatgrass. Elevation is 4,300 to 6,000 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 47 to 52 degrees F, and the average frost-free period is 130 to 150 days.

Typically, the surface layer is pale brown gravelly sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is very pale brown very gravelly sandy loam. In places the surface layer is gravelly loam or very gravelly sandy loam. In a few areas slopes are more than 15 percent.

Included with this soil in mapping are small areas of the sandy Izamatch soils on lake terraces, the loamy Tooele soils on lake terraces, the sandy Yenrab soils on stabilized sand dunes, and areas where bedrock is at a depth of less than 60 inches. Included areas make up about 15 percent of the total acreage of this unit.

Permeability is moderately rapid in the Cliffdown soil. Available water capacity is low (about 3.0 to 4.5 inches). The water-supplying capacity is 2.5 to 4.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 0.5 percent to 1.0 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used mainly as rangeland or for wildlife habitat. Small areas are used for irrigated alfalfa, irrigated barley, or irrigated pasture.

The potential plant community is about 40 percent perennial grasses, 5 percent forbs, and 55 percent shrubs. Important plant species are shadscale, galleta, bud sagebrush, and Indian ricegrass.

The suitability for livestock grazing is poor because of low forage production.

The suitability for rangeland seeding is very poor. The main limitation is low precipitation. Seeding is generally not recommended.

This soil is suited to irrigated crops of alfalfa hay, pasture, orchards, and small grain. The gravel on or near the surface limits tillage and can damage equipment. Maintaining a permanent cover of vegetation is more suitable in areas of this soil. Sprinkler systems are suitable for irrigation. The design of the sprinkler systems should not exceed the intake rate of the soil. This soil is not suited to nonirrigated crops because of low soil moisture.

If good management practices are applied, irrigated alfalfa can yield about 5 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

If this soil is used for roads or for building site development, the main limitation is the slope.

The land capability classification is IVe, irrigated, and VIIs, nonirrigated. The range site is Desert Gravelly Loam (Shadscale).

**13—Cristo loam, 10 to 60 percent slopes.** This moderately deep, well drained soil is on mountainsides. It formed in residuum and colluvium derived dominantly from shale and limestone. Slopes are medium in length and are convex. The present vegetation in most areas is bluebunch wheatgrass, basin wildrye, rabbitbrush, and mountain big sagebrush. Elevation is 6,500 to 8,800 feet. The average annual precipitation is 16 to 22 inches, the mean annual air temperature is 41 to 43 degrees F, and the average frost-free period is 60 to 70 days.

Typically, the surface layer is dark grayish brown loam about 9 inches thick. The subsoil is grayish brown gravelly clay loam about 13 inches thick. The substratum is pale brown extremely gravelly clay loam about 13 inches thick. Fractured shale bedrock is at a

depth of about 35 inches. In some areas the surface layer is gravelly loam. In other areas the subsoil is very gravelly shaly clay.

Included with this soil in mapping are small areas of the shallow Lodar soils on south-facing mountainsides, the shallow Lundy soils on north-facing mountainsides, Rock outcrop on ridges and escarpments, and areas of very deep gravelly loam in drainageways. Included areas make up about 15 percent of the total acreage of this unit.

Permeability is moderately slow in the Cristo soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 7 to 10 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 5 percent. Runoff is very rapid, and the hazard of water erosion is very severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 45 percent perennial grasses, 10 percent forbs, and 45 percent shrubs. Important plant species are bluebunch wheatgrass, birchleaf mountainmahogany, bluegrass, and mountain big sagebrush.

The suitability for livestock grazing is poor or fair because of the slope.

The suitability for rangeland seeding is very poor. The main limitation is the slope. Seeding is not recommended.

This unit is susceptible to landslides and slumping.

The land capability classification is VIIe, nonirrigated. The range site is Mountain Gravelly Loam (Mountain Big Sagebrush).

**14—Dateman-Podmor-Rock outcrop association, 30 to 70 percent slopes.** This map unit is on mountainsides. Slopes are medium in length and are linear to convex. The present vegetation in most areas of the Dateman soil is Douglas-fir, white fir, mountain brome, snowberry, and quaking aspen. The present vegetation in most areas of the Podmor soil is mountain big sagebrush, bluebunch wheatgrass, western wheatgrass, and snowberry. Elevation is 7,000 to 10,000 feet. The average annual precipitation is 16 to 35 inches, the mean annual air temperature is 35 to 45 degrees F, and the average frost-free period is 70 to 90 days.

This unit is about 40 percent Dateman gravelly loam, 30 to 70 percent slopes, on north-facing slopes; 30 percent Podmor very cobbly loam, 30 to 60 percent slopes, on south-, east-, and west-facing slopes; 10 percent Rock outcrop; and 20 percent other soils.

The Dateman soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface is covered with a mat of partly decomposed needles, leaves, and twigs. This mat is about 1 inch thick. The surface layer is very dark grayish brown and dark brown gravelly loam about 22 inches thick. The subsoil is brown very cobbly loam about 14 inches thick. Fractured limestone bedrock is at a depth of about 36 inches. In some areas bedrock is at a depth of more than 40 inches.

The Podmor soil is moderately deep and is well drained. It formed in colluvium and residuum derived dominantly from quartzite. Typically, the upper part of the surface layer is brown very cobbly loam about 3 inches thick. The lower part is brown very gravelly loam about 13 inches thick. The subsoil is brown very cobbly loam. Fractured quartzite bedrock is at a depth of about 23 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the shallow Lundy soils on mountainsides under bluebunch wheatgrass; the very deep Flygare soils on mountainsides under aspen; the shallow Onaqui soils on ridges under low sagebrush; and areas of very deep, loamy soils in drainageways under bigtooth maple, chokecherry, and willows.

Permeability is moderate in the Dateman soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 8 to 14 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderate in the Podmor soil. Available water capacity is very low (about 1.5 to 2.5 inches). The water-supplying capacity is 5 to 8 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as woodland or rangeland or for wildlife habitat.

The potential plant community on the Dateman soil is an overstory of Douglas-fir and white fir with about 60 percent canopy cover. The understory vegetation is about 45 percent perennial grasses, 20 percent forbs, and 35 percent shrubs. Important plant species are Oregongrape, sheep fescue, bluegrass, and mountain brome.

The potential plant community on the Podmor soil is about 65 percent perennial grasses, 10 percent forbs, and 25 percent shrubs. Important plant species are

bluebunch wheatgrass, bulbous oniongrass, antelope bitterbrush, and mountain big sagebrush.

The site index for Douglas-fir is 65 on the Dateman soil, and the site index for white fir is 60. The suitability for harvesting is poor because of the slope and the severe hazard of erosion. The potential for production of Christmas trees is fair.

The suitability for livestock grazing is poor because of the slope. Forage production is low on the Dateman soil.

Rangeland seeding is not suitable in areas of this unit because of the slope. Seeding is not recommended.

The land capability classification of the Dateman and Podmor soils is VIIe, nonirrigated. The woodland site for the Dateman soil is High Mountain Stony Loam (Conifer). The range site for the Podmor soil is Mountain Stony Loam (Antelope Bitterbrush). The land capability classification of the Rock outcrop is VIII. No woodland site or range site is assigned for the Rock outcrop.

**14A—Dateman-Podmor, moist-Rock outcrop association, 30 to 70 percent slopes.** This map unit is on mountainsides. Slopes are medium in length and are linear to convex. The present vegetation in most areas of the Dateman soil is Douglas-fir, white fir, mountain brome, snowberry, and quaking aspen. The present vegetation on the Podmor soil is Gambel oak, bluebunch wheatgrass, mountain big sagebrush, snowberry, and bluegrass. Elevation is 6,000 to 10,000 feet. The average annual precipitation is 18 to 35 inches, the mean annual air temperature is 35 to 45 degrees F, and the average frost-free period is 70 to 90 days.

This unit is about 50 percent Dateman gravelly loam, 30 to 70 percent slopes, on north-facing slopes; 20 percent Podmor very cobbly loam, moist, 30 to 60 percent slopes, on south-, east-, and west-facing slopes; 10 percent Rock outcrop; and 10 percent other soils.

The Dateman soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface is covered with a mat of partially decomposed needles, leaves, and twigs. This mat is about 1 inch thick. The surface layer is very dark grayish brown and dark brown gravelly loam about 22 inches thick. The subsoil is brown very cobbly loam about 14 inches thick. Fractured limestone bedrock is at a depth of about 36 inches. In some areas fractured bedrock is at a depth of more than 40 inches.

The Podmor soil is moderately deep and is well drained. It formed in colluvium and residuum derived dominantly from quartzite. Typically, the upper part of the surface layer is brown very gravelly loam about 3 inches thick. The lower part is brown very gravelly loam about 13 inches thick. The subsoil is brown very cobbly loam. Fractured quartzite bedrock is at a depth of about 23 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the shallow Lundy soils on mountainsides under bluebunch wheatgrass; the very deep Flygare soils on mountainsides under aspen; the shallow Onaqui soils on ridges under low sagebrush; barren talus slopes; and areas of very deep, loamy soils in drainageways under bigtooth maple, chokecherry, and willows.

Permeability is moderate in the Dateman soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 8 to 14 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderate in the Podmor soil. Available water capacity is very low (about 1.5 to 2.5 inches). The water-supplying capacity is 6 to 9 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as woodland or rangeland or for wildlife habitat.

The potential plant community on the Dateman soil is an overstory of Douglas-fir and white fir with about 60 percent canopy cover. The understory vegetation is about 45 percent perennial grasses, 20 percent forbs, and 35 percent shrubs. Important plant species are Oregongrape, sheep fescue, bluegrass, and mountain brome.

The potential plant community on the Podmor soil is about 35 percent perennial grasses, 10 percent forbs, and 55 percent shrubs. Important plant species are Gambel oak, bearded wheatgrass, bluebunch wheatgrass, and mountain big sagebrush.

The site index for Douglas-fir is 65 on the Dateman soil, and the site index for white fir is 60. The suitability for harvesting wood products is poor because of the slope and the severe hazard of erosion. The potential for production of Christmas trees is fair.

The suitability for livestock grazing is poor because of the slope. Forage production is low on the Dateman soil.

Rangeland seeding is not suitable in areas of this

unit because of the slope. Seeding is not recommended.

The land capability classification of the Dateman and Podmor soils is VIIe, nonirrigated. The woodland site for the Dateman soil is High Mountain Stony Loam (Conifer). The range site for the Podmor soil is Mountain Gravelly Loam (Oak). The land capability classification of the Rock outcrop is VIII. No woodland site or range site is assigned for the Rock outcrop.

**15—Doyce loam, 2 to 8 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived from mixed rock sources. Slopes are medium in length or long and are convex. The present vegetation in most areas is mountain big sagebrush, rabbitbrush, bluebunch wheatgrass, bitterbrush, and some juniper. Elevation is 4,800 to 6,300 feet. The average annual precipitation is 12 to 14 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is brown loam about 10 inches thick. The upper 11 inches of the subsoil is pale brown and light yellowish brown clay loam, and the lower 21 inches is very pale brown loam. The substratum to a depth of 60 inches or more is very pale brown loam. In places the surface layer is silt loam. In some areas the lower part of the subsoil has gravelly textures. In other areas the slope is more than 8 percent.

Included with this soil in mapping are small areas of the silty Erda soils, the gravelly Abela soils, Borvant soils in landscape positions similar to those of the Doyce soil, and the loamy Birdow soils along drainageways. Borvant soils are shallow to a hardpan. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderately slow in the Doyce soil. Available water capacity is high (about 9.0 to 10.5 inches). The water-supplying capacity is 9.0 to 10.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat. Some areas are used for nonirrigated or irrigated crops.

The potential plant community is about 60 percent perennial grasses, 10 percent forbs, and 30 percent shrubs. Important plant species are bluebunch wheatgrass, mountain big sagebrush, Indian ricegrass, and bluegrass.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitation is low precipitation. The suitability for seeding can be improved by seeding prior to periods of high soil moisture and by seeding adapted species.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, field corn, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, and furrow. The design of irrigation systems should not exceed the intake rate of the soil. The soil is suited to nonirrigated crops. Soil moisture is too low for annual cropping. A suitable rotation is 1 year of small grain followed by 1 year of summer fallow. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion and conserve soil moisture.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 100 bushels per acre, irrigated pasture can yield about 7 animal unit months per acre, nonirrigated winter wheat can yield about 15 bushels per acre, and nonirrigated alfalfa can yield about 2 tons per acre.

If this unit is used for roads or for building site development, the main limitations are the potential for frost action and the slow percolation rate.

The land capability classification is IIIe, irrigated, and IVs, nonirrigated. The range site is Upland Loam (Mountain Big Sagebrush).

**16—Dune land.** Dune land consists of ridges and the intervening troughs made up of fine sand-sized particles that shift with the wind. The dunes formed on the lake plains and low lake terraces between Knolls and Dugway. This unit supports less than 10 percent vegetative cover. The dunes are about 5 to 15 feet in height. The average annual precipitation is 6 to 8 inches.

Included in mapping are small areas of Rock outcrop along hillsides; the sandy, oolitic Dynal soils; and the sandy Yenrab soils on stabilized sand dunes. Included areas make up about 10 percent of the total acreage of this unit.

Dune land is a good source of fine sands. These areas have very little value as rangeland, but they provide habitat for rodents, lizards, and insects. Some areas are used as a military training range.

The land capability classification is VIII.

**17—Dynal sand, 2 to 15 percent slopes.** This very deep, somewhat excessively drained soil is on stabilized sand dunes (fig. 12). It formed in very strongly calcareous, oolitic, eolian sand derived dominantly from lacustrine sediments. Slopes are hummocky. The present vegetation in most areas is Indian ricegrass, greasewood, rabbitbrush, and fourwing

**Figure 12.—An area of Dynal sand, 2 to 15 percent slopes, near Knolls. Mud-flat playas are in the background.**

saltbush. Elevation is 4,200 to 4,250 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 48 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is very pale brown sand about 1 inch thick. The underlying material to a depth of 60 inches or more is very pale brown and light gray sand. In some areas the surface layer is sandy loam or loamy sand.

Included with this soil in mapping are small areas of Dune land and beach deposits that are barren of vegetation; the silty Skumpah soils on low lake terraces; the poorly drained, saline Saltair soils on lake plains; the loamy Tooele soils on low lake terraces; and the

sandy Yenrab soils in landscape positions similar to those of the Dynal soil. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is rapid in the Dynal soil. Available water capacity is low (about 2.5 to 4.0 inches). The water-supplying capacity is 2.5 to 5.0 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 0.5 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is very severe.

This unit is used for rangeland, wildlife habitat, or recreation.

The potential plant community is about 10 percent perennial grasses, 25 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, Torrey seepweed, fourwing saltbush, and shadscale.

The suitability for livestock grazing is poor because of low forage production.

The suitability for rangeland seeding is very poor. The main limitations are the texture of the surface layer, low precipitation, and the available water capacity. Seeding is not recommended.

This unit is poorly suited to roads and to building site development. The main limitations are the instability of the soil and a poor filtering capacity, which affects septic tank absorption fields.

The land capability classification is VIIs, nonirrigated. The range site is Desert Oolitic Dunes (Black Greasewood).

**18—Dynal-Tooele, saline, complex, 0 to 15 percent slopes.** This map unit is on stabilized sand dunes and low lake terraces. Slopes are hummocky. The present vegetation in most areas of the Dynal soil is Indian ricegrass, fourwing saltbush, black greasewood, and rabbitbrush. The present vegetation in most areas of the Tooele soil is black greasewood, cheatgrass, gray molly, and shadscale. Elevation is 4,200 to 4,250 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit is about 55 percent Dynal sand, 2 to 15 percent slopes, on vegetated oolitic dunes; 25 percent Tooele fine sandy loam, saline, 0 to 5 percent slopes, on low lake terraces; and 20 percent other soils and Playas. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Dynal soil is very deep and is somewhat excessively drained. It formed in eolian sands derived dominantly from calcareous, oolitic lacustrine sediments. Typically, the surface layer is white sand about 6 inches thick. The underlying material to a depth of 60 inches or more also is white sand. In some areas the surface layer is loamy sand.

The Tooele soil is very deep and is well drained. It formed in eolian material, lacustrine sediments, and alluvium derived from mixed rock sources. Typically, the surface layer is pale brown fine sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is very pale brown fine sandy loam. In some areas gravelly textures are below a depth of 30 inches.

Included in mapping are small areas of the saline Skumpah soils on low lake terraces under black greasewood; the poorly drained, saline Saltair soils on lake plains under pickleweed; and Playas.

Permeability is rapid in the Dynal soil. Available water capacity is low (about 2.5 to 4.0 inches). The water-supplying capacity is 2.5 to 5.0 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 0.5 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is very severe.

Permeability is moderately rapid in the Tooele soil. Available water capacity is low (about 3.0 to 5.5 inches). The water-supplying capacity is 3 to 5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Dynal soil is about 10 percent perennial grasses, 25 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, Torrey seepweed, fourwing saltbush, and shadscale.

The potential plant community on the Tooele soil is about 25 percent perennial grasses, 10 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, bottlebrush squirreltail, alkali sacaton, and seepweed.

The suitability for livestock grazing is poor because of low forage production and the relative unpalatability of the dominant plants.

The suitability for rangeland seeding is very poor. The main limitations are the available water capacity, the texture of the surface layer, and low precipitation in areas of the Dynal soil and low precipitation and the content of salt and alkali in areas of the Tooele soil. Seeding is not recommended.

The Dynal soil is poorly suited to roads and to building site development. The main limitations are the instability of the soil and a poor filtering capacity, which

affects septic tank absorption fields. The Tooele soil is well suited to these uses.

The land capability classification is VIIs, nonirrigated. The range site of the Dynal soil is Desert Oolitic Dunes (Black Greasewood). The range site of the Tooele soil is Alkali Flat (Black Greasewood).

**19—Erda silt loam, 1 to 5 percent slopes.** This very deep, well drained soil is on fan remnants and lake terraces. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are medium in length or long and are linear or slightly convex. The vegetation in areas that are not cultivated is mainly Wyoming big sagebrush, rabbitbrush, bluebunch wheatgrass, and Indian ricegrass. Elevation is 4,250 to 6,000 feet. The average annual precipitation is 12 to 14 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 130 to 170 days.

Typically, the surface layer is grayish brown and brown silt loam about 14 inches thick. The subsoil is pale brown and very pale brown silt loam about 25 inches thick. The substratum to a depth of 60 inches or more is very pale brown silt loam. In some areas the surface layer is loam or fine sandy loam. In other areas the substratum is silty clay loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Bramwell soils on the lower fan remnants under inland saltgrass, the gravelly Lakewin soils on the higher fan remnants, the loamy Birdow soils in drainageways, and the gravelly Abela soils on ridges. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Erda soil. Available water capacity is high or very high (about 9.5 to 11.0 inches). The water-supplying capacity is 9 to 11 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used for nonirrigated cropland, irrigated cropland (fig. 13), rangeland, building site development, or wildlife habitat.

The potential plant community is about 60 percent perennial grasses, 10 percent forbs, and 30 percent shrubs. Important plant species are bluebunch wheatgrass, mountain big sagebrush, Indian ricegrass, and bluegrass.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitation is low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, field corn, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, and furrow. The design of irrigation systems should not exceed the intake rate of the soil. The soil is suited to nonirrigated crops. Soil moisture is too low for annual cropping. A suitable rotation is 1 year of small grain followed by 1 year of summer fallow. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion and conserve soil moisture.

If good management practices are applied, irrigated alfalfa can yield about 7 tons per acre, irrigated barley can yield about 100 bushels per acre, irrigated pasture can yield about 7 animal unit months per acre, nonirrigated winter wheat can yield about 22 bushels per acre, and nonirrigated alfalfa can yield about 2 tons per acre.

This unit is well suited to building site development. Low strength and the potential for frost action are moderate limitations on sites used for roads.

The land capability classification is IIe, irrigated, and IVs, nonirrigated. The range site is Upland Loam (Mountain Big Sagebrush).

**20—Flygare-Dateman-Rock outcrop association, 30 to 70 percent slopes.** This map unit is on mountainsides. Slopes are medium in length and are convex. The present vegetation in most areas of the Flygare soil is quaking aspen, mountain brome, blue wildrye, and nodding bluegrass. The present vegetation in most areas of the Dateman soil is white fir, Douglas-fir, and mountain brome. Elevation is 7,200 to 10,000 feet. The average annual precipitation is 22 to 35 inches, the mean annual air temperature is 35 to 45 degrees F, and the average frost-free period is 50 to 90 days.

This unit is about 40 percent Flygare cobbly loam, 30 to 60 percent slopes, on south-, east-, and west-facing slopes; 20 percent Dateman gravelly loam, 30 to 70 percent slopes, on north-facing slopes; 20 percent Rock outcrop; and 20 percent other soils and talus.

The Flygare soil is very deep and is well drained. It formed in alluvium and colluvium derived dominantly from interbedded quartzite and limestone. Typically, the surface layer is dark brown cobbly loam about 22 inches thick. The subsurface layer is pale brown very cobbly loam about 14 inches thick. The subsoil is pale brown very cobbly sandy clay loam and light yellowish brown extremely cobbly loam.

The Dateman soil is moderately deep and is well drained. It formed in residuum and colluvium derived

**Figure 13.—Irrigated alfalfa in an area of Erda silt loam, 1 to 5 percent slopes, near Erda. The Oquirrh Mountains are in the background.**

dominantly from limestone. Typically, the surface is covered with a mat of partially decomposed needles, leaves, and twigs. This mat is about 1 inch thick. The surface layer is very dark grayish brown and dark brown gravelly loam about 22 inches thick. The subsoil is brown very cobbly loam about 14 inches thick.

Fractured limestone bedrock is at a depth of about 36 inches. In some areas fractured bedrock is at a depth of more than 40 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the moderately deep Podmor soils on the lower south-facing slopes under mountain big sagebrush, the shallow Onaqui soils on ridges under low sagebrush, and talus slopes in very steep areas.

Permeability is moderate in the Flygare soil. Available water capacity is moderate (about 5.0 to 6.5 inches). The water-supplying capacity is 12 to 17 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 5 to 10 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderate in the Dateman soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 8 to 14 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as woodland or for wildlife habitat.

The potential plant community on the Flygare soil is an overstory of aspen with about 50 percent canopy cover. The understory vegetation is about 40 percent perennial grasses, 30 percent forbs, and 30 percent shrubs. Important plant species are mountain snowberry, mountain brome, blue wildrye, common chokecherry, and butterweed.

The potential plant community on the Dateman soil is an overstory of Douglas-fir and white fir with about 60 percent canopy cover. The understory vegetation is about 45 percent perennial grasses, 20 percent forbs, and 35 percent shrubs. Important plant species are Oregongrape, sheep fescue, bluegrass, and mountain brome.

The site index for aspen is 55 on the Flygare soil, and the site index for white fir is 31. The site index for Douglas-fir is 65 on the Dateman soil, and the site index for white fir is 60. The suitability for harvesting wood products is poor because of the slope and the severe hazard of erosion. The potential for production of Christmas trees is fair on the Dateman soil.

The suitability for livestock grazing is poor because of the slope.

Rangeland seeding is generally not suitable in areas of this unit because of the slope. Forage production is low on the Dateman soil.

The land capability classification of the Flygare and Dateman soils is VIIe, nonirrigated. The woodland site for the Flygare soil is High Mountain Loam (Aspen). The woodland site for the Dateman soil is High Mountain Stony Loam (Conifer). The land capability classification of the Rock outcrop is VIII. No woodland site is assigned for the Rock outcrop.

**21—Hiko Peak gravelly loam, 2 to 15 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived from mixed rock sources. Slopes are medium in length and are convex. The present vegetation in most areas is Wyoming big sagebrush, Douglas rabbitbrush, Indian ricegrass, and cheatgrass. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The upper 8 inches of the subsoil is light yellowish brown very gravelly loam, and the lower part to a depth of 60 inches or more is very pale brown and light yellowish brown very gravelly loam. In some areas the surface layer is loam, very gravelly loam, or stony sandy loam. In other areas the subsoil is very cobbly loam.

Included with this soil in mapping are small areas of the loamy Medburn soils on the less sloping lower fan remnants, the sandy Berent soils on stabilized sand dunes under juniper, and Spager soils in landscape positions similar to those of the Hiko Peak soil. Spager soils are shallow to a hardpan. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Hiko Peak soil. Available water capacity is moderate (about 5.0 to 6.5 inches). The water-supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

This unit is used for rangeland; irrigated alfalfa, pasture, and grain; building site development; or wildlife habitat.

The potential plant community is about 45 percent perennial grasses, 15 percent forbs, and 40 percent shrubs. Important plant species are Wyoming big sagebrush, bluebunch wheatgrass, and Indian ricegrass.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitations are low precipitation, the slope, and the rock fragments. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by

seeding drought-tolerant species. Because of the slope and the rock fragments, the use of specialized equipment is necessary.

This soil is suited to irrigated crops of alfalfa hay, pasture, orchards, and small grain. The gravel on or near the surface limits tillage and can damage equipment. Maintaining a permanent cover of vegetation is more suitable in areas of this soil. Sprinkler systems are suitable for irrigation. The design of the sprinkler systems should not exceed the intake rate of the soil. This soil is not suited to nonirrigated crops because of low soil moisture.

If good management practices are applied, irrigated alfalfa can yield about 5 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

This unit is well suited to roads and to building site development. The removal of rock fragments in disturbed areas is needed for landscaping.

The land capability classification is IVe, irrigated, and VIs, nonirrigated. The range site is Semidesert Gravelly Loam (Wyoming Big Sagebrush) North.

**22—Hiko Peak very stony loam, 2 to 8 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived from mixed rock sources. Slopes are medium in length and are convex. The present vegetation in most areas is black sagebrush, bluebunch wheatgrass, rabbitbrush, and Utah juniper. Elevation is 4,900 to 5,300 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is pale brown very stony loam about 4 inches thick. The upper 8 inches of the subsoil is light yellowish brown very stony loam, and the lower part to a depth of 60 inches or more is very pale brown extremely gravelly sandy loam. In some areas the surface layer is very cobbly loam, stony loam, or very stony sandy loam.

Included with this soil in mapping are small areas of the loamy Medburn soils on low fan remnants, the sandy Berent soils on stabilized sand dunes under Utah juniper, the gravelly Cliffdown soils on the lower south-facing slopes, the shallow Amtoft soils on ridges, and Rock outcrop. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Hiko Peak soil. Available water capacity is low (about 3.5 to 5.0 inches). The water-supplying capacity is 5 to 7 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 35 percent perennial grasses, 5 percent forbs, and 60 percent shrubs. Important plant species are black sagebrush, bluebunch wheatgrass, Indian ricegrass, shadscale, and Douglas rabbitbrush.

The suitability for livestock grazing is poor because of low forage production.

The suitability for rangeland seeding is poor. The main limitations are low precipitation and the stones in the surface layer. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species. Because of the rock fragments, the use of specialized equipment is necessary.

If this unit is used for roads or for building site development, the main limitation is the stoniness.

The land capability classification is VIIs, nonirrigated. The range site is Semidesert Stony Loam (Black Sagebrush).

**23—Hiko Peak-Checkett complex, 2 to 40 percent slopes.** This map unit is on fan remnants and hillsides. Slopes are short or medium in length and are convex. The present vegetation in most areas of the Hiko Peak soil is Wyoming big sagebrush, rabbitbrush, Indian ricegrass, and cheatgrass. The present vegetation in most areas of the Checkett soil is black sagebrush, cheatgrass, Nevada bluegrass, and Indian ricegrass. Elevation is 4,500 to 5,600 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 140 days.

This unit is about 45 percent Hiko Peak gravelly loam, 2 to 15 percent slopes, on fan remnants; 35 percent Checkett very cobbly loam, 10 to 40 percent slopes, on hillsides; and 20 percent other soils and Rock outcrop. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Hiko Peak soil is very deep and is well drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The upper 8 inches of the subsoil is light yellowish brown very gravelly loam, and the lower part to a depth of 60 inches or more is very pale brown and light yellowish brown very gravelly loam, stony loam, or gravelly sandy loam. In some areas the subsoil is very cobbly loam.

The Checkett soil is shallow and well drained. It formed in residuum and colluvium derived dominantly

from igneous and metamorphic rocks. Typically, the surface layer is pale brown very cobbly loam about 3 inches thick. The subsoil is light yellowish brown very cobbly clay loam and very cobbly loam. Fractured quartzite bedrock is at a depth of about 14 inches. In some areas the surface layer is very gravelly loam, very stony loam, or gravelly loam.

Included in mapping are small areas of the loamy Medburn soils in drainageways, the sandy Berent soils on stabilized sand dunes, and Rock outcrop on escarpments and ridges.

Permeability is moderately rapid in the Hiko Peak soil. Available water capacity is moderate (about 5.0 to 6.5 inches). The water-supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

Permeability is moderate in the Checkett soil. Available water capacity is very low (about 1.0 to 1.5 inches). The water-supplying capacity is 1 to 3 inches. Effective rooting depth is limited by bedrock at a depth of 14 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Hiko Peak soil is about 45 percent perennial grasses, 15 percent forbs, and 40 percent shrubs. Important plant species are Wyoming big sagebrush, bluebunch wheatgrass, and Indian ricegrass.

The potential plant community on the Checkett soil is about 45 percent perennial grasses, 5 percent forbs, and 50 percent shrubs. Important plant species are bluebunch wheatgrass, black sagebrush, Indian ricegrass, and horsebrush.

The suitability for livestock grazing on the Hiko Peak soil is good. The suitability for livestock grazing on the Checkett soil is only fair because of moderate forage production and the slope.

The suitability of the Hiko Peak soil for rangeland seeding is fair. The main limitation is low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species. The suitability of the Checkett soil for rangeland seeding is very poor. The main limitations are the restricted rooting depth and the available water capacity. Seeding is not recommended.

The Hiko Peak soil is well suited to roads and to building site development. The removal of rock fragments in disturbed areas is needed for landscaping. The Checkett soil is poorly suited to roads and to building site development. The main limitations are the slope and the depth to bedrock.

The land capability classification of the Hiko Peak soil is VIs, nonirrigated. The range site is Semidesert Gravelly Loam (Wyoming Big Sagebrush) North. The land capability classification of the Checkett soil is VIIs, nonirrigated. The range site is Semidesert Shallow Loam (Black Sagebrush).

**24—Hiko Peak-Taylorsflat complex, 1 to 15 percent slopes.** This map unit is on fan remnants and lake terraces. Slopes are short or medium in length. The present vegetation in most areas of the Hiko Peak soil is Wyoming big sagebrush, Indian ricegrass, Sandberg bluegrass, and cheatgrass. The present vegetation in most areas of the Taylorsflat soil is Wyoming big sagebrush, Indian ricegrass, bottlebrush squirreltail, and cheatgrass. Elevation is 4,700 to 5,500 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 110 to 140 days.

This unit is about 45 percent Hiko Peak gravelly loam, 2 to 15 percent slopes, on convex slopes; 40 percent Taylorsflat loam, 1 to 5 percent slopes, in linear or slightly concave positions; and 15 percent other soils. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Hiko Peak soil is very deep and is well drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is pale brown gravelly loam about 4 inches thick. The upper 8 inches of the subsoil is light yellowish brown very gravelly loam, and the lower part to a depth of 60 inches or more is very pale brown and light yellowish brown very gravelly loam. In some areas the surface layer is very gravelly loam, stony loam, or gravelly sandy loam. In other areas the subsoil is very cobbly loam.

The Taylorsflat soil is very deep and is well drained. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is pale brown loam about 4 inches thick. The upper 5 inches of the subsoil is light yellowish brown loam, and the lower 42 inches is very pale brown loam. The substratum to a depth of 60 inches or more is very pale brown loam. In some areas the surface layer is silt loam or sandy loam.

Included in mapping are small areas of the saline Taylorsflat soils on low lake terraces, the loamy Medburn soils in drainageways, and Spager soils on ridges. Spager soils are shallow to a hardpan.

Permeability is moderately rapid in the Hiko Peak soil. Available water capacity is moderate (about 5.0 to

6.5 inches). The water-supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

Permeability is moderately slow in the Taylorsflat soil. Available water capacity is high (about 6.5 to 9.5 inches). The water-supplying capacity is 8 to 10 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used for rangeland, irrigated alfalfa, irrigated barley, building site development, or wildlife habitat.

The potential plant community on the Hiko Peak soil is about 45 percent perennial grasses, 15 percent forbs, and 40 percent shrubs. Important plant species are Wyoming big sagebrush, bluebunch wheatgrass, and Indian ricegrass.

The potential plant community on the Taylorsflat soil is about 50 percent perennial grasses, 15 percent forbs, and 35 percent shrubs. Important plant species are bluebunch wheatgrass, Wyoming big sagebrush, Indian ricegrass, and bottlebrush squirreltail.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitations are low precipitation and the slope. Rock fragments in the surface layer are a limitation in areas of the Hiko Peak soil. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species. Because of the slope and the rock fragments, the use of specialized equipment is necessary.

This unit is suited to irrigated alfalfa hay, small grain, and pasture. Because of the slope, sprinkler irrigation systems are best suited. The rock fragments can hinder tillage. These soils are not suited to nonirrigated crops because of insufficient precipitation during the summer.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

This unit is well suited to roads and to building site development. The potential for frost action is a moderate limitation affecting roads on the Taylorsflat soil. The removal of rock fragments in disturbed areas is needed for landscaping.

The land capability classification of the Hiko Peak soil is IVe, irrigated, and VIs, nonirrigated. The range site is Semidesert Gravelly Loam (Wyoming Big Sagebrush) North. The land capability classification of the Taylorsflat soil is IIIe, irrigated, and VI, nonirrigated. The range site is Semidesert Loam (Wyoming Big Sagebrush).

**25—Hiko Springs gravelly sandy loam, 2 to 4 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from igneous and sedimentary rocks. Slopes are medium in length and are convex. The present vegetation in most areas is Indian ricegrass, rabbitbrush, shadscale, and winterfat. Elevation is 5,700 to 6,000 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 51 to 53 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is pale brown gravelly sandy loam about 4 inches thick. The subsoil to a depth of 60 inches or more is very pale brown gravelly sandy loam. In some areas the surface layer and subsoil are sandy loam or gravelly loam.

Included with this soil in mapping are small areas of the loamy Tooele soils on fan remnants under shadscale, areas of silty soils in depressions under winterfat, and Cliffdown soils on ridges under shadscale and horsebrush. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderately rapid in the Hiko Springs soil. Available water capacity is moderate (about 5.0 to 5.5 inches). The water-supplying capacity is 3.5 to 5.0 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 5 percent forbs, and 45 percent shrubs. Important plant species are Indian ricegrass, shadscale, winterfat, and bud sagebrush.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitation is low precipitation. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site is Desert Sandy Loam (Shadscale).

**26—Holmes very stony sandy loam, 5 to 15 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from sedimentary and igneous rocks. Slopes are medium in length and are convex. The present vegetation in most areas is mountain big sagebrush, Thurber needlegrass, bluebunch wheatgrass, and black

sagebrush. Elevation is 6,200 to 7,500 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 40 to 43 degrees F, and the average frost-free period is 80 to 100 days.

Typically, the surface layer is dark brown very stony sandy loam about 10 inches thick. The upper 19 inches of the subsoil is brown and light brown very stony sandy clay loam, and the lower 8 inches is pink very stony sandy loam. The substratum to a depth of 60 inches or more is very pale brown extremely stony loamy coarse sand. In some areas the soil is bouldery, very gravelly, or very cobbly throughout.

Included with this soil in mapping are small areas of the cobbly Yeates Hollow soils on the upper fan remnants, the gravelly Springmeyer soils on the lower fan remnants, and the loamy Birdow soils in drainageways. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderate in the Holmes soil. Available water capacity is low (about 3 to 4 inches). The water-supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, bluegrass, mountain big sagebrush, and antelope bitterbrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is poor. Because of the rock fragments, the use of specialized equipment is necessary.

The land capability classification is VIs, nonirrigated. The range site is Upland Gravelly Loam (Mountain Big Sagebrush).

**27—Izamatch-Cliffdown, alkali, complex, 2 to 8 percent slopes.** This map unit is on lake terraces and fan remnants. Slopes are medium in length and are linear to convex. The present vegetation in most areas of the Izamatch soil is Indian ricegrass, shadscale, and horsebrush, and that in most areas of the Cliffdown soil is bud sagebrush, galleta, and shadscale. Elevation is 4,250 to 5,300 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 50 to 52 degrees F, and the average frost-free period is 130 to 150 days.

This unit is about 45 percent Izamatch gravelly sandy loam, 2 to 8 percent slopes, on lake terraces; 40 percent Cliffdown very gravelly sandy loam, alkali, 2 to 8 percent slopes, on fan remnants; and 15 percent other soils, Rock outcrop, and Badlands. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Izamatch soil is very deep and is somewhat excessively drained. It formed in lacustrine sediments and alluvium derived from mixed rock sources. Typically, the surface layer is light brownish gray gravelly sandy loam about 3 inches thick. The upper 7 inches of the subsoil is pale brown gravelly sandy loam. The next 20 inches is pale brown very gravelly loamy sand. The underlying material to a depth of 60 inches or more is pale brown very gravelly sand.

The Cliffdown soil is very deep and is somewhat excessively drained. It formed in alluvium derived dominantly from sedimentary rocks. Typically, the surface layer is light gray very gravelly sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is very pale brown very gravelly sandy loam.

Included in mapping are small areas of the loamy Tooele soils on the lower fan remnants, the sandy Yenrab soils on stabilized sand dunes under Indian ricegrass and fourwing saltbush, and the stony to gravelly Hiko Peak soils on lake terraces under sagebrush. Also included are small areas of Badlands on terrace escarpments and a few small areas of Rock outcrop.

Permeability is rapid in the Izamatch soil. Available water capacity is low (about 2.5 to 3.5 inches). The water-supplying capacity is 3 to 4 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 0.5 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

Permeability is moderately rapid in the Cliffdown soil. Available water capacity is low (about 2.0 to 3.5 inches). The water-supplying capacity is 2.5 to 4.0 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Izamatch soil is about 45 percent perennial grasses, 10 percent forbs, and 45 percent shrubs. Important plant species are Indian ricegrass, shadscale, winterfat, and galleta.

The potential plant community on the Cliffdown soil is about 30 percent perennial grasses, 10 percent forbs, and 60 percent shrubs. Important plant species are bud sagebrush, galleta, and shadscale.

The suitability for livestock grazing is only fair because of low forage production.

The suitability for rangeland seeding is very poor. The main limitation is low precipitation. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site for the Izamatch soil is Desert Gravelly Sandy Loam (Indian Ricegrass). The range site for the Cliffdown soil is Desert Alkali Bench (Bud Sagebrush).

**28—Izamatch, alkali-Cliffdown complex, 2 to 15 percent slopes.** This map unit is on lake terraces and fan remnants. Slopes are medium in length and are linear to convex. The present vegetation in most areas of the Izamatch soil is shadscale and bud sagebrush, and that in most areas of the Cliffdown soil is shadscale, Indian ricegrass, and horsebrush. Elevation is 4,250 to 5,300 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 50 to 52 degrees F, and the average frost-free period is 130 to 150 days.

This unit is about 60 percent Izamatch very gravelly sandy loam, alkali, 2 to 8 percent slopes, on lake terraces; 20 percent Cliffdown gravelly sandy loam, 2 to 15 percent slopes, on fan remnants; and 20 percent other soils, Badlands, and Rock outcrop. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Izamatch soil is very deep and is somewhat excessively drained. It formed in lacustrine sediments and alluvium derived dominantly from mixed rock sources. Typically, the surface layer is pale brown very gravelly sandy loam about 5 inches thick. The subsoil, to a depth of about 10 inches, is very pale brown very gravelly sandy loam. The underlying material to a depth of 60 inches or more is very pale brown very gravelly loamy sand.

The Cliffdown soil is very deep and is somewhat excessively drained. It formed in alluvium derived dominantly from sedimentary rocks. Typically, the surface layer is pale brown gravelly sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is very pale brown very gravelly sandy loam.

Included in mapping are small areas of the loamy Tooele soils on the lower fan remnants, the sandy Yenrab soils on stabilized sand dunes under Indian ricegrass and fourwing saltbush, Badlands on terrace escarpments, and a few small areas of Rock outcrop.

Permeability is rapid in the Izamatch soil. Available water capacity is very low or low (about 2 to 3 inches). The water-supplying capacity is 2.5 to 3.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 0.5 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

Permeability is moderately rapid in the Cliffdown soil. Available water capacity is low (about 3.0 to 4.5 inches). The water-supplying capacity is 2.5 to 4.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Izamatch soil is about 30 percent perennial grasses, 10 percent forbs, and 60 percent shrubs. Important plant species are galleta, bud sagebrush, and shadscale.

The potential plant community on the Cliffdown soil is about 40 percent perennial grasses, 5 percent forbs, and 55 percent shrubs. Important plant species are shadscale, galleta, bud sagebrush, and Indian ricegrass.

The suitability for livestock grazing is poor because of low forage production.

The suitability for rangeland seeding is very poor. The main limitation is low precipitation. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site for the Izamatch soil is Desert Alkali Bench (Bud Sagebrush). The range site for the Cliffdown soil is Desert Gravelly Loam (Shadscale).

**29—Jericho gravelly sandy loam, dry, 2 to 8 percent slopes.** This well drained soil is on fan remnants. It is shallow over a duripan. It formed in alluvium derived dominantly from igneous rocks. Slopes are medium in length and are convex. The present vegetation in most areas is black sagebrush, rabbitbrush, Indian ricegrass, and shadscale. Elevation is 5,000 to 6,100 feet. The average annual precipitation is 8 to 10 inches, the mean annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is pale brown gravelly sandy loam about 3 inches thick. The upper 6 inches of the subsoil is very pale brown gravelly sandy loam, and the lower 5 inches is very pale brown very gravelly sandy loam. A silica- and carbonate-cemented hardpan is between the depths of 14 and 19 inches. Below this to a depth of 60 inches or more is very pale brown extremely gravelly loamy coarse sand about 14 inches thick overlying stratified layers of silica- and carbonate-cemented hardpan and sand and gravel. In some areas the surface layer is gravelly loam or very gravelly sandy

loam. In other areas the depth to the hardpan is less than 14 inches.

Included with this soil in mapping are small areas of the loamy Scalade soils on fan remnants, the very deep Hiko Peak soils on the more sloping parts of fan remnants, and the loamy Medburn soils in drainageways. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Jericho soil. Available water capacity is very low (about 1.0 to 1.5 inches). The water-supplying capacity is 1.0 to 2.5 inches. Effective rooting depth is limited by the hardpan at a depth of 14 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 45 percent perennial grasses, 10 percent forbs, and 45 percent shrubs. Important plant species are black sagebrush, Indian ricegrass, needleandthread, and winterfat.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation, the restricted rooting depth, and the available water capacity. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site is Semidesert Shallow Hardpan 8-10 Ppt.

**30—Junkett gravelly loam, 2 to 5 percent slopes.** This well drained soil is on fan remnants. It is moderately deep over a petrocalcic horizon. It formed in alluvium derived dominantly from igneous and sedimentary rocks. Slopes are short or medium in length and are slightly convex. The present vegetation in most areas is Wyoming big sagebrush, Sandberg bluegrass, bluebunch wheatgrass, and rabbitbrush. Elevation is 5,900 to 6,300 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 130 days.

Typically, the surface layer is brown gravelly loam about 5 inches thick. The upper 11 inches of the subsoil is brown and light brown gravelly clay loam, and the lower 8 inches is very pale brown gravelly loam. A carbonate-cemented hardpan is between the depths of 24 and 30 inches. Below this to a depth of 60 inches or more is stratified very gravelly sandy loam, very gravelly loamy sand, and indurated hardpan. In some areas the surface layer is gravelly sandy loam. In other areas the lower part of the subsoil is gravelly sandy loam or very gravelly sandy loam.

Included with this soil in mapping are small areas of the very deep Hiko Peak soils on the lower fan remnants, Scalade soils on ridges, and the loamy Medburn soils in drainageways. Scalade soils are shallow over a hardpan. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Junkett soil. Available water capacity is low (about 3 to 4 inches). The water-supplying capacity is 5.0 to 6.5 inches. Effective rooting depth is limited by the hardpan at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 15 percent forbs, and 35 percent shrubs. Important plant species are bluebunch wheatgrass, Wyoming big sagebrush, Indian ricegrass, and bottlebrush squirreltail.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is poor. The main limitations are low precipitation, the available water capacity, and the restricted rooting depth. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

The land capability classification is VIIs, nonirrigated. The range site is Semidesert Loam (Wyoming Big Sagebrush).

**31—Kanosh loam, 0 to 2 percent slopes.** This very deep, somewhat poorly drained soil is on low lake terraces. It formed in lacustrine sediments derived from mixed rock sources. Slopes are short or medium in length and are slightly convex to slightly concave. The present vegetation in most areas is inland saltgrass, alkali bluegrass, Nuttall alkaligrass, and tall green rabbitbrush. Elevation is 4,200 to 4,300 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 49 to 54 degrees F, and the average frost-free period is 140 to 180 days.

Typically, the surface layer is light brownish gray loam about 4 inches thick. The upper part of the subsoil is very pale brown loam about 4 inches thick. The next part is very pale brown and light gray fine sandy loam about 19 inches thick. The lower part of the subsoil to a depth of 60 inches or more is white fine sandy loam. In some areas, the surface layer is fine sandy loam or silt loam or the subsoil is silt loam.

Included with this soil in mapping are small areas of the well drained Manassa soils on lake terraces; the sandy Berent soils on stabilized sand dunes; the silty

Bramwell soils on low lake terraces; the poorly drained, saline Saltair soils on lake plains under pickleweed; and the poorly drained Logan soils in seeps and drainageways under inland saltgrass and rushes. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderately rapid in the Kanosh soil. Available water capacity is moderate (about 5.5 to 7.5 inches). Effective rooting depth is limited by a seasonal high water table at a depth of 3 feet from March through July. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

Most areas are used as rangeland or for wildlife habitat. A few areas are used for irrigated crops or pasture.

The potential plant community is about 70 percent perennial grasses, 10 percent forbs, and 20 percent shrubs. Important plant species are inland saltgrass, alkali sacaton, alkali bluegrass, basin wildrye, and sedge.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding adapted species.

The seasonal high water table and the content of salt and alkali limit the production of alfalfa hay, pasture, and grain. Salt and alkali can be leached by proper irrigation management and drainage. Wheel line or handline sprinklers are suitable irrigation systems. The design of irrigation systems should not exceed the intake rate of the soil. The hazard of wind erosion can be reduced by using a conservation tillage system.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated pasture can yield about 6 animal unit months per acre, and irrigated barley can yield about 80 bushels per acre.

The land capability classification is IIIw, irrigated, and VIIw, nonirrigated. The range site is Alkali Bottom (Alkali Sacaton).

**32—Kanosh-Saltair-Logan complex, 0 to 2 percent slopes.** This map unit is on low lake terraces, lake plains, and flood plains. Slopes are medium or long and are slightly convex to slightly concave. The present vegetation in most areas of the Kanosh soil is inland saltgrass, alkali bluegrass, Nuttall alkaligrass, and tall green rabbitbrush. The present vegetation in most areas of the Saltair soil is pickleweed and inland saltgrass. The present vegetation in most areas of the Logan soil is sedges, inland saltgrass, and rushes. The Saltair and Logan soils are subject to frequent flooding. Elevation is 4,200 to 4,300 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 54 degrees F, and the average frost-free period is 140 to 180 days.

This unit is about 45 percent Kanosh loam, 0 to 2 percent slopes, on slightly convex, low lake terraces; 20 percent Saltair silt loam, 0 to 1 percent slopes, on linear lake plains; 15 percent Logan silt loam, 0 to 1 percent slopes, in slightly concave drainageways; and 20 percent other soils and Playas. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Kanosh soil is very deep and is somewhat poorly drained. It formed in lacustrine sediments derived from mixed rock sources. Typically, the surface layer is light brownish gray loam about 4 inches thick. The upper part of the subsoil is very pale brown loam about 4 inches thick. The next part is very pale brown and light gray fine sandy loam about 19 inches thick. The lower part of the subsoil to a depth of 60 inches or more is white fine sandy loam. In some areas the surface layer is fine sandy loam or silt loam.

The Saltair soil is very deep and is poorly drained. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is very pale brown silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is white silt loam and silty clay loam. In some areas the surface layer is silty clay loam.

The Logan soil is very deep and is poorly drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is dark grayish brown and dark gray loam about 15 inches thick. The subsoil to a depth of 60 inches or more is gray and white silty clay loam.

Included in mapping are small areas of the well drained Manassa soils on lake terraces; the somewhat excessively drained Berent soils on stabilized sand dunes; the well drained Skumpah soils on low lake terraces under greasewood; the somewhat poorly drained, silty Bramwell soils on low lake terraces; Playas; and the somewhat excessively drained Dynal soils on oolitic dunes.

Permeability is moderately rapid in the Kanosh soil. Available water capacity is moderate (about 5.5 to 7.5 inches). Effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 3.5 feet from March through July. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

Permeability is slow in the Saltair soil. Available

water capacity is very low or low (about 1 to 5 inches). Effective rooting depth is limited by a seasonal high water table at the surface to 1 foot below the surface from March through June. A high content of salt also limits rooting depth. The content of organic matter in the surface layer is less than 1 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate. This soil is frequently flooded during the spring.

Permeability is slow in the Logan soil. Available water capacity is very high (about 10 to 11 inches). Effective rooting depth is limited by a seasonal high water table at the surface to 2 feet below the surface from March through July. The content of organic matter in the surface layer is 4 to 8 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate. This soil is frequently flooded during the spring.

This unit is used mainly for rangeland or as wildlife habitat. Some areas are used for meadow hay or pasture.

The potential plant community on the Kanosh soil is about 70 percent perennial grasses, 10 percent forbs, and 20 percent shrubs. Important plant species are inland saltgrass, alkali sacaton, alkali bluegrass, basin wildrye, and sedge.

The potential plant community on the Saltair soil is about 35 percent perennial grasses, 10 percent forbs, and 55 percent shrubs. Important plant species are pickleweed, inland saltgrass, Europe swampfire, and seepweed.

The potential plant community on the Logan soil is about 75 percent perennial grasses, 20 percent forbs, and 5 percent shrubs. Important plant species are alkali sacaton, rush, inland saltgrass, bulrush, Europe swampfire, and sedge.

The suitability for livestock grazing on the Kanosh and Logan soils is good. The suitability for livestock grazing on the Saltair soil is very poor because of low forage quality and low production.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding adapted species.

This unit is poorly suited to roads and to building site development. The main limitations are wetness and flooding.

The land capability classification of the Kanosh and Logan soils is VIIw, nonirrigated. The land capability classification of the Saltair soil is VIII. The range site for the Kanosh soil is Alkali Bottom (Alkali Sacaton), the range site for the Saltair soil is Desert Salty Silt (Pickleweed), and the range site for the Logan soil is Wet Saline Meadow.

**33—Kapod gravelly loam, 2 to 10 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from sandstone and limestone. Slopes are medium in length and are convex. The vegetation in areas that are not cultivated is mainly mountain big sagebrush, bluebunch wheatgrass, mulesear dock, and Gambel oak. Elevation is 5,200 to 5,700 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 45 to 49 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is dark grayish brown and dark brown gravelly loam about 11 inches thick. The upper part of the subsoil is yellowish brown and light brown very cobbly clay loam about 19 inches thick. The lower part to a depth of 60 inches or more is very pale brown very cobbly sandy clay loam. In some areas the surface layer is loam or cobbly loam. In other areas, the upper part of the subsoil is gravelly clay loam or cobbly clay loam and the lower part is extremely gravelly sandy loam or extremely cobbly sandy loam. In some places along drainageways and on terrace breaks, the slopes are steeper. In other places the surface is gravelly to very cobbly.

Included with this soil in mapping are small areas of the loamy Birdow soils in drainageways, the cobbly Yeates Hollow soils on north-facing slopes, and the gravelly Lakewin soils on lake terraces. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderate in the Kapod soil. Available water capacity also is moderate (about 5 to 7 inches). The water-supplying capacity is 8 to 11 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

This unit is used for irrigated and nonirrigated cropland, rangeland, building site development, or wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, mountain big sagebrush, bluegrass, and antelope bitterbrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. Because of the rock fragments in the surface layer, the use of specialized equipment is necessary.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, field corn, orchards, and pastures. Suitable irrigation systems include wheel line, handline, center pivot, and furrow. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion and conserve soil moisture. The soil is suited to nonirrigated crops. Soil moisture is too low for annual cropping. A suitable rotation is 1 year of small grain followed by 1 year of summer fallow or 8 to 10 years of alfalfa and 1 year of small grain. The gravel near the surface may limit tillage.

If good management practices are applied, irrigated barley can yield about 90 bushels per acre, nonirrigated winter wheat can yield about 25 bushels per acre, irrigated alfalfa can yield about 6 tons per acre, nonirrigated alfalfa can yield about 2 tons per acre, and irrigated pasture can yield about 7 animal unit months per acre.

If this unit is used for roads or for building site development, the main limitation is the stoniness. Topsoil should be stockpiled and used to reclaim areas disturbed during construction.

The land capability classification is IIIe, irrigated, and IVs, nonirrigated. The range site is Upland Gravelly Loam (Mountain Big Sagebrush).

**34—Kapod stony loam, 5 to 30 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from sandstone and limestone. Slopes are medium in length and are linear to convex. The present vegetation in most areas is cheatgrass, threeawn, and bluebunch wheatgrass. Elevation is 4,600 to 5,200 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 45 to 49 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is dark grayish brown stony loam about 12 inches thick. The upper part of the subsoil is brown and yellowish brown very cobbly sandy clay loam about 14 inches thick. The lower part to a depth of 60 inches or more is light yellowish brown and very pale brown very cobbly sandy loam. In some areas the surface layer is very cobbly loam or very stony loam. In other areas the subsoil is very stony loam.

Included with this soil in mapping are small areas of the gravelly Lakewin soils on lake terraces, the loamy Birdow soils in drainageways, and the cobbly Yeates Hollow soils on north-facing slopes. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderate in the Kapod soil. Available water capacity also is moderate (about 4.5 to 6.0 inches). The water-supplying capacity is 7.5 to 10.0 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

This unit is used as rangeland (fig. 14) or for wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, mountain big sagebrush, bluegrass, and antelope bitterbrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. Because of the rock fragments, the use of specialized equipment is necessary.

The land capability classification is VIs, nonirrigated. The range site is Upland Gravelly Loam (Mountain Big Sagebrush).

**35—Kapod very cobbly loam, 5 to 30 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from sandstone and limestone. Slopes are medium in length and are linear to convex. The present vegetation in most areas is Utah juniper, mountain big sagebrush, bitterbrush, and bluebunch wheatgrass. Elevation is 5,000 to 6,500 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 45 to 49 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is dark grayish brown very cobbly loam about 11 inches thick. The upper part of the subsoil is brown and light yellowish brown very cobbly sandy clay loam about 14 inches thick. The lower part to a depth of 60 inches or more is very pale brown very cobbly sandy loam. In some areas the subsoil is very cobbly loam.

Included with this soil in mapping are small areas of the loamy Birdow soils in drainageways, the shallow Lodar soils on ridges, the cobbly Yeates Hollow soils on the upper fan remnants, and Borvant soils on the lower fan remnants. Borvant soils are shallow to a hardpan. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderate in the Kapcd soil. Available water capacity is low or moderate (about 4.0 to 5.5 inches). The water-supplying capacity is 7 to 9 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

**Figure 14.—Rangeland in an area of Kapod stony loam, 5 to 30 percent slopes, in Tooele Valley. The Oquirrh Mountains are in the background.**

This unit is used as rangeland or woodland or for wildlife habitat.

The potential plant community is an overstory of pinyon and Utah juniper with about 50 percent canopy cover. The understory is about 45 percent perennial grasses, 5 percent forbs, and 50 percent shrubs. Important plant species are mountain big sagebrush, black sagebrush, bluebunch wheatgrass, bluegrass, and antelope bitterbrush.

The site index for pinyon and Utah juniper is 65. Average productivity is low. Average yields are about 2 to 4 cords of wood per acre. The potential for production of posts or Christmas trees is poor.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is poor. The main limitations are the slope and the rock fragments. The use of specialized equipment is necessary.

The land capability classification is VIs, nonirrigated. The woodland site is Upland Stony Loam (Pinyon-Utah Juniper).

**36—Kilburn gravelly sandy loam, 2 to 10 percent slopes.** This very deep, somewhat excessively drained soil is on fan remnants and lake terraces. It formed in alluvium and colluvium derived dominantly from gneiss, schist, and quartzite. Slopes are short or medium in length and are convex. The present vegetation in most areas is cheatgrass, threeawn, foxtail fescue, and sand dropseed. Elevation is 4,250 to 4,500 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 160 to 180 days.

Typically, the surface layer is grayish brown gravelly sandy loam about 19 inches thick. The subsoil is pale brown very gravelly sandy loam about 17 inches thick. The substratum to a depth of 60 inches or more is pale brown very gravelly loamy sand and very cobbly loamy sand. In some areas the surface layer is sandy loam, stony sandy loam, or very stony sandy loam.

Included with this soil in mapping are small areas of the sandy Wasatch soils on the more sloping fan remnants, the moderately deep Ridd soils on hillsides, the loamy Birdow soils in depressions, and very deep, loamy soils in drainageways under bigtooth maple. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderately rapid in the Kilburn soil. Available water capacity is low (about 3 to 4 inches). The water-supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, mountain big sagebrush, bluegrass, and antelope bitterbrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is poor. The main limitation is the available water capacity. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

The land capability classification is VIs, nonirrigated. The range site is Upland Gravelly Loam (Mountain Big Sagebrush).

**37—Lakewin gravelly loam, 1 to 5 percent slopes.** This very deep, well drained soil is on lake terraces. It formed in alluvium and lacustrine sediments derived dominantly from quartzite and limestone. Slopes are medium in length and are convex. The vegetation in areas that are not cultivated is mainly bluebunch wheatgrass, cheatgrass, mountain big sagebrush, and rabbitbrush. Elevation is 4,700 to 5,200 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 46 to 52 degrees F, and the average frost-free period is 140 to 170 days.

Typically, the surface layer is dark grayish brown gravelly loam about 7 inches thick. The upper part of the subsoil is brown gravelly sandy clay loam about 11 inches thick. The next part is pale brown very gravelly sandy loam about 12 inches thick. The lower part to a depth of 60 inches or more is pale brown very gravelly sand. In some areas the surface layer is loam, sandy loam, gravelly sandy loam, or very gravelly sandy loam.

Included with this soil in mapping are small areas of the loamy Birdow soils along drainageways, the silty Erda soils, the gravelly Abela soils, the stony Kapod soils on fan remnants, and the sandy Wasatch soils. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderately rapid in the Lakewin soil. Available water capacity is low (about 3.5 to 5.0 inches). The water-supplying capacity is 7.0 to 8.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used as rangeland; for wildlife habitat; for irrigated and nonirrigated grain, alfalfa, or pasture; or for urban development.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, mountain big sagebrush, bluegrass, and antelope bitterbrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitations are the available water capacity and the rock fragments. The suitability for seeding can be improved by using special techniques for seedbed preparation, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, field corn, orchards, and pastures. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, and furrow. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the

surface and using a conservation tillage system help to control wind erosion and water erosion and conserve soil moisture. The soil is suited to nonirrigated crops. Soil moisture is too low for annual cropping. A suitable rotation is 1 year of small grain followed by 1 year of summer fallow or 8 to 10 years of alfalfa and 1 year of small grain. The gravel near the surface may limit tillage.

If good management practices are applied, nonirrigated winter wheat can yield about 25 bushels per acre and nonirrigated alfalfa can yield about 2 tons per acre. Irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 90 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

If this soil is used for building site development, the main limitation is a poor filtering capacity, which affects septic tank absorption fields. The potential for frost action is a moderate limitation on sites for roads.

The land capability classification is IVs, irrigated, and VIs, nonirrigated. The range site is Upland Gravelly Loam (Mountain Big Sagebrush).

**38—Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes.** This map unit is on mountainsides. Slopes are short or medium in length and are convex. The present vegetation in most areas of the Lodar soil is bluebunch wheatgrass, Utah juniper, pinyon, black sagebrush, and cliffrose. The present vegetation in most areas of the Lundy soil is bluebunch wheatgrass, pinyon, Rocky Mountain juniper, curlleaf mountainmahogany, and snowberry. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 12 to 18 inches, the mean annual air temperature is 40 to 50 degrees F, and the average frost-free period is 80 to 120 days.

This unit is 40 percent Lodar very cobbly loam, 30 to 60 percent slopes, mainly on the drier south-facing slopes; 30 percent Lundy very cobbly loam, 30 to 60 percent slopes, mainly on moist north-facing slopes; 10 percent Rock outcrop on ridges and escarpments; and 20 percent other soils.

The Lodar soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown very cobbly loam about 8 inches thick. The subsoil is pale brown very cobbly loam. Fractured limestone bedrock is at a depth of about 16 inches. In some areas the surface layer and subsoil are very stony loam or very gravelly loam.

The Lundy soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown very cobbly loam about 11 inches thick. The subsoil is yellowish brown very cobbly loam. Fractured limestone bedrock is at a depth of about 18 inches. In some areas the surface layer and subsoil are very stony loam or very gravelly loam.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the very deep Abela soils in drainageways, the moderately deep Dateman soils on north-facing slopes under fir trees, the moderately deep Podmor soils on mountainsides under mountain big sagebrush, and the moderately deep Cristo soils.

Permeability is moderate in the Lodar soil. Available water capacity is very low (about 1 to 2 inches). The water-supplying capacity is 2 to 5 inches. Effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderate in the Lundy soil. Available water capacity is very low (about 1 to 2 inches). The water-supplying capacity is 2 to 5 inches. Effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat. In a few areas the juniper and pinyon trees are used for firewood, fence posts, or Christmas trees.

The potential plant community on the Lodar soil is an overstory of pinyon and Utah juniper with about 50 percent canopy cover. The understory is about 55 percent perennial grasses, 5 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, low sagebrush, bluegrass, and antelope bitterbrush.

The potential plant community on the Lundy soil is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, low sagebrush, bluegrass, and antelope bitterbrush.

The site index for pinyon and Utah juniper is 40 on the Lodar soil. Average productivity is low. Average yields are about 1 to 2 cords of wood per acre. The potential for production of posts or Christmas trees is poor.

The suitability for livestock grazing is poor because of the slope.

The suitability for rangeland seeding is very poor. The main limitations are the slope, the restricted rooting depth, and rock fragments. Seeding is generally not recommended.

The land capability classification of the Lodar and Lundy soils is VIIe, nonirrigated. The woodland site for the Lodar soil is Upland Shallow Loam (Pinyon-Utah Juniper). The range site for the Lundy soil is Mountain Shallow Loam (Low Sagebrush). The land capability classification of the Rock outcrop is VIII. No woodland site or range site is assigned for the Rock outcrop.

**39—Logan silt loam, 0 to 1 percent slopes.** This very deep, poorly drained soil is on flood plains. It formed in alluvium derived from mixed rock sources. Slopes are medium in length and are linear or slightly concave. The present vegetation in most areas is sedges, inland saltgrass, and rushes. Elevation is 4,200 to 5,500 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 46 to 51 degrees F, and the average frost-free period is 110 to 160 days.

Typically, the surface layer is dark grayish brown and dark gray silt loam about 15 inches thick. The subsoil to a depth of 60 inches or more is gray and white silty clay loam. In some areas the underlying material is silt loam or silty clay. In other areas the soil is sandy loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Bramwell soils and the well drained Birdow soils. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is slow in the Logan soil. Available water capacity is very high (about 10 to 11 inches). Effective rooting depth is limited by a seasonal high water table at the surface to 2 feet below the surface from March through July. The content of organic matter in the surface layer is 4 to 8 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate. This soil is frequently flooded during the spring.

This unit is used mainly for meadow hay, pasture, or wildlife habitat.

The potential plant community is about 75 percent perennial grasses, 20 percent forbs, and 5 percent shrubs. Important plant species are alkali sacaton, rush, inland saltgrass, bulrush, sedge, and swampfire.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is very poor. The main limitation is the content of salt and alkali. Plants that tolerate wetness should be seeded.

This unit is poorly suited to cropland unless it is drained and irrigated. The main limitations are the seasonal high water table and the frequent flooding. If the soil is used for meadow hay or pasture, grasses that are adapted to wetness should be planted.

The land capability classification is VIIw, nonirrigated. The range site is Wet Saline Meadow.

**40—Lundy-Dateman-Rock outcrop association, 30 to 70 percent slopes.** This map unit is on mountainsides. Slopes are short or medium in length and are convex. The present vegetation in most areas of the Lundy soil is low sagebrush, bluebunch wheatgrass, bitterbrush, and bluegrass. The present vegetation in most areas of the Dateman soil is Douglas-fir, white fir, mountain brome, snowberry, and aspen. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 16 to 35 inches, the mean annual air temperature is 35 to 45 degrees F, and the average frost-free period is 70 to 90 days.

This unit is about 45 percent Lundy very cobbly loam, 30 to 60 percent slopes, on south-, east-, and west-facing slopes; 25 percent Dateman gravelly loam, 30 to 70 percent slopes, on north-facing slopes; 10 percent Rock outcrop; and 20 percent other soils.

The Lundy soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown very cobbly loam about 11 inches thick. The subsoil is yellowish brown very cobbly loam. Fractured limestone bedrock is at a depth of about 18 inches. In some areas slopes are less than 30 percent. In places the soil is extremely cobbly loam or extremely stony loam.

The Dateman soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface is covered with a mat of partly decomposed needles, leaves, and twigs. This mat is about 1 inch thick. The surface layer is very dark grayish brown and dark brown gravelly loam about 22 inches thick. The subsoil is brown very cobbly loam. Fractured limestone bedrock is at a depth of about 36 inches. In some areas bedrock is at a depth of more than 40 inches. In other areas slopes are less than 30 percent.

Rock outcrop consists of exposures of barren limestone on escarpments and ridges.

Included in mapping are small areas of the moderately deep Podmor soils in slightly concave positions under mountain big sagebrush and the very deep Flygare soils on the upper parts of slopes under quaking aspen. Also included are very deep, gravelly soils in drainageways under mountain big sagebrush, maple, and oak.

Permeability is moderate in the Lundy soil. Available water capacity is very low (about 1 to 2 inches). The water-supplying capacity is 2 to 5 inches. Effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderate in the Dateman soil.

Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 8 to 14 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or woodland or for wildlife habitat.

The potential plant community on the Lundy soil is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, low sagebrush, bluegrass, and antelope bitterbrush.

The potential plant community on the Dateman soil is an overstory of Douglas-fir and white fir with about 60 percent canopy cover. The understory vegetation is about 45 percent perennial grasses, 20 percent forbs, and 35 percent shrubs. Important plant species are Oregongrape, sheep fescue, bluegrass, and mountain brome.

The site index for Douglas-fir is 65 on the Dateman soil, and the site index for white fir is 60. The suitability for harvesting wood products is poor because of the slope and the severe hazard of erosion. The potential for production of Christmas trees is fair.

The suitability for livestock grazing is poor because of the slope. Forage production is low on the Dateman soil.

The suitability for rangeland seeding is very poor. The main limitations are the slope, the restricted rooting depth, and rock fragments. Seeding is generally not recommended.

The land capability classification of the Lundy and Dateman soils is VIIe, nonirrigated. The range site for the Lundy soil is Mountain Shallow Loam (Low Sagebrush). The woodland site for the Dateman soil is High Mountain Stony Loam (Conifer). The land capability classification of the Rock outcrop is VIII. No woodland site or range site is assigned for the Rock outcrop.

**41—Manassa silt loam, 0 to 3 percent slopes.** This very deep, well drained soil is on fan remnants and lake terraces. It formed in alluvium and lacustrine sediments derived dominantly from limestone and sandstone. Slopes are medium in length and are linear or slightly convex. The present vegetation in most areas is cheatgrass, crested wheatgrass, Wyoming big sagebrush, and bluebunch wheatgrass. Elevation is 4,250 to 4,800 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 140 to 180 days.

Typically, the surface layer is light brownish gray silt loam about 12 inches thick. The upper part of the underlying material is very pale brown silt loam about 11 inches thick. The next part is very pale brown silty clay loam about 13 inches thick. The lower part to a depth of 60 inches or more is white silty clay loam. In some areas the surface layer is loam or silty clay loam.

Included with this soil in mapping are small areas of the gravelly Hiko Peak soils on ridges, the loamy Medburn soils in outwash areas, the loamy Taylorsflat soils in landscape positions similar to those of the Manassa soil, and the somewhat poorly drained Bramwell soils in depressional areas. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is slow in the Manassa soil. Available water capacity is moderate or high (about 6 to 10 inches). The water-supplying capacity is 6.5 to 9.0 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used for rangeland, irrigated small grain, irrigated alfalfa, irrigated pasture, building site development, or wildlife habitat.

The potential plant community is about 30 percent perennial grasses, 15 percent forbs, and 55 percent shrubs. Important plant species are black greasewood, Wyoming big sagebrush, bottlebrush squirreltail, and Indian ricegrass.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is poor. The main limitation is low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

This soil is suited to irrigated crops if the content of salt and alkali is reduced by incorporating a minimum leaching program. Suitable crops are small grain, alfalfa hay, field corn, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers and furrow flood systems. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low precipitation.

If good management practices are applied, irrigated alfalfa can yield about 7 tons per acre, irrigated barley can yield about 90 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

If this soil is used for roads or for building site development, the main limitations are a slow percolation rate, the shrink-swell potential, and the potential for frost action. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. Maintaining drainage channels helps to control spring runoff.

The land capability classification is IIIe, irrigated, and VIs, nonirrigated. The range site is Semidesert Alkali Loam (Black Greasewood).

**42—Medburn fine sandy loam, 2 to 8 percent slopes.** This very deep, well drained soil is on lake terraces and fan remnants. It formed in alluvium and lacustrine sediments derived dominantly from sedimentary rocks. Slopes are short or medium in length and are convex to linear. The present vegetation in most areas is Wyoming big sagebrush, cheatgrass, Douglas rabbitbrush, and Indian ricegrass. Elevation is 4,500 to 5,800 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is pale brown fine sandy loam about 4 inches thick. The subsoil is light yellowish brown fine sandy loam about 37 inches thick. The substratum to a depth of 60 inches or more is very pale brown fine sandy loam. In some areas the surface layer is very fine sandy loam or sandy loam.

Included with this soil in mapping are small areas of the gravelly Hiko Peak soils on ridges, the loamy Taylorsflat soils in landscape positions similar to those of the Medburn soil, and the sandy Berent soils on stabilized sand dunes. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderately rapid in the Medburn soil. Available water capacity is moderate (about 5 to 7 inches). The water-supplying capacity is 5 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion also is moderate.

This unit is used for rangeland (fig. 15), irrigated alfalfa, irrigated barley, irrigated pasture, or wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 15 percent forbs, and 35 percent shrubs. Important plant species are bluebunch wheatgrass, Wyoming big sagebrush, Indian ricegrass, and bottlebrush squirreltail.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is poor. The main limitation is low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 90 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

This unit is well suited to building site development. The potential for frost action is a moderate limitation affecting roads.

The land capability classification is IIIe, irrigated, and VIIs, nonirrigated. The range site is Semidesert Loam (Wyoming Big Sagebrush).

**43—Medburn fine sandy loam, saline, 2 to 4 percent slopes.** This very deep, well drained soil is on lake terraces and fan remnants. It formed in alluvium and lacustrine sediments derived dominantly from sedimentary rocks. Slopes are short or medium in length and are slightly convex or linear. The present vegetation in most areas is black greasewood, shadscale, bottlebrush squirreltail, spiny horsebrush, and seepweed. Elevation is 4,500 to 5,800 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is pale brown fine sandy loam about 8 inches thick. The subsoil is light yellowish brown fine sandy loam about 38 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown fine sandy loam. In some areas the surface layer is very fine sandy loam or silt loam.

Included with this soil in mapping are small areas of the gravelly Hiko Peak soils along drainageways under Wyoming big sagebrush and the loamy Taylorsflat soils in landscape positions similar to those of the Medburn soil. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderately rapid in the Medburn soil. Available water capacity is low or moderate (about 4 to 6 inches). The water-supplying capacity is 4.5 to 7.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1

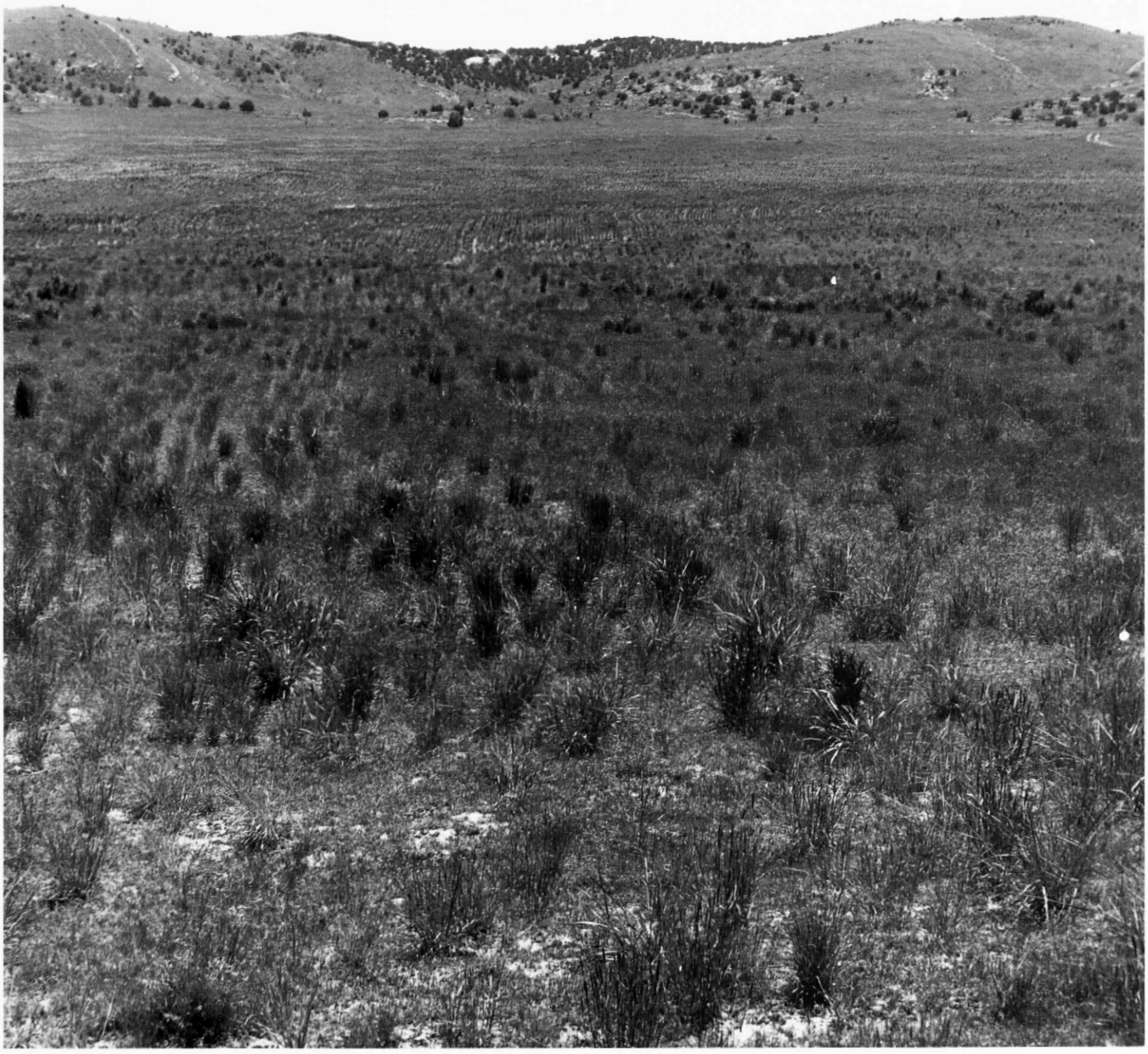


**Figure 15.—Crested wheatgrass in an area of Medburn fine sandy loam, 2 to 8 percent slopes, used as rangeland. The Cedar Mountains are in the background.**

to 2 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used for rangeland, irrigated alfalfa, irrigated barley, irrigated pasture, or wildlife habitat.

The potential plant community is about 30 percent perennial grasses, 15 percent forbs, and 55 percent shrubs. Important plant species are black greasewood, Wyoming big sagebrush, bottlebrush squirreltail, and Indian ricegrass.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. The suitability for seeding can be improved by using special techniques and adapted species.

This unit is suited to irrigated crops if the content of salt and alkali is reduced by incorporating a minimum leaching program. Suitable crops are small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 90 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

This unit is well suited to building site development. The potential for frost action is a moderate limitation affecting roads.

The land capability classification is IVs, irrigated, and VIIs, nonirrigated. The range site is Semidesert Alkali Loam (Black Greasewood).

**44—Pits.** Pits consist of open excavations from which soil and the underlying material have been removed for road construction, municipal uses, or other purposes. Pits are generally located in gravelly and sandy soils. Some sites have been excavated to bedrock. The sides of the Pits are steep. The material that remains supports few plants and has no value for farming. Pits are generally not suited to rangeland, but some areas have value for wildlife habitat or industrial uses.

The land capability classification is VIII.

**45—Playas.** Playas consist of barren, undrained basins that are subject to repeated inundation by water and salinization by evaporation of accumulated water. They are on lake plains. Many areas are commonly ponded in the spring. The surface is smooth, commonly has a thin covering of salt crystals, and is patterned by cracks when dry. The soil materials are strongly calcareous, stratified lacustrine sediments of silt, clay, and sand containing sufficient amounts of salt to prohibit the growth of vegetation.

Included in mapping are small areas of the poorly drained Saltair soils on lake plains under pickleweed, the somewhat excessively drained Dynal soils on stabilized sand dunes, the well drained Skumpah soils on low lake terraces under greasewood, and Salt flats. Included areas make up about 10 percent of the total acreage of this unit.

Playas are not suitable for rangeland. A few areas are used as solar evaporation ponds.

The land capability classification is VIII.

**46—Playas-Saltair complex, 0 to 1 percent slopes.** This map unit is on lake plains. Slopes are long and linear. Playas are in depressions. They are mostly barren. The present vegetation in most areas of the Saltair soil is pickleweed and inland saltgrass. Elevation is 4,200 to 4,300 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit is about 60 percent Playas; 30 percent Saltair silt loam, 0 to 1 percent slopes; and 10 percent other soils and Salt flats. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used (fig. 16).

Playas consist of barren, undrained basins. The surface is covered with a thin layer of salt and is patterned with cracks when dry. Many areas are commonly ponded in the spring. The soil material is stratified lacustrine sediments of silt loam, silty clay loam, and sandy loam.

The Saltair soil is very deep and is poorly drained. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is very pale brown silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is white silt loam and silty clay loam. In some areas the surface layer is silty clay loam or sandy loam.

Included in mapping are small areas of the well drained Skumpah soils on low lake terraces under shadscale and greasewood; Salt flats; and the sandy Dynal soils on stabilized oolitic dunes under greasewood and saltbush. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is slow in the Saltair soil. Available water capacity is very low or low (about 1 to 5 inches). The content of organic matter in the surface layer is less than 1 percent. Effective rooting depth is limited by a seasonal high water table at the surface to 1 foot below the surface from March through October. A high content of salt also limits the effective rooting depth. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate. This soil is frequently flooded during the spring.

This unit is used as a military bombing range. A few areas are used as a source of salt from solar evaporation ponds.

The potential plant community on the Saltair soil is about 35 percent perennial grasses, 10 percent forbs, and 55 percent shrubs. Important plant species are

**Figure 16.—An area of Playas-Saltair complex, 0 to 1 percent slopes, in Skull Valley. The Stansbury Mountains are in the background.**

pickleweed, inland saltgrass, Europe swampfire, and seepweed.

The suitability for livestock grazing is very poor because of low forage quality and low production.

This unit is not suitable for rangeland seeding because of the content of salt and alkali.

This unit is not suited to recreational uses or homesite development, mainly because of wetness and the flooding. It has some potential for solar evaporation ponds.

The land capability classification is VIII. The range site of the Saltair soil is Desert Salty Silt (Pickleweed). No range site is assigned for the Playas.

**46A—Podmor, moist-Dateman-Rock outcrop association, 30 to 70 percent slopes.** This map unit is on mountainsides. Slopes are short or medium in length and are convex. The present vegetation in most areas of the Podmor soil is Gambel oak, bluebunch wheatgrass, mountain big sagebrush, snowberry, and

bluegrass. The present vegetation in most areas of the Dateman soil is Douglas-fir, white fir, mountain brome, snowberry, and quaking aspen. Elevation is 6,000 to 10,000 feet. The average annual precipitation is 18 to 35 inches, the mean annual air temperature is 35 to 45 degrees F, and the average frost-free period is 70 to 90 days.

This unit is about 60 percent Podmor very cobbly loam, moist, 30 to 60 percent slopes, mainly on south-, east-, and west-facing slopes; 20 percent Dateman gravelly loam, 30 to 70 percent slopes, mainly on north-facing slopes; 10 percent Rock outcrop; and 10 percent other soils.

The Podmor soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from quartzite and sandstone. Typically, the upper part of the surface layer is brown very cobbly loam about 3 inches thick. The lower part is brown very gravelly loam about 13 inches thick. The subsoil is brown very cobbly loam. Fractured quartzite bedrock is at a depth of about 23 inches.

The Dateman soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from limestone and sandstone. Typically, the surface is covered with a mat of partly decomposed needles, leaves, and twigs. This mat is about 1 inch thick. The surface layer is very dark grayish brown and dark brown gravelly loam about 22 inches thick. The subsoil is brown very cobbly loam. Fractured limestone bedrock is at a depth of about 36 inches. In some areas fractured bedrock is at a depth of more than 40 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the shallow Lundy soils on side slopes under curlleaf mountainmahogany; the shallow Onaqui soils on ridges under low sagebrush; the very deep Flygare soils on the higher or north-facing slopes under aspen; and very deep, loamy soils in drainageways under bigtooth maple, chokecherry, and willows.

Permeability is moderate in the Podmor soil. Available water capacity is low (about 1.5 to 2.5 inches). The water-supplying capacity is 6 to 9 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderate in the Dateman soil. Available water capacity is low. The water-supplying capacity is 8 to 14 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Podmor soil is about 35 percent perennial grasses, 10 percent forbs, and 55 percent shrubs. Important plant species are Gambel oak, bearded wheatgrass, bluebunch wheatgrass, and mountain big sagebrush.

The potential plant community on the Dateman soil is an overstory of Douglas-fir and white fir with about 60 percent canopy cover. The understory vegetation is about 45 percent perennial grasses, 20 percent forbs, and 35 percent shrubs. Important plant species are Oregongrape, sheep fescue, bluegrass, and mountain brome.

The site index for Douglas-fir is 65 on the Dateman soil, and the site index for white fir is 60. The suitability for harvesting wood products is poor because of the slope and the severe hazard of erosion. The potential for production of Christmas trees is fair.

The suitability for livestock grazing is poor because of the slope. Forage production is low on the Dateman soil.

The suitability for rangeland seeding is very poor. The main limitations are the slope and rock fragments. Seeding is not recommended.

The land capability classification of the Podmor and Dateman soils is VIIe. The range site for the Podmor soil is Mountain Gravelly Loam (Oak). The woodland site for the Dateman soil is High Mountain Stony Loam (Conifer). The land capability classification of the Rock outcrop is VIII. No woodland site or range site is assigned for the Rock outcrop.

**47—Podmor-Onaqui-Rock outcrop association, 20 to 60 percent slopes.** This map unit is on mountainsides and ridges. Slopes are short or medium in length and are convex. The present vegetation in most areas of the Podmor soil is mountain big sagebrush, snowberry, bluebunch wheatgrass, and arrowleaf balsamroot. The present vegetation in most areas of the Onaqui soil is low sagebrush, bluebunch wheatgrass, Sandberg bluegrass, and phlox. Elevation is 7,000 to 10,000 feet. The average annual precipitation is 16 to 22 inches, the mean annual air temperature is 40 to 45 degrees F, and the average frost-free period is 70 to 90 days.

This unit is about 45 percent Podmor very cobbly loam, 30 to 60 percent slopes, on mountainsides; 35 percent Onaqui very cobbly loam, 20 to 60 percent slopes, on ridges; 10 percent Rock outcrop; and 10 percent other soils and talus. In areas in the Stansbury Mountains, the Rock outcrop makes up a higher percentage of the map unit.

The Podmor soil is moderately deep and is well

drained. It formed in colluvium and residuum derived dominantly from quartzite. Typically, the upper part of the surface layer is brown very cobbly loam about 3 inches thick. The lower part is brown very gravelly loam about 13 inches thick. The subsoil is brown very cobbly loam. Fractured quartzite bedrock is at a depth of about 23 inches. In some areas the soil is very gravelly loam, very stony loam, or extremely cobbly loam throughout.

The Onaqui soil is shallow and well drained. It formed in colluvium and residuum derived dominantly from quartzite. Typically, the upper part of the surface layer is dark brown very cobbly loam about 4 inches thick. The lower part is brown extremely cobbly loam about 11 inches thick. Fractured quartzite bedrock is at a depth of about 15 inches. In some areas the soil is very gravelly loam, very stony loam, or extremely cobbly loam throughout.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of talus slopes in very steep colluvial areas; the very deep Flygare soils on the upper south-, east-, and west-facing slopes under quaking aspen; the moderately deep Dateman soils on north-facing slopes under fir trees; and very deep, loamy soils in drainageways under bigtooth maple, chokecherry, and willows.

Permeability is moderate in the Podmor soil. Available water capacity is very low (about 1.5 to 2.5 inches). The water-supplying capacity is 5 to 8 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderate in the Onaqui soil. Available water capacity is very low (about 0.5 inch to 1.5 inches). The water-supplying capacity is 1.5 to 5.0 inches. Effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Podmor soil is about 65 percent perennial grasses, 10 percent forbs, and 25 percent shrubs. Important plant species are bluebunch wheatgrass, bulbous oniongrass, antelope bitterbrush, and mountain big sagebrush.

The potential plant community on the Onaqui soil is about 40 percent perennial grasses, 25 percent forbs, and 35 percent shrubs. Important plant species are low sagebrush, bluebunch wheatgrass, Idaho fescue, and Douglas rabbitbrush.

The suitability for livestock grazing is poor because of the slope. Forage production is low on the Onaqui soil.

The suitability for rangeland seeding is very poor. The main limitations are the slope and rock fragments. Seeding is generally not recommended.

The land capability classification of the Podmor and Onaqui soils is VIIe, nonirrigated. The range site for the Podmor soil is Mountain Stony Loam (Antelope Bitterbrush). The range site for the Onaqui soil is Mountain Windswept Ridge. The land capability classification of the Rock outcrop is VIII. No woodland site or range site is assigned for the Rock outcrop.

**48—Reywat-Broad-Rock outcrop association, 30 to 60 percent slopes.** This map unit is on hillsides and mountainsides. Slopes are short or medium in length and are convex. The present vegetation in most areas of the Reywat soil is bluebunch wheatgrass, Utah juniper, and black sagebrush. The present vegetation in most areas of the Broad soil is bluebunch wheatgrass, mountain big sagebrush, arrowleaf balsamroot, birchleaf mountainmahogany, and serviceberry. Elevation is 5,200 to 7,200 feet. The average annual precipitation is 12 to 17 inches, the mean annual air temperature is 42 to 50 degrees F, and the average frost-free period is 80 to 120 days.

This unit is about 45 percent Reywat very cobbly loam, 30 to 60 percent slopes, mainly on droughty south aspects; 30 percent Broad cobbly loam, 30 to 60 percent slopes, mainly on the more moist north aspects; 10 percent Rock outcrop; and 15 percent other soils.

The Reywat soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from quartzite and igneous rocks. Typically, the surface layer is grayish brown very cobbly loam about 2 inches thick. The upper 2 inches of the subsoil is grayish brown very gravelly clay loam, and the lower 7 inches is brown very gravelly clay loam. Fractured quartzite bedrock is at a depth of about 11 inches. In some areas the surface layer is very gravelly sandy loam.

The Broad soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from quartzite and sandstone. Typically, the surface layer is dark brown and brown cobbly loam about 14 inches thick. The upper 9 inches of the subsoil is yellowish brown very gravelly clay loam, and the lower 13 inches is pale brown very cobbly loam. Fractured quartzite bedrock is at a depth of about 36 inches. In some areas the surface layer is very gravelly loam or very cobbly loam. In other areas bedrock is at a depth of more than 40 inches.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the very deep

Abela soils in drainageways, the shallow Lodar soils in landscape positions similar to those of the Reywat soil, and the shallow Lundy soils in landscape positions similar to those of the Broad soil.

Permeability is moderately slow in the Reywat soil. Available water capacity is very low (about 1.0 to 1.5 inches). The water-supplying capacity is 2.0 to 3.5 inches. Effective rooting depth is limited by bedrock at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

Permeability is moderately slow in the Broad soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 7.0 to 9.5 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 3 to 5 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Reywat soil is an overstory of pinyon and Utah juniper with about 30 percent canopy cover. The understory is about 55 percent perennial grasses, 5 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, Indian ricegrass, black sagebrush, bluegrass, and antelope bitterbrush.

The potential plant community on the Broad soil is about 65 percent perennial grasses, 10 percent forbs, and 25 percent shrubs. Important plant species are bluebunch wheatgrass, bulbous oniongrass, antelope bitterbrush, and mountain big sagebrush.

The site index for pinyon and Utah juniper is about 40 on the Reywat soil. Average productivity is low. Average yields are 1 to 2 cords of wood per acre. The potential for production of fence posts and Christmas trees is poor.

The suitability for livestock grazing is poor because of the slope.

The suitability for rangeland seeding is very poor. The main limitations are the slope, rock fragments, and the restricted rooting depth. Seeding is generally not recommended.

The land capability classification of the Reywat and Broad soils is VIIe, nonirrigated. The woodland site for the Reywat soil is Upland Shallow Loam (Pinyon-Utah Juniper). The range site for the Broad soil is Mountain Stony Loam (Antelope Bitterbrush). The land capability classification of the Rock outcrop is VIII. No woodland site or range site is assigned for the Rock outcrop.

**49—Ridd-Rock outcrop complex, 30 to 70 percent slopes.** This map unit is on hillsides and mountainsides. Slopes are short and convex. The present vegetation in most areas is cheatgrass, foxtail fescue, sand dropseed, and threeawn. Elevation is 5,200 to 6,500 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 45 to 51 degrees F, and the average frost-free period is 140 to 180 days.

This unit is about 70 percent Ridd very stony sandy loam, 30 to 70 percent slopes; 15 percent Rock outcrop; and 15 percent other soils and talus. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Ridd soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from gneiss, schist, and quartzite. Typically, the surface layer is brown very stony sandy loam about 13 inches thick. The subsoil is yellowish brown very stony sandy loam about 9 inches thick. The substratum is pale brown and light olive brown very stony sandy loam. Fractured quartzite bedrock is at a depth of about 36 inches. In some areas the surface layer and subsoil are very gravelly sandy loam or very cobbly sandy loam. In other areas the depth to bedrock is more than 40 inches. In places the subsoil is very stony sandy clay loam.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the very deep, sandy Wasatch soils on fan remnants; the shallow Reywat soils on south-facing mountainsides; and talus slopes in the more sloping areas.

Permeability is moderate in the Ridd soil. Available water capacity is very low (about 2.0 to 2.5 inches). The water-supplying capacity is 4.5 to 6.0 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Ridd soil is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, Wyoming big sagebrush, bottlebrush squirreltail, and Indian ricegrass.

The suitability for livestock grazing is poor because of the slope.

The suitability for rangeland seeding is very poor. The main limitations are the slope and rock fragments. Seeding is generally not recommended.

The land capability classification of the Ridd soil is

VIIe, nonirrigated. The range site is Upland Stony Loam (Wyoming Big Sagebrush). The land capability classification of the Rock outcrop is VIII. No range site is assigned for the Rock outcrop.

**50—Ridd-Wasatch-Rock outcrop association, 6 to 30 percent slopes.** This map unit is on hillsides and fan remnants. Slopes are short or medium in length and are convex. The present vegetation in most areas of the Ridd soil is cheatgrass, foxtail fescue, sand dropseed, and threeawn. The present vegetation in most areas of the Wasatch soil is cheatgrass, needleandthread, and Utah juniper. Elevation is 4,200 to 5,300 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 140 to 180 days.

This unit is about 55 percent Ridd very stony sandy loam, 6 to 30 percent slopes, on hillsides; 20 percent Wasatch loamy coarse sand, 6 to 25 percent slopes, on fan remnants; 10 percent Rock outcrop; and 15 percent other soils.

The Ridd soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from gneiss, schist, and quartzite. Typically, the surface layer is brown very stony sandy loam about 13 inches thick. The subsoil is yellowish brown very stony sandy loam about 9 inches thick. The substratum is pale brown and light olive brown very stony sandy loam. Fractured gneiss and schist bedrock is at a depth of about 36 inches. In some areas the surface layer and subsoil are very gravelly sandy loam or very cobbly sandy loam. In other areas the depth to bedrock is more than 40 inches. In places the subsoil is very stony sandy clay loam.

The Wasatch soil is very deep and is excessively drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is brown loamy coarse sand about 18 inches thick. The underlying material to a depth of 60 inches or more is pale brown sand. In some areas the surface layer is sandy loam. In other areas the underlying material is loamy coarse sand.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

Included in mapping are small areas of the very deep, gravelly Kilburn soils on fan remnants and lake terraces; the shallow Reywat soils on south-facing slopes; very deep, loamy soils in drainageways under bigtooth maple and boxelder; and sandy soils containing a layer of carbonate accumulation on toe slopes of fan remnants.

Permeability is moderate in the Ridd soil. Available water capacity is very low (about 2.0 to 2.5 inches). The water-supplying capacity is 4.5 to 6.0 inches. Effective rooting depth is limited by bedrock at a depth of 20 to 40 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

Permeability is rapid in the Wasatch soil. Available water capacity is low (about 3 to 4 inches). The water-supplying capacity is 6 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is severe.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Ridd soil is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, Wyoming big sagebrush, bottlebrush squirreltail, and Indian ricegrass.

The potential plant community on the Wasatch soil is about 55 percent perennial grasses, 20 percent forbs, and 25 percent shrubs. Important plant species are Indian ricegrass, antelope bitterbrush, needleandthread, and western wheatgrass.

The suitability for livestock grazing is good.

The suitability of the Ridd soil for rangeland seeding is poor. The main limitations are the slope, the available water capacity, and rock fragments. The suitability of the Wasatch soil for range seeding is very poor. The main limitations are the texture of the surface layer and the available water capacity. Because of the slope and the rock fragments, the use of specialized equipment is necessary. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

The land capability classification of the Ridd soil is VIIs, nonirrigated. The range site is Upland Stony Loam (Wyoming Big Sagebrush). The land capability classification of the Wasatch soil is VIs, nonirrigated. The range site is Upland Sand (Indian Ricegrass). The land capability classification of the Rock outcrop is VIII. No range site is assigned for the Rock outcrop.

**51—Rock outcrop-Lundy complex, 30 to 60 percent slopes.** This map unit is on mountainsides that are mainly south-facing. Slopes are medium in length and are convex. The present vegetation in areas of the Lundy soil is low sagebrush, bluebunch wheatgrass, bitterbrush, and bluegrass. Elevation is 7,200 to 8,500 feet. The average annual precipitation is 16 to 22 inches, the mean annual air temperature is 40 to 45 degrees F, and the average frost-free period is 80 to 90 days.

This unit is about 70 percent Rock outcrop; 20

percent Lundy very cobbly loam, 30 to 60 percent slopes; and 10 percent other soils and talus. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Rock outcrop consists of exposures of barren bedrock, mainly on escarpments and ridges.

The Lundy soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is brown very cobbly loam about 11 inches thick. The subsoil is yellowish brown very cobbly loam. Fractured limestone bedrock is at a depth of about 18 inches. In some areas the soil is extremely cobbly loam or extremely stony loam throughout.

Included in mapping are small areas of the moderately deep Dateman soils on north-facing slopes under fir trees; the moderately deep Podmor soils on east- and west-facing slopes under mountain big sagebrush; talus slopes in the more sloping areas and in drainageways; and very deep, gravelly soils under maple.

Permeability is moderate in the Lundy soil. Available water capacity is very low (about 1 to 2 inches). The water-supplying capacity is 2 to 5 inches. Effective rooting depth is 10 to 20 inches. The content of organic matter in the surface layer is 2 to 4 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used for wildlife habitat.

The potential plant community on the Lundy soil is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, low sagebrush, bluegrass, and antelope bitterbrush.

The suitability for livestock grazing is poor because of the slope.

This unit is not suited to rangeland seeding because of the slope and the Rock outcrop.

This unit is poorly suited to roads and to building site development. The main limitations are the slope and the depth to bedrock.

The land capability classification of the Rock outcrop is VIII. No range site is assigned. The land capability classification of the Lundy soil is VIIe, nonirrigated. The range site is Mountain Shallow Loam (Low Sagebrush).

**52—Salt flats.** Salt flats are barren, undrained basins on lake plains near Wendover. The surface is covered with a layer of salt crust that ranges to about 1 foot in thickness. Many areas are commonly ponded in the spring. Some areas are of local importance as a source of salt from solar evaporation ponds. The Bonneville Salt Flats Race Track is in this unit.

The land capability classification is VIII.

**53—Saltair-Playas complex, 0 to 1 percent slopes.** This map unit is on lake plains. Slopes are long and linear. The present vegetation in most areas of the Saltair soil is pickleweed and inland saltgrass. Playas are mostly barren. Elevation is 4,200 to 4,300 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit is about 60 percent Saltair silt loam, 0 to 1 percent slopes; 30 percent Playas in depressions; and 10 percent other soils. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Saltair soil is very deep and is poorly drained. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is very pale brown silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is white silt loam and silty clay loam. In some areas the surface layer is silty clay loam or sandy loam.

Playas consist of barren, undrained basins. Many areas are commonly ponded in the spring. The surface is covered with a thin layer of salt and is patterned with cracks when dry. The soil material is stratified lacustrine sediments of silt loam, silty clay loam, and sandy loam.

Included in mapping are small areas of the well drained Skumpah soils under shadscale and greasewood, the somewhat excessively drained Dynal soils on stabilized oolitic dunes, the somewhat poorly drained Kanosh soils on low lake terraces under inland saltgrass, the poorly drained Logan soils in drainageways under inland saltgrass and rushes, and the somewhat excessively drained Yenrab soils on stabilized sand dunes.

Permeability is slow in the Saltair soil. Available water capacity is very low or low (about 1 to 5 inches). Effective rooting depth is limited by a seasonal high water table at the surface to 1 foot below the surface from March through October. A high content of salt also limits rooting depth. The content of organic matter in the surface layer is less than 1 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate. This soil is frequently flooded during the spring.

This unit is used mainly as a military bombing range. A few areas are used as rangeland. A few areas are used as a source of salt from solar evaporation ponds.

The potential plant community on the Saltair soil is about 35 percent perennial grasses, 10 percent forbs, and 55 percent shrubs. Important plant species are pickleweed, inland saltgrass, Europe swampfire, and seepweed.

The suitability for livestock grazing is poor because of low forage quality and low production.

This unit is not suited to rangeland seeding because of the content of salt and alkali.

This unit is not suited to recreational uses or to building site development. The main limitations are wetness and the flooding.

The land capability classification is VIII. The range site for the Saltair soil is Desert Salty Silt (Pickleweed). No range site is assigned for the Playas.

**54—Scalade very fine sandy loam, moist, 2 to 5 percent slopes.** This well drained soil is on fan remnants. It is shallow over a hardpan. It formed in alluvium derived dominantly from igneous rocks. Slopes are medium in length and are linear or slightly convex. The present vegetation in most areas is Wyoming big sagebrush, little rabbitbrush, Indian ricegrass, bluebunch wheatgrass, and bottlebrush squirreltail. Elevation is 5,000 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is pale brown very fine sandy loam about 3 inches thick. The subsoil is pale brown and very pale brown very fine sandy loam about 14 inches thick. A hardpan is between the depths of 17 and 24 inches. It is strongly cemented with silica and carbonates. The underlying material to a depth of 60 inches or more is stratified, weakly cemented gravelly loam, weakly cemented gravelly loamy sand, indurated hardpans, and sand and gravel. In some areas the surface layer and the subsoil are loam.

Included with this soil in mapping are small areas of the very deep Medburn soils in drainageways, the very deep Hiko Peak soils along the upper drainageways, and the gravelly Jericho soils on ridges. Included soils make up about 15 percent of the total acreage of this unit.

Permeability is moderate in the Scalade soil. Available water capacity is very low or low (about 2 to 3 inches). The water-supplying capacity is 3 to 5 inches. Effective rooting depth is limited by the hardpan at a depth of 12 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is severe. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 15 percent forbs, and 35 percent shrubs. Important plant species are Wyoming big sagebrush, bluebunch wheatgrass, Indian ricegrass, and bottlebrush squirreltail.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is very poor. The main limitation is the restricted rooting depth. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

The land capability classification is VIIs, nonirrigated. The range site is Semidesert Loam (Wyoming Big Sagebrush).

**55—Scalade-Jericho-Medburn association, 2 to 15 percent slopes.** This map unit is on fan remnants. Slopes are short or medium in length and are convex to concave. The present vegetation in most areas of the Scalade soil is black sagebrush, Douglas rabbitbrush, Indian ricegrass, needleandthread, and bottlebrush squirreltail. The present vegetation in most areas of the Jericho soil is Utah juniper, black sagebrush, rabbitbrush, and Indian ricegrass (fig. 17). The present vegetation in most areas of the Medburn soil is Wyoming big sagebrush, cheatgrass, rabbitbrush, and Indian ricegrass. Elevation is 5,000 to 6,100 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 120 days.

This unit is about 40 percent Scalade very fine sandy loam, 2 to 5 percent slopes, on broad fan remnants; 30 percent Jericho gravelly sandy loam, 2 to 15 percent slopes, on ridges; 20 percent Medburn fine sandy loam, 2 to 8 percent slopes, in drainageways; and 10 percent other soils.

The Scalade soil is shallow and well drained. It formed in alluvium derived dominantly from igneous rocks. Typically, the surface layer is pale brown very fine sandy loam about 3 inches thick. The subsoil is pale brown and very pale brown very fine sandy loam about 14 inches thick. A hardpan is between the depths of 17 and 24 inches. It is strongly cemented with silica and carbonates. The underlying material to a depth of 60 inches or more is stratified, weakly cemented gravelly loam, weakly cemented gravelly loamy sand, indurated hardpans, and sand and gravel. In some areas the surface layer and the subsoil are loam.

The Jericho soil is shallow over a hardpan and is well drained. It formed in alluvium derived dominantly from igneous rocks. Typically, the surface layer is very pale brown gravelly sandy loam about 4 inches thick. The upper 5 inches of the subsoil is very pale brown gravelly sandy loam, and the lower 7 inches is very pale brown very gravelly sandy loam. A silica- and carbonate-cemented hardpan is between the depths of 16 and 20 inches. Below this to a depth of 60 inches or more are stratified extremely gravelly loam, coarse sand, cemented hardpans, and sand and gravel. In

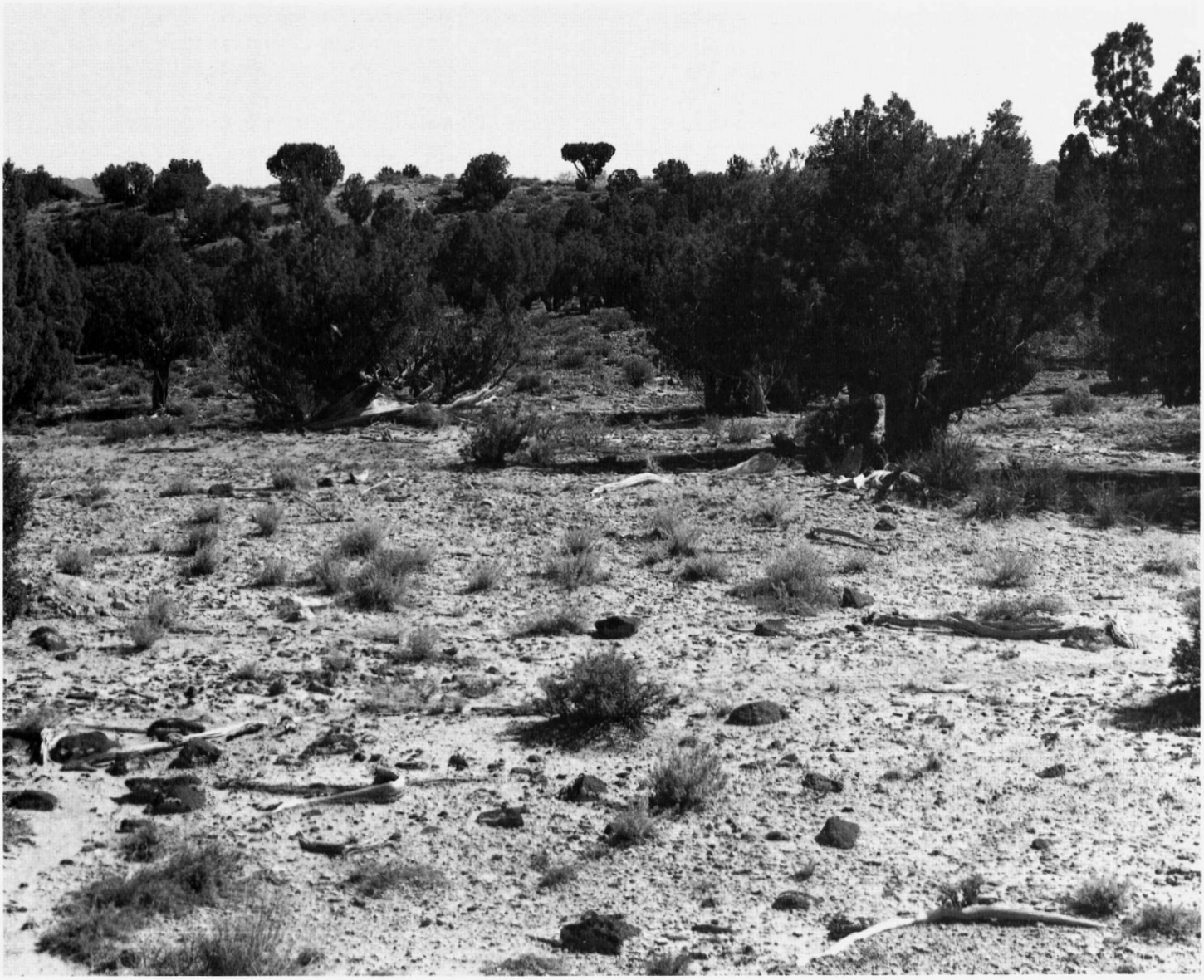


**Figure 17.—Utah juniper and black sagebrush on Jericho gravelly sandy loam in an area of Scalade-Jericho-Medburn association, 2 to 15 percent slopes, near Ibapah.**

some areas the surface layer is gravelly loam or very gravelly sandy loam.

The Medburn soil is very deep and is well drained. It formed in alluvium derived dominantly from sedimentary rocks. Typically, the surface layer is pale brown fine sandy loam about 4 inches thick. The subsoil is light yellowish brown fine sandy loam about 37 inches thick. The substratum to a depth of 60 inches or more is very pale brown fine sandy loam. In some areas the surface layer is very fine sandy loam or sandy loam.

Included in mapping are small areas of the very deep, gravelly Hiko Peak soils on side slopes along drainageways and the saline Taylorsflat soils on the lower fan remnants. Taylorsflat soils support greasewood.

Permeability is moderate in the Scalade soil. Available water capacity is very low or low (about 2 to 3 inches). The water-supplying capacity is 3.0 to 4.5 inches. Effective rooting depth is limited by the hardpan at a depth of 12 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is severe. The

hazard of wind erosion is moderate.

Permeability is moderately rapid in the Jericho soil. Available water capacity is very low (about 1.0 to 1.5 inches). The water-supplying capacity is 1 to 2 inches. Effective rooting depth is limited by the hardpan at a depth of 14 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

Permeability is moderately rapid in the Medburn soil. Available water capacity is moderate (about 5 to 7 inches). The water-supplying capacity is 5 to 8 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is medium, and the hazard of water erosion is moderate. The hazard of wind erosion also is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Scalade soil is about 45 percent perennial grasses, 10 percent forbs, and 45 percent shrubs. Important plant species are black sagebrush, Indian ricegrass, needleandthread, and winterfat.

The potential plant community on the Jericho soil is an overstory of Utah juniper with about 30 percent canopy cover. The understory is about 40 percent perennial grasses, 10 percent forbs, and 50 percent shrubs. Important plant species are black sagebrush, bluebunch wheatgrass, Indian ricegrass, and winterfat.

The potential plant community on the Medburn soil is about 50 percent perennial grasses, 15 percent forbs, and 35 percent shrubs. Important plant species are bluebunch wheatgrass, Wyoming big sagebrush, Indian ricegrass, and bottlebrush squirreltail.

The site index for Utah juniper is 15 on the Jericho soil. Average productivity is low. Average yields are less than 1 cord of wood per acre. The potential for production of posts is poor.

The suitability for livestock grazing on the Jericho and Scalade soils is only fair because of moderate forage production. The suitability for livestock grazing on the Medburn soil is good.

The suitability of the Scalade and Jericho soils for rangeland seeding is very poor. The main limitations are the restricted rooting depth and the available water capacity. The suitability of the Medburn soil for rangeland seeding is poor because of low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

The land capability classification is VIIs, nonirrigated. The range site for the Scalade soil is Semidesert Shallow Hardpan 8-10 Ppt. The woodland site for the Jericho soil is Semidesert Shallow Hardpan (Utah Juniper). The range site for the Medburn soil is Semidesert Loam (Wyoming Big Sagebrush).

**56—Skumpah silt loam, 0 to 2 percent slopes.** This very deep, well drained soil is on lake terraces. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are long and linear. The present vegetation in most areas is shadscale, gray molly, seepweed, and bottlebrush squirreltail. Elevation is 4,200 to 4,700 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is light gray silt loam about 5 inches thick. The upper 9 inches of the subsoil is light yellowish brown, moderately saline silty clay loam, and the lower 14 inches is pale brown silt loam. The substratum to a depth of 60 inches or more is white and light gray silty clay loam. In some areas the surface layer is silty clay loam or fine sandy loam.

Included with this soil in mapping are small areas of the saline Skumpah soils under greasewood, the poorly drained Saltair soils under pickleweed, the loamy Tooele soils on ridges, Playas, the somewhat excessively drained Dynal soils on oolitic dunes, and the somewhat excessively drained Yenrab soils on stabilized sand dunes. Included areas make up 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Skumpah soil. Available water capacity is low or moderate (about 3.5 to 7.0 inches). The water-supplying capacity is 3.0 to 5.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 15 percent perennial grasses, 5 percent forbs, and 80 percent shrubs. Important plant species are shadscale, winterfat, bottlebrush squirreltail, and bud sagebrush.

The suitability for livestock grazing is poor because of low forage production.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

This unit is generally not suited to cropland. A few small areas have been reclaimed and are used for irrigated pasture, alfalfa, or barley, but careful management is necessary. The main limitations are the content of salt and alkali and a lack of available irrigation water.

This unit is poorly suited to roads and to building site development. The main limitations are the shrink-swell potential, low strength, and a slow percolation rate. The effects of shrinking and swelling can be minimized by using proper engineering designs and backfilling with material that has a low shrink-swell potential. On sites for septic tank absorption fields, sandy backfill and longer lines are needed to overcome the slow percolation rate.

The land capability classification is VIIs, nonirrigated. The range site is Desert Flat (Shadscale).

**57—Skumpah silt loam, wet substratum, 0 to 1 percent slopes.** This very deep, well drained soil is in depressional areas on lake terraces. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are medium in length and are linear. The present vegetation in most areas is alkali sacaton and saltgrass. Elevation is 4,200 to 4,300 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is light gray silt loam about 2 inches thick. The upper 7 inches of the subsoil is very pale brown silty clay loam, and the lower 17 inches is light gray silty clay loam. The substratum to a depth of 60 inches or more is white silty clay loam. In some areas the surface layer is fine sandy loam or loam. In other areas the substratum is fine sandy loam or very fine sandy loam. In places the substratum is weakly cemented.

Included with this soil in mapping are small areas of the somewhat excessively drained Yenrab soils on stabilized sand dunes, the somewhat excessively drained Dynal soils on oolitic dunes, the loamy Tooele soils on ridges, the somewhat poorly drained Bramwell soils in depressions under saltgrass, the poorly drained Saltair soils on lake plains under pickleweed, and the saline Skumpah soils in the slightly higher areas under greasewood. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Skumpah soil. Available water capacity is low or moderate (about 4.5 to 7.5 inches). Effective rooting depth is limited by a seasonal high water table at a depth of 3.5 to 5.0 feet from March through July. The content of organic matter in the surface layer is about 0.5 percent to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 70 percent perennial grasses, 10 percent forbs, and 20 percent shrubs. Important plant species are inland saltgrass, alkali sacaton, alkali bluegrass, and basin wildrye.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

This unit is generally not suited to cropland. A few small areas have been reclaimed and are used for irrigated pasture, alfalfa, or barley, but careful management is needed. The main limitations are the content of salt and alkali and a lack of available irrigation water.

This unit is poorly suited to roads and to building site development. The main limitations are wetness, the shrink-swell potential, low strength, and a slow percolation rate. The effects of shrinking and swelling can be minimized by using proper engineering designs and backfilling with material that has a low shrink-swell potential. On sites for septic tank absorption fields, sandy backfill and longer lines are needed to overcome the slow percolation rate.

The land capability classification is VIIs, nonirrigated. The range site is Alkali Bottom (Alkali Sacaton).

**58—Skumpah silt loam, wet substratum, saline, 0 to 1 percent slopes.** This very deep, well drained soil is in depressional areas on lake terraces. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are long and linear. The present vegetation in most areas is sickle saltbush, gray molly, seepweed, and bottlebrush squirreltail. Elevation is 4,200 to 5,050 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is light gray silt loam about 2 inches thick. The upper 7 inches of the subsoil is very pale brown silty clay loam, and the lower 23 inches is very pale brown and light gray, saline silt loam and silty clay loam. The substratum to a depth of 60 inches or more is white silt loam. In some areas the surface layer is silty clay loam. In other areas the underlying material is clay loam.

Included with this soil in mapping are small areas of the nonsaline Skumpah soils under shadscale, the loamy Tooele soils on ridges, the poorly drained Saltair soils on lake plains, the somewhat excessively drained Yenrab soils on stabilized sand dunes, the somewhat excessively drained Dynal soils on oolitic dunes, and barren Playas. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is moderately low in the Skumpah soil. Available water capacity is low or moderate (about 4.5 to 7.5 inches). Effective rooting depth is limited by a seasonal high water table at a depth of 3.5 to 5.0 feet

from March through July. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 10 percent perennial grasses, 10 percent forbs, and 80 percent shrubs. Important plant species are sickle saltbush, gray molly, and bottlebrush squirreltail.

The suitability for livestock grazing is poor because of low forage production.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

This unit is poorly suited to roads and to building site development. The main limitations are wetness, the shrink-swell potential, low strength, and a slow percolation rate. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. On sites for septic tank absorption fields, sandy backfill and longer lines are needed to overcome the slow percolation rate.

The land capability classification is VIIs, nonirrigated. The range site is Desert Salt Flat (Sickle Saltbush).

**59—Skumpah silt loam, saline, 0 to 2 percent slopes.** This very deep, well drained soil is on lake terraces. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are long and linear. The present vegetation in most areas is black greasewood, gray molly, seepweed, and bottlebrush squirreltail. Elevation is 4,200 to 5,050 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is light gray silt loam about 4 inches thick. The upper 7 inches of the subsoil is light yellowish brown clay loam, and the lower 16 inches is white silty clay loam. The substratum to a depth of 60 inches or more also is white silty clay loam. In some areas the surface layer is silty clay loam.

Included with this soil in mapping are small areas of the nonsaline Skumpah soils under shadscale, the loamy Tooele soils on ridges, the poorly drained Saltair soils under pickleweed on lake plains, and Playas. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Skumpah soil. Available water capacity is low or moderate (about 3.5 to 7.0 inches). The water-supplying capacity is 3.0 to 5.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 25 percent perennial grasses, 10 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, bottlebrush squirreltail, alkali sacaton, and seepweed.

The suitability for livestock grazing is poor because of low forage production and the relative unpalatability of the dominant plants.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

This unit is generally not suited to cropland. A few small areas have been reclaimed and are used for irrigated pasture, alfalfa, or barley, but careful management is needed. The main limitations are the content of salt and alkali and a lack of available irrigation water.

This unit is poorly suited to roads and to building site development. The main limitations are the shrink-swell potential, low strength, and a slow percolation rate. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. On sites for septic tank absorption fields, sandy backfill and longer lines are needed to overcome the slow percolation rate.

The land capability classification is VIIs, nonirrigated. The range site is Alkali Flat (Black Greasewood).

**60—Skumpah-Yenrab complex, saline, 0 to 15 percent slopes.** This map unit is on lake plains, lake terraces, and hummocky stabilized sand dunes. Slopes are short and linear on the Skumpah soil and short and convex on the Yenrab soil. The present vegetation on the Skumpah soil is black greasewood, gray molly, seepweed, and bottlebrush squirreltail, and that on the Yenrab soil is cheatgrass, black greasewood, Indian ricegrass, winterfat, and needleandthread. Elevation is 4,200 to 4,400 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit is about 45 percent Skumpah silt loam, saline, 0 to 2 percent slopes, on low lake terraces; 40 percent Yenrab loamy fine sand, saline, 2 to 15 percent slopes, on stabilized sand dunes; and 15 percent other soils and Playas. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Skumpah soil is very deep and is well drained. It

formed in alluvium and lacustrine sediments derived from mixed rock sources. Typically, the surface layer is light gray silt loam about 4 inches thick. The upper 7 inches of the subsoil is light yellowish brown silty clay loam, and the lower 16 inches is white silty clay loam. The substratum to a depth of 60 inches or more also is white silty clay loam. In some areas the surface layer is silty clay loam.

The Yenrab soil is very deep and is somewhat excessively drained. It formed in eolian sands derived from mixed rock sources. Typically, the surface layer is very pale brown loamy fine sand about 5 inches thick. The underlying material to a depth of 60 inches or more is very pale brown fine sand. In some areas the surface layer is fine sand.

Included in mapping are small areas of the loamy Tooele soils adjacent to dunes, the poorly drained Saltair soils under pickleweed, and Playas.

Permeability is moderately slow in the Skumpah soil. Available water capacity is low or moderate (about 3.5 to 7.0 inches). The water-supplying capacity is 3.0 to 5.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

Permeability is rapid in the Yenrab soil. Available water capacity is low (about 3.5 to 4.5 inches). The water-supplying capacity is 2.5 to 4.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 1 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is severe.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Skumpah soil is about 25 percent perennial grasses, 10 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, bottlebrush squirreltail, alkali sacaton, and seepweed.

The potential plant community on the Yenrab soil is about 50 percent perennial grasses, 5 percent forbs, and 45 percent shrubs. Important plant species are Indian ricegrass, fourwing saltbush, alkali sacaton, Douglas rabbitbrush, and black greasewood.

The suitability for livestock grazing on the Skumpah soil is poor because of low forage production and the relative unpalatability of the dominant plants. The suitability for livestock grazing on the Yenrab soil is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site for the Skumpah soil is Alkali Flat (Black Greasewood). The range site for the Yenrab soil is Desert Alkali Sand (Fourwing Saltbush).

**61—Slickens and mine dumps.** Slickens are accumulations of fine textured material, such as material separated in placer mine and ore mill operations. Slickens from ore mills consist largely of freshly ground rock, which commonly has undergone chemical treatment during the milling process. Such material is typically detrimental to plant growth. This unit contains less than 10 percent vegetative cover and has large, deep gullies.

Mine dumps consist mainly of rock fragments removed in mining operations and left in piles. The material commonly contains arsenic and sulfur in amounts high enough to be toxic to plants. These areas support little vegetation and have no agricultural value.

The land capability classification is VIII.

**62—Spager gravelly loam, 2 to 15 percent slopes.** This somewhat excessively drained soil is on fan remnants. It is shallow over a hardpan. It formed in alluvium derived dominantly from limestone. Slopes are long and are linear to convex. The present vegetation in most areas is rabbitbrush, black sagebrush, Indian ricegrass, and bluebunch wheatgrass. Elevation is 5,200 to 6,200 feet. The average annual precipitation is 8 to 12 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 100 to 140 days.

Typically, the surface layer is pale brown gravelly loam about 3 inches thick. The subsoil is very pale brown very gravelly loam about 11 inches thick. A carbonate-cemented hardpan is between the depths of 14 and 20 inches. The underlying material to a depth of 60 inches or more is stratified very gravelly sandy loam, very gravelly loamy sand, and carbonate-cemented hardpan. In some areas the surface layer is stony loam or very gravelly loam. In other areas the hardpan is below a depth of 20 inches. In a few places slopes are more than 15 percent.

Included with this soil in mapping are small areas of the very deep Hiko Peak soils along drainageways under Wyoming big sagebrush and the shallow Amtoft soils under black sagebrush. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Spager soil. Available water capacity is very low (about 1 to 2 inches). The water-supplying capacity is 2 to 4 inches. Effective rooting depth is limited by the hardpan at a depth of 10 to 20 inches. The content of organic matter in the surface layer is 1 to 2 percent. Runoff is rapid, and the hazard of water erosion is moderate. The

hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 45 percent perennial grasses, 10 percent forbs, and 45 percent shrubs. Important plant species are black sagebrush, Indian ricegrass, needleandthread, and bottlebrush squirreltail.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitations are the available water capacity and the restricted rooting depth. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

The land capability classification is VIIs, nonirrigated. The range site is Semidesert Shallow Hardpan 8-10 Ppt.

**63—Springmeyer gravelly sandy loam, 3 to 7 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from granite. Slopes are short and convex. The present vegetation in most areas is mountain big sagebrush, Nevada bluegrass, and Douglas rabbitbrush. Elevation is 5,900 to 6,500 feet. The average annual precipitation is 12 to 14 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is grayish brown and dark grayish brown gravelly sandy loam about 14 inches thick. The upper 15 inches of the subsoil is brown and light brown gravelly sandy clay loam, and the lower 13 inches is light brown very gravelly sandy loam. The substratum to a depth of 60 inches or more is light yellowish brown and yellowish brown very gravelly loamy sand. In some areas the surface layer is gravelly loam.

Included with this soil in mapping are small areas of the loamy Doyce soils on the lower fan remnants, the very stony Holmes soils on ridges and the upper fan remnants, and the loamy Birdow soils in drainageways. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Springmeyer soil. Available water capacity is low or moderate (about 4.0 to 5.5 inches). The water-supplying capacity is 6.5 to 8.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 5 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used for rangeland, pasture, or wildlife habitat. It has potential for use as irrigated cropland.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are bluebunch wheatgrass, mountain big sagebrush, bluegrass, and antelope bitterbrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitations are low precipitation and rock fragments. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

The land capability classification is VIs, nonirrigated. The range site is Upland Gravelly Loam (Mountain Big Sagebrush).

**64—Taylorsflat loam, 1 to 5 percent slopes.** This very deep, well drained soil is on lake terraces and fan remnants. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are medium in length and are linear to convex. The present vegetation in most areas is Wyoming big sagebrush, Indian ricegrass, and cheatgrass. Elevation is 5,000 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 110 to 140 days.

Typically, the surface layer is pale brown loam about 4 inches thick. The upper 5 inches of the subsoil is light yellowish brown loam. The lower 42 inches is very pale brown loam. The substratum to a depth of 60 inches or more also is very pale brown loam. In some areas the surface layer is silt loam or sandy loam. In places gravelly textures are below a depth of 40 inches.

Included with this soil in mapping are small areas of the gravelly Hiko Peak soils in landscape positions similar to those of the Taylorsflat soil, Spager soils on ridges, and the loamy Birdow soils in drainageways. Spager soils are shallow to a hardpan. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Taylorsflat soil. Available water capacity is moderate or high (about 6.5 to 9.5 inches). The water-supplying capacity is 8 to 10 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is about 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used for rangeland, wildlife habitat, building site development, irrigated alfalfa, irrigated barley, or irrigated pasture.

The potential plant community is about 50 percent

perennial grasses, 15 percent forbs, and 35 percent shrubs. Important plant species are bluebunch wheatgrass, Wyoming big sagebrush, Indian ricegrass, and bottlebrush squirreltail.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is fair. The main limitation is low precipitation. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding drought-tolerant species.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, furrow, and controlled flooding. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low precipitation.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

If this unit is used for roads or for building site development, the main limitations are a slow percolation rate and the potential for frost action.

The land capability classification is IIIs, irrigated, and VIs, nonirrigated. The range site is Semidesert Loam (Wyoming Big Sagebrush).

**65—Taylorsflat loam, saline, 0 to 3 percent slopes.** This very deep, well drained soil is on lake terraces and fan remnants. It formed in alluvium and lacustrine sediments derived from mixed rock sources. Slopes are medium in length and are linear or slightly convex. The present vegetation in most areas is black greasewood, cheatgrass, shadscale, and Indian ricegrass. Elevation is 4,300 to 5,300 feet. The average annual precipitation is 10 to 12 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 110 to 140 days.

Typically, the surface layer is pale brown loam about 3 inches thick. The upper 6 inches of the subsoil is light yellowish brown loam, and the lower 38 inches is very pale brown loam. The substratum to a depth of 60 inches or more is pale brown loam. In some areas the surface layer is silt loam. In some places the soil is silt loam throughout. In other places gravelly textures are below a depth of 40 inches.

Included with this soil in mapping are small areas of the nonsaline Taylorsflat soils under Wyoming big sagebrush, the gravelly Hiko Peak soils on ridges under Wyoming big sagebrush, and Spager soils on ridges under black sagebrush. Spager soils are shallow to a hardpan. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Taylorsflat soil. Available water capacity is moderate or high (about 6.5 to 9.0 inches). The water-supplying capacity is 8 to 10 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is about 1 to 2 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used for rangeland (fig. 18), wildlife habitat, building site development, irrigated alfalfa, irrigated barley, or irrigated pasture.

The potential plant community is about 30 percent perennial grasses, 15 percent forbs, and 55 percent shrubs. Important plant species are black greasewood, Wyoming big sagebrush, bottlebrush squirreltail, and Indian ricegrass.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitation is the content of salt and alkali. The suitability for seeding can be improved by removing competing vegetation prior to seeding, by seeding prior to periods of high soil moisture, and by seeding adapted species.

This soil is suited to irrigated crops if the content of salt and alkali is reduced by incorporating a minimum leaching program. Suitable crops are small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, furrow, and controlled flooding. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low precipitation.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

If this unit is used for roads or for building site development, the main limitations are a slow percolation rate and the potential for frost action. Maintaining drainage channels helps to control spring runoff.

The land capability classification is IVs, irrigated, and VIs, nonirrigated. The range site is Semidesert Alkali Loam (Black Greasewood).

**65A—Theriot-Rock outcrop complex, 15 to 70 percent slopes.** This map unit is on mountainsides and hillsides. Slopes are short and convex. The present vegetation in most areas is shadscale, spiny horsebrush, galleta, and Indian ricegrass. Elevation is

**Figure 18.—Rangeland in an area of Taylorsflat loam, saline, 0 to 3 percent slopes, in Rush Valley. South Mountain and the Oquirrh Mountains are in the background.**

4,250 to 6,300 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 50 to 52 degrees F, and the average frost-free period is 150 to 170 days.

This unit is about 70 percent Theriot very stony loam, 15 to 70 percent slopes; 15 percent Rock outcrop; and 15 percent other soils. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Theriot soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from limestone. Typically, the surface layer is light brownish gray very stony loam about 3 inches thick. The underlying material is very pale brown very cobbly loam. Fractured limestone bedrock is at a depth of about 14 inches. In some areas the soil is extremely stony loam or extremely cobbly loam throughout.

Rock outcrop consists of exposures of barren limestone, mainly on escarpments and ridges.

Included in mapping are small areas of the shallow Amtoft soils on the upper slopes under Utah juniper, the very deep Hiko Peak soils on the upper fan remnants

and in drainageways, Spager soils on high fan remnants, and the very deep Cliffdown and Izamatch soils on low fan remnants. Spager soils are shallow to a hardpan.

Permeability is moderate in the Theriot soil. Available water capacity to a depth of 16 inches is very low (about 0.5 inch to 1.0 inch). The water-supplying capacity is 1 to 2 inches. Effective rooting depth is 10 to 20 inches. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is very rapid, and the hazard of water erosion is severe. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Theriot soil is about 30 percent perennial grasses, 10 percent forbs, and 60 percent shrubs. Important plant species are shadscale, galleta, bud sagebrush, and Indian ricegrass.

The suitability for livestock grazing is poor because of low forage production and the slope.

The suitability of the Theriot soil for rangeland seeding is very poor. The main limitations are the slope, the restricted rooting depth, rock fragments, and the available water capacity. Seeding is not recommended.

This unit is poorly suited to roads and to building site development. The main limitations are the slope and the depth to bedrock.

The land capability classification of the Theriot soil is VIIs, nonirrigated. The range site is Desert Shallow Loam (Shadscale). The land capability classification of the Rock outcrop is VIII. No range site is assigned for the Rock outcrop.

**66—Timpie silt loam, 0 to 3 percent slopes.** This very deep, well drained soil is on lake terraces and fan remnants. It formed in lacustrine sediments and alluvium derived dominantly from limestone and quartzite. Slopes are long and are linear or slightly convex. The present vegetation in most areas is shadscale, cheatgrass, gray molly, bud sagebrush, and bottlebrush squirreltail. Elevation is 4,300 to 5,300 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 47 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is pale brown silt loam about 5 inches thick. The subsoil is very pale brown silt loam about 9 inches thick. The underlying material to a depth of 60 inches or more also is very pale brown silt loam. In some areas the surface layer is fine sandy loam or loam.

Included with this soil in mapping are small areas of the gravelly Cliffdown soils along drainageways, silty soils in depressional areas under winterfat, the somewhat excessively drained Yenrab soils on stabilized sand dunes, the saline Skumpah soils on the lower lake terraces, and the saline Timpie soils under greasewood. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Timpie soil. Available water capacity is low or moderate (about 4 to 7 inches). The water-supplying capacity is 3.0 to 5.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used mainly as rangeland or for wildlife habitat. Some small areas are used for irrigated alfalfa, irrigated barley, or irrigated pasture.

The potential plant community is about 35 percent perennial grasses, 15 percent forbs, and 50 percent shrubs. Important plant species are shadscale, Indian ricegrass, bud sagebrush, winterfat, and bottlebrush squirreltail.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitation is low precipitation. Seeding is generally not recommended.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, furrow, and controlled flooding. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low precipitation.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

The land capability classification is IVs, irrigated, and VIIs, nonirrigated. The range site is Desert Loam (Shadscale).

**67—Timpie silt loam, saline, 0 to 4 percent slopes.** This very deep, well drained soil is on fan remnants and lake terraces. It formed in alluvium and lacustrine sediments derived dominantly from limestone and quartzite. Slopes are short or medium in length and are linear or slightly convex. The present vegetation in most areas is black greasewood, shadscale, cheatgrass, gray molly, and trident saltbush. Elevation is 4,200 to 4,500 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 47 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is pale brown silt loam about 3 inches thick. The subsoil is very pale brown silt loam about 18 inches thick. The underlying material to a depth of 60 inches or more also is very pale brown silt loam. In some areas the surface layer is fine sandy loam or loam.

Included with this soil in mapping are small areas of the saline Skumpah soils on the lower lake terraces, the gravelly Cliffdown soils along drainageways, the somewhat excessively drained Yenrab soils on stabilized sand dunes, and the nonsaline Timpie soils under shadscale. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Timpie soil. Available water capacity is low or moderate (about 4 to 7 inches). The water-supplying capacity is 3.0 to 5.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used mainly as rangeland or for wildlife habitat. Some small areas are used for irrigated alfalfa, irrigated barley, or irrigated pasture.

The potential plant community is about 25 percent perennial grasses, 10 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, bottlebrush squirreltail, alkali sacaton, and seepweed.

The suitability for livestock grazing is poor because of low forage production and the relative unpalatability of the dominant plants.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

This soil is suited to irrigated crops if the content of salt and alkali is reduced by incorporating a minimum leaching program. Suitable crops are small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, furrow, and controlled flooding. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low precipitation.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

The land capability classification is IVs, irrigated, and VIIs, nonirrigated. The range site is Alkali Flat (Black Greasewood).

**68—Timpie-Tooele complex, saline, 0 to 5 percent slopes.** This map unit is on lake terraces. Slopes are medium in length and are linear to convex. The present vegetation in most areas is black greasewood, shadscale, cheatgrass, gray molly, and trident saltbush. Elevation is 4,200 to 4,500 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 47 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit is about 60 percent Timpie silt loam, saline, 0 to 4 percent slopes, in linear positions; 25 percent Tooele fine sandy loam, saline, 0 to 5 percent slopes, in convex positions; and 15 percent other soils. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Timpie soil is very deep and is well drained. It formed in lacustrine sediments and alluvium derived dominantly from limestone and quartzite. Typically, the surface layer is pale brown silt loam about 3 inches thick. The subsoil is very pale brown silt loam about 18 inches thick. The underlying material to a depth of 60 inches or more also is very pale brown silt loam. In some areas the surface layer is very fine sandy loam or loam.

The Tooele soil is very deep and is well drained. It formed in eolian material, lacustrine sediments, and alluvium derived from mixed rock sources. Typically, the surface layer is pale brown fine sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is very pale brown fine sandy loam. In some areas the surface layer is sandy loam or loam. In other areas gravelly or sandy layers are below a depth of 30 inches.

Included in mapping are small areas of the somewhat excessively drained Yenrab soils on stabilized sand dunes and the gravelly Izamatch soils on ridges.

Permeability is moderately slow in the Timpie soil. Available water capacity is low or moderate (about 4 to 7 inches). The water-supplying capacity is 3.0 to 5.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

Permeability is moderately rapid in the Tooele soil. Available water capacity is low (about 3.0 to 5.5 inches). The water-supplying capacity is 3 to 5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 25 percent perennial grasses, 10 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, bottlebrush squirreltail, alkali sacaton, and seepweed.

The suitability for livestock grazing is poor because of low forage production and the relative unpalatability of the dominant plants.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site is Alkali Flat (Black Greasewood).

**69—Tooele fine sandy loam, 0 to 5 percent slopes.** This very deep, well drained soil is on lake terraces and fan remnants. It formed in eolian material, lacustrine sediments, and alluvium derived from mixed rock sources. Slopes are long and are linear or slightly convex. The present vegetation in most areas is shadscale, cheatgrass, Indian ricegrass, and horsebrush. Elevation is 4,300 to 6,000 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is pale brown and very pale brown fine sandy loam about 9 inches thick. The upper part of the underlying material is very pale brown fine sandy loam about 33 inches thick. The lower part to a depth of 60 inches or more is very pale brown fine sand. In some areas the surface layer is silt loam or loam. In other areas the soil is very fine sandy loam or fine sandy loam throughout.

Included with this soil in mapping are small areas of the somewhat excessively drained Yenrab soils on stabilized sand dunes, silty soils in depressional areas under winterfat, the gravelly Cliffdown soils on ridges and along drainageways, and the silty Timpie soils on the lower fan remnants under shadscale. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Tooele soil. Available water capacity is moderate (about 5.0 to 6.5 inches). The water-supplying capacity is 3.5 to 5.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used mainly as rangeland or for wildlife habitat. Some small areas are used for irrigated alfalfa, irrigated barley, or irrigated pasture.

The potential plant community is about 35 percent perennial grasses, 15 percent forbs, and 50 percent shrubs. Important plant species are shadscale, Indian ricegrass, bud sagebrush, bottlebrush squirreltail, and winterfat.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitation is low precipitation. Seeding is generally not recommended.

This soil is suited to irrigated crops of small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, furrow, and controlled flooding. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low precipitation.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

The land capability classification is IVs, irrigated, and VIIs, nonirrigated. The range site is Desert Loam (Shadscale).

**70—Tooele fine sandy loam, saline, 0 to 5 percent slopes.** This very deep, well drained soil is on lake terraces and fan remnants. It formed in eolian material, lacustrine sediments, and alluvium derived from mixed rock sources. Slopes are long and are linear or slightly convex. The present vegetation in most areas is black greasewood, cheatgrass, gray molly, and shadscale. Elevation is 4,200 to 5,000 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 50 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is pale brown fine sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is very pale brown fine sandy loam. In some areas the surface layer is silt loam, very fine sandy loam, or loam. In other areas gravelly or sandy layers are below a depth of 30 inches.

Included with this soil in mapping are small areas of the nonsaline Tooele soils under shadscale, the silty Skumpah soils on low lake terraces, Yenrab soils on stabilized sand dunes, and the gravelly Cliffdown soils on ridges. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Tooele soil. Available water capacity is low (about 3.0 to 5.5 inches). The water-supplying capacity is 3 to 5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water

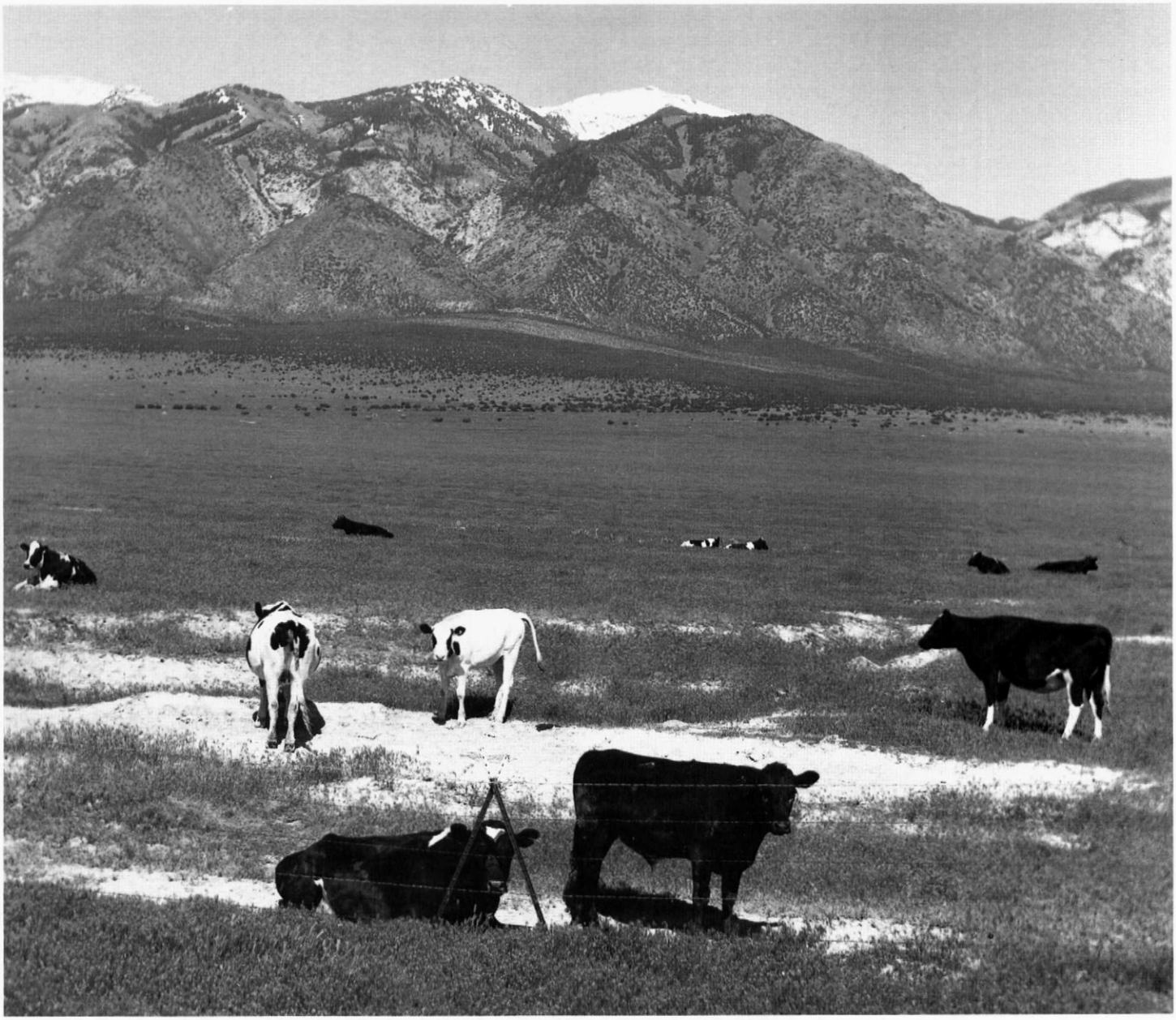


**Figure 19.—An area of Tooele fine sandy loam, saline, 0 to 5 percent slopes, used as rangeland. The Stansbury Mountains are in the background.**

erosion is slight. The hazard of wind erosion is moderate.

This unit is used mainly as rangeland (fig. 19) or for wildlife habitat. Some small areas are used for irrigated alfalfa, irrigated barley, or irrigated pasture.

The potential plant community is about 25 percent perennial grasses, 10 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, bottlebrush squirreltail, alkali sacaton, and seepweed.

The suitability for livestock grazing is poor because of low forage production and the relative unpalatability of the dominant plants.

The suitability for rangeland seeding is very poor. The main limitations are low precipitation and the content of salt and alkali. Seeding is generally not recommended.

This soil is suited to irrigated crops if the content of salt and alkali is reduced by incorporating a minimum

leaching program. Suitable crops are small grain, alfalfa hay, corn silage, and pasture. The suitable irrigation systems are wheel line or handline sprinklers, center pivot, furrow, and controlled flooding. The design of irrigation systems should not exceed the intake rate of the soil. Keeping crop residue on the surface and using a conservation tillage system help to control wind erosion and water erosion. This soil is not suited to nonirrigated crops because of low annual precipitation.

If good management practices are applied, irrigated alfalfa can yield about 6 tons per acre, irrigated barley can yield about 80 bushels per acre, and irrigated pasture can yield about 7 animal unit months per acre.

The land capability classification is IVs, irrigated, and VIIs, nonirrigated. The range site is Alkali Flat (Black Greasewood).

**71—Yeates Hollow cobbly loam, 6 to 20 percent slopes.** This very deep, well drained soil is on fan remnants. It formed in alluvium derived dominantly from quartzite and sandstone. Slopes are medium in length and are convex. The present vegetation in most areas is bluebunch wheatgrass, basin wildrye, rabbitbrush, mulesear dock, and mountain big sagebrush. Elevation is 6,400 to 8,000 feet. The average annual precipitation is 16 to 20 inches, the mean annual air temperature is 38 to 45 degrees F, and the average frost-free period is 80 to 110 days.

Typically, the surface layer is brown cobbly loam about 12 inches thick. The subsoil is brown and light brown very cobbly clay loam about 32 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown extremely cobbly sandy clay loam. In some areas the surface layer is loam, gravelly loam, very cobbly loam, or stony loam. In other areas, the upper part of the subsoil is gravelly clay loam or cobbly clay loam and the lower part is extremely gravelly loam, extremely cobbly loam, or extremely cobbly sandy loam.

Included with this soil in mapping are small areas of the moderately deep Broad soils on the steeper slopes under Gambel oak, the very cobbly Kapod soils on ridges under juniper and pinyon trees, and very deep, loamy soils in drainageways under bigtooth maple, chokecherry, and willows. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is slow in the Yeates Hollow soil. Available water capacity is moderate (about 5.0 to 6.5 inches). The water-supplying capacity is 9 to 12 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 5 percent. Runoff is medium, and the hazard of water erosion is slight. The hazard of wind erosion also is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 45 percent perennial grasses, 10 percent forbs, and 45 percent shrubs. Important plant species are bluebunch wheatgrass, birchleaf mountainmahogany, bluegrass, and mountain big sagebrush.

The suitability for livestock grazing is good.

The suitability for rangeland seeding is poor. Because of the slope and the rock fragments in the surface layer, the use of specialized equipment is necessary.

The land capability classification is IVe, nonirrigated. The range site is Mountain Gravelly Loam (Mountain Big Sagebrush).

**72—Yeates Hollow very cobbly loam, 6 to 40 percent slopes.** This very deep, well drained soil is on dissected fan remnants. It formed in alluvium derived dominantly from quartzite and sandstone. Slopes are medium in length and are convex. The present vegetation in most areas is bluebunch wheatgrass, low sagebrush, and bluegrass. Elevation is 5,400 to 7,600 feet. The average annual precipitation is 14 to 16 inches, the mean annual air temperature is 38 to 45 degrees F, and the average frost-free period is 80 to 100 days.

Typically, the surface layer is very dark grayish brown very cobbly loam about 12 inches thick. The subsoil is brown very cobbly clay loam about 26 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown extremely cobbly sandy clay loam. In some areas the surface layer is very stony loam or very gravelly loam.

Included with this soil in mapping are small areas of the very stony Holmes soils on ridges, the gravelly Springmeyer soils in drainageways, Borvant soils on the lower fan remnants, and the moderately deep Podmor soils on mountainsides. Borvant soils are shallow to a hardpan. Included soils make up about 10 percent of the total acreage of this unit.

Permeability is slow in the Yeates Hollow soil. Available water capacity is low or moderate (about 4 to 6 inches). The water-supplying capacity is 7.5 to 9.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 2 to 5 percent. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of wind erosion is slight.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 50 percent perennial grasses, 10 percent forbs, and 40 percent shrubs. Important plant species are low sagebrush, bluegrass, needlegrass, and bluebunch wheatgrass.

The suitability for livestock grazing is only fair because of moderate forage production and the slope.

The suitability for rangeland seeding is poor. Because of the rock fragments in the surface layer and the slope, the use of specialized equipment is necessary.

The land capability classification is VIe, nonirrigated. The range site is Upland Claypan (Low Sagebrush).

**73—Yenrab fine sand, 2 to 15 percent slopes.** This very deep, somewhat excessively drained soil is on hummocky stabilized sand dunes on lake terraces, fan remnants, and lake plains. It formed in eolian sands derived from mixed rock sources. Slopes are short and are convex to concave. The present vegetation in most areas is Indian ricegrass, fourwing saltbush, rabbitbrush, and winterfat. Elevation is 4,400 to 4,900 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

Typically, the surface layer is pale brown fine sand about 15 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown fine sand. In some areas the surface layer is loamy fine sand.

Included with this soil in mapping are small areas of the gravelly Izamatch soils on lake terraces, the loamy Tooele soils on lake terraces, and areas of Playas and Dune land. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is rapid in the Yenrab soil. Available water capacity is low (about 3.0 to 4.5 inches). The water-supplying capacity is 2.5 to 4.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 1 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is very severe.

This unit is used as rangeland or for wildlife habitat.

The potential plant community is about 40 percent perennial grasses, 10 percent forbs, and 50 percent shrubs. Important plant species are Indian ricegrass, fourwing saltbush, winterfat, and Mormon tea.

The suitability for livestock grazing is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitations are the texture of the surface layer and the low precipitation. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site is Desert Sand (Fourwing Saltbush).

**74—Yenrab-Badlands complex, 2 to 15 percent slopes.** This map unit is on hummocky stabilized sand dunes and lake terraces. Slopes are short and are convex to concave. The present vegetation in most areas of the Yenrab soil is mainly Indian ricegrass, fourwing saltbush, rabbitbrush, and winterfat. Badlands are mostly barren. Elevation is 4,200 to 5,000 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit is about 60 percent Yenrab fine sand, 2 to 15 percent slopes, on stabilized sand dunes; 25 percent Badlands; and 15 percent other soils, Playas, and Dune land. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Yenrab soil is very deep and is somewhat excessively drained. It formed in eolian sands derived from mixed rock sources. Typically, the surface layer is pale brown fine sand about 15 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown fine sand. In some areas the surface layer is loamy fine sand.

Badlands are gently sloping to moderately steep, mostly barren areas dissected by many intermittent drainage channels. They are derived from salty lacustrine deposits of stratified very fine sand, silt, and clay. Runoff is rapid, and the hazard of water erosion is severe. The hazard of wind erosion is moderate or severe.

Included in mapping are small areas of the loamy Tooele soils on lake terraces, the gravelly Izamatch soils on lake terraces, and areas of Playas and Dune land.

Permeability is rapid in the Yenrab soil. Available water capacity is low (about 3.0 to 4.5 inches). The water-supplying capacity is 2.5 to 4.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 1 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is very severe.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Yenrab soil is about 40 percent perennial grasses, 10 percent forbs, and 50 percent shrubs. Important plant species are Indian ricegrass, fourwing saltbush, winterfat, and Mormon tea.

The suitability for livestock grazing on the Yenrab soil is only fair because of moderate forage production.

The suitability for rangeland seeding is very poor. The main limitations are the low precipitation and the texture of the surface layer. Seeding is generally not recommended.

The land capability classification of the Yenrab soil is VIIs, nonirrigated. The range site is Desert Sand (Fourwing Saltbush). The land capability classification of

the Badlands is VIII. No range site is assigned for the Badlands.

**75—Yenrab-Tooele complex, saline, 0 to 15 percent slopes.** This map unit is on stabilized sand dunes and lake terraces. Slopes are short and are convex to concave on the Yenrab soil. They are long and are linear or slightly convex on the Tooele soil. The present vegetation on the Yenrab soil is cheatgrass, black greasewood, Indian ricegrass, winterfat, and needleandthread. The present vegetation on the Tooele soil is black greasewood, cheatgrass, gray molly, and shadscale. Elevation is 4,300 to 4,700 feet. The average annual precipitation is 6 to 8 inches, the mean annual air temperature is 45 to 52 degrees F, and the average frost-free period is 120 to 160 days.

This unit is about 50 percent Yenrab loamy fine sand, saline, 2 to 15 percent slopes, on stabilized sand dunes; 35 percent Tooele fine sandy loam, saline, 0 to 5 percent slopes, on lake terraces; and 15 percent other soils and Dune land. The components of the unit are so intricately intermingled that it was not practical to map them separately at the scale used.

The Yenrab soil is very deep and is somewhat excessively drained. It formed in eolian sands derived from mixed rock sources. Typically, the surface layer is very pale brown loamy fine sand about 5 inches thick. The underlying material to a depth of 60 inches or more is very pale brown fine sand. In some areas the surface layer is fine sand.

The Tooele soil is very deep and is well drained. It formed in eolian material, lacustrine sediments, and alluvium derived from mixed rock sources. Typically, the surface layer is pale brown fine sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is very pale brown fine sandy loam. In some areas the surface layer is silt loam, very fine sandy loam, or loam. In other areas gravelly or sandy layers are below a depth of 30 inches.

Included in mapping are small areas of the loamy Tooele soils under shadscale, the gravelly Cliffdown soils, the somewhat excessively drained Berent soils on stabilized sand dunes under Utah juniper, and areas of Dune land.

Permeability is rapid in the Yenrab soil. Available water capacity is low (about 3.0 to 4.5 inches). The water-supplying capacity is 2.5 to 4.5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is less than 1 percent. Runoff is very slow, and the hazard of water erosion is slight. The hazard of wind erosion is severe.

Permeability is moderately rapid in the Tooele soil. Available water capacity is low (about 3.0 to 5.5 inches). The water-supplying capacity is 3 to 5 inches. Effective rooting depth is 60 inches or more. The content of organic matter in the surface layer is 0.5 to 1.0 percent. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is moderate.

This unit is used as rangeland or for wildlife habitat.

The potential plant community on the Yenrab soil is about 50 percent perennial grasses, 5 percent forbs, and 45 percent shrubs. Important plant species are Indian ricegrass, fourwing saltbush, Douglas rabbitbrush, alkali sacaton, and black greasewood.

The potential plant community on the Tooele soil is about 25 percent perennial grasses, 10 percent forbs, and 65 percent shrubs. Important plant species are black greasewood, bottlebrush squirreltail, seepweed, and alkali sacaton.

The suitability for livestock grazing on the Yenrab soil is only fair because of moderate forage production. The suitability for livestock grazing on the Tooele soil is poor because of low forage production and the relative unpalatability of the dominant plants.

The suitability for rangeland seeding is very poor. The main limitation is low precipitation. The content of salt and alkali is a limitation on the Tooele soil. Seeding is generally not recommended.

The land capability classification is VIIs, nonirrigated. The range site for the Yenrab soil is Desert Alkali Sand (Fourwing Saltbush). The range site for the Tooele soil is Alkali Flat (Black Greasewood).

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