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 Soil Conservation Service or the Cooperative Extension Service.

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Soil Survey of
Cassia County, Idaho, Eastern Part

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United States Department of Agriculture, Soil Conservation Service, in cooperation with
the United States Department of the Interior, Bureau of Land Management; the Idaho Soil Conservation Commission; and the University of Idaho, College of Agriculture

The survey area is in the extreme south-central part of Idaho (fig. 1). It is bounded on the east by Power and Oneida Counties, on the north by the Snake River and Power County, and on the west by the Albion Mountains and Twin Falls County. The total area is about 868,685 acres, or 1,357 square miles. Elevation ranges from about 4,200 feet above sea level at Lake Walcott to about 8,400 feet at the top of Middle Mountain.

A dominant feature of the survey area is the Raft River valley, which extends north from the Utah border to the Snake River. Other smaller valleys, including the Albion, Elba, Almo, and Junction Valleys, occur between the mountain ranges. The Sublett, Albion, Cotterel, Cassia, Black Pine, and Jimsage Mountains constitute the major topographic relief.

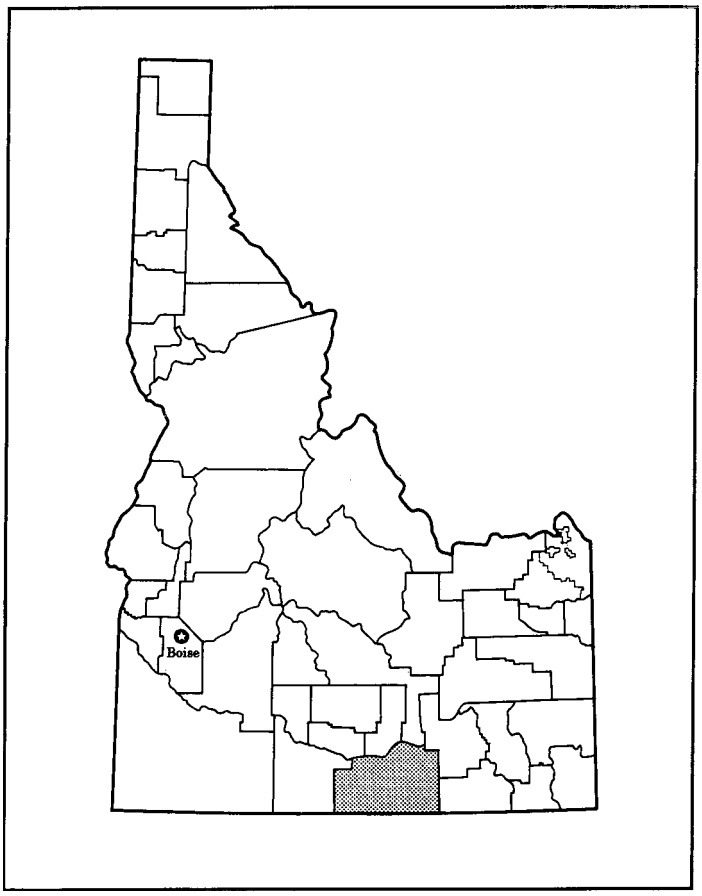

Figure 1.-Location of Cassia County in Idaho.

General Nature of the Survey Area

This section gives general information about the survey area. It describes history and development, water supply, and climate.

History and Development

Cassia County is known as the "crosstrails of the pioneers" because the California and Oregon Trails meet in this area. In the early 1800's, explorers and trappers recorded the history of the area in their journals.

The first known exploration of the survey area was in 1805 by Lewis and Clark. In 1811, trappers from the Pacific Fur Company came to the area. Traders from the Hudson Bay Company trapped the area in the mid-1820's. Early accounts report plentiful game, including elk, buffalo, deer, and beaver. Indians from the Snake, Bannock, Blackfeet, and Nez Perce tribes hunted the area but established no permanent settlements.

Early settlement of the survey area corresponded to an increase in traffic on the Oregon and California Trails and the completion of the transcontinental railroad in 1869. Cattlemen arrived in the Raft River area in 1868. Sheepherders and farmers followed. In the 1870's, Mormon settlers moved north from the Salt Lake area and brought their knowledge of irrigation to the survey area.

Cattle raising was the main enterprise until about 1900, when sheep raising became more popular. The Raft River area became popular as a place in the West to winter sheep.

Cassia County was established on February 20, 1879. It was originally part of Owyhee County. Albion was the first county seat. The first college in southern Idaho, established in 1894, was located in Albion. Burley is now the county seat.

A mechanical system of irrigation was first used in about 1888. Irrigation water was lifted from the Snake River by water wheels. In 1910, the Sublett Reservoir was built. Most irrigation water in the survey area comes from wells, some as deep as 1,000 feet.

The East Cassia Soil Conservation District was formed in 1956 in order to promote better farming and the conservation of soil and water resources.

Water Supply

Water used for irrigation in the survey area is principally supplied by deep wells. These wells generally range from 150 to 600 feet in dept, and the water generally is raised 60 to 150 feet. Approximately 68 percent, or 72,600 acres, of the irrigated cropland in the survey area is sprinkler irrigated with well supplies. Most of this land is irrigated by center-pivot sprinkler systems.

The principal supply of surface water comes from the winter snowpack in the upper watersheds of the Raft River, Cassia Creek, Marsh Creek, Goose Creek, and Sublett Creek drainageways. Approximately 27 percent, or 28,400 acres, of the irrigated cropland is irrigated with surface water. Supplies of surface water are reduced during the warm, dry summer months. During these months, farmers that hold the most recent water rights are restricted from water supplies while those with the oldest rights are allowed full supplies. In years of low snowpack, many creeks and streams become completely dry in late summer and early fall.

The survey area has five bodies of water that are used for various purposes. These bodies of water are Lake Walcott, Sublett Reservoir, Lake Cleveland, Independence Lakes, and the upper portion of Lower Goose Creek Reservoir. Their uses include storage of irrigation water, flood control, recreation, fish and wildlife habitat, and power generation. Lake Cleveland and Independence Lakes are located in the Sawtooth National Forest.

The survey area has approximately 12 organized irrigation districts, companies, or associations, which distribute surface water from the various creeks, rivers, and streams.

The State Department of Water Resources has identified a critical ground-water area in the Raft River valley. The area starts at the port of entry and extends south to the Utah border. Permits for the development of new wells in this area are closely scrutinized by the Department of Water Resources.

Another important ground-water resource in the survey area is the natural, hot water wells located near Bridge. The United States Department of Energy has been experimenting with different methods of utilizing this geothermal water for the production of electrical power. The research facility is currently closed; however, the information and data obtained is being used for other purposes.

Climate

The climatic data presented in the following section was recorded at Malta, Idaho. This is the only complete weather data available. It is not entirely representative of the weather patterns in the survey area. Differences are described at the end of this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded in the period 1963 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 29 degrees F and the average daily minimum temperature is 10 degrees. The lowest temperature on record, which occurred at Malta on December 11, 1972, is -27 degrees. In summer, the average temperature is 60 degrees and the average daily maximum temperature is 85 degrees. The highest recorded temperature, which occurred at Malta on July 7, 1975, is 104 degrees.

Growing degree days are shown in table 3. 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.

The total annual precipitation is about 11 inches. Of this, 7 inches, or about 60 percent, usually falls it April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 4 inches. The heaviest 1-day rainfall during the period of record was 1.85 inches at Malta on August 23, 1965. Thunderstorms occur on about 23 days each year.

The average seasonal snowfall is about 18 inches. The greatest snow depth at any one time during the period of record was 10 inches. On an average of 18 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 70 percent. The sun shines 80 percent of the time possible in summer and 40 percent in winter. The prevailing wind is from the southeast. Average windspeed is highest, 12 miles per hour, in spring.

Malta is located at the base of the Cotterel Mountains and is about 15 miles east of the Albion Mountains. Due to its location, Malta receives more precipitation than the more central parts of the Rat River valley. A pronounced rainshadow affects the central part of the valley, making it very dry. On the far eastern side of the valley, the average annual precipitation increases because air masses are pushed up by the Sublett and Black Pine Mountains. Because of this orographic effect, dryland farming is possible on the less sloping areas of the mountains.

To the west of Malta lie a series of mountain ranges. These include the Cotterel, Albion, and Jimsage Mountains, Middle Mountain, and the Cassia Mountains, known locally as the South Hills. These mountains greatly influence the weather in the survey area. Because of their high average elevations, the average annual air temperature is lower than that at Malta and the average annual precipitation is higher. For example, Albion, which is located about 10 miles northwest of Malta on the east side of the Albion Mountains, has an average annual precipitation of about 14 inches. Generally, the average annual precipitation ranges from 12 to 16 inches throughout the mountains at elevations below about 6,000 feet. Above 6,000 feet, it can range from 14 to more than 20 inches.

The mountains also have a major affect on the average annual temperature of the Raft River valley. The northern part of the valley has generally westerly to northwesterly winds that come off the Snake River plain. In contrast, the southern part of the valley has westerly to southwesterly winds that originate in Utah and Nevada. This southerly air flow increases average annual temperatures, even though elevations increase from 4,200 feet at the northern end of the valley to 5,200 feet at the Utah border.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; 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 are 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 or 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 they 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.

Individual soils on the landscape commonly merge into one another as their characteristics gradually change. To construct an accurate 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 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. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties End 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 and 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 predict 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 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 at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. 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 map units in this survey have been grouped for broad interpretive purposes. Each of the broad groups and the map units in each group are described on the following pages.

Map Unit Descriptions

Nearly Level to Moderately Sloping, Well Drained and Somewhat Excessively Drained, Shallow, Moderately Deep, and Very Deep Soils on Basalt Plains

Number of general soil map units: 3
Percentage of survey area: 10

1. Davey-Trevino-Vining

Shallow, moderately deep, and very deep, well drained and somewhat excessively drained, nearly level to moderately sloping soils that formed in mixed alluvium and sandy eolian material

Percentage of survey area: 1
Landscape position: River terraces, basalt plains
Elevation: 4,200 to 4,500 feet
Frost-free period: 125 to 135 days
Average annual precipitation: 8 to 12 inches
Minor components: Rock outcrop, small areas of wet soils bordering Lake Walcott
Present uses: Wildlife refuge, rangeland
Limitations: Rock outcrop, depth to bedrock, low available water capacity, low precipitation during the growing season

2. Scoon-Taunton-Somsen

Shallow and moderately deep, well drained, nearly level to moderately sloping soils that formed in mixed alluvium and eolian material

Percentage of survey area: 7
Landscape position: Basalt plains, fan terraces (fig. *2)*
Elevation: 4,200 to 5,500 feet
Frost-free period: 100 to 135 days
Average annual precipitation: 8 to 12 inches
Minor components: Thornock and Trevino soils, rock outcrop
Present uses: Rangeland, irrigated cropland, wildlife habitat
Limitations: Shallow to moderate soil depth, low available water capacity, low precipitation during the growing season, rock outcrop in some areas

3. Trevino-Paulville-Somsen

Shallow, moderately deep, and very deep, well drained, nearly level to moderately sloping soils that formed in mixed alluvium and eolian material that has some loess (fig. *3)*

Percentage of survey area: 2
Landscape position: Basalt plains (fig. *2)*
Elevation: 4,200 to 4,500 feet
Frost-free period: 125 to 135 days
Average annual precipitation: 8 to 12 inches
Minor components: Thornock and Portneuf soils, rock outcrop
Present uses: Rangeland, irrigated cropland, wildlife habitat
Limitations: Shallow soil depth in some areas, low available water capacity, low precipitation during the growing season, rock outcrop in some areas

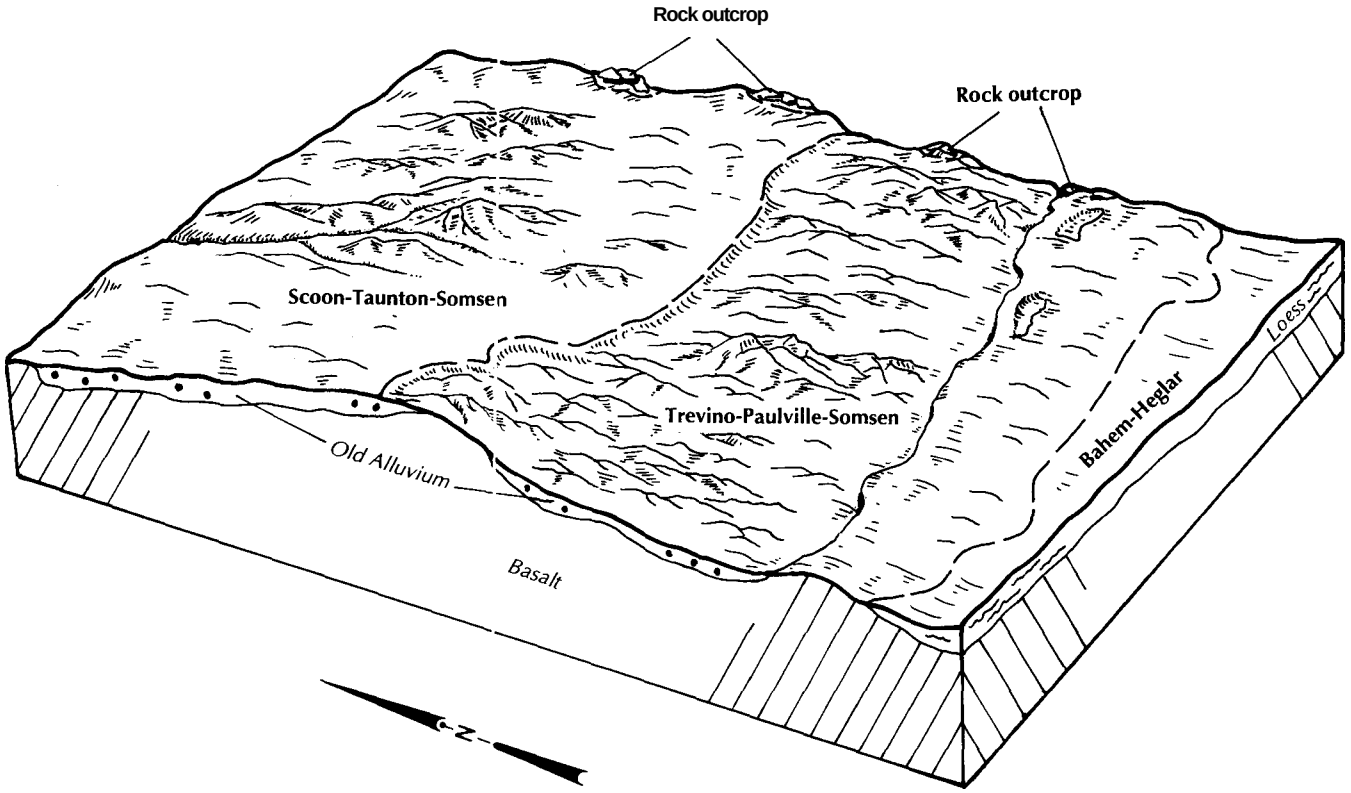

Figure 2.-Typical pattern of soils and parent material on the basalt plains in general soil map units 2, 3, and 4.

Nearly Level to Moderately Steep, Well Drained, Very Deep Soils on Basalt Plains and Fan Terraces

Number of general soil map units: 1
Percentage of survey area: 11

4. Bahem-Heglar

Very deep, well drained, nearly level to moderately steep soils that formed in mixed silty alluvium that has some loess

Percentage of survey area: 11
Landscape position: Basalt plains, fan terraces, hillsides (fig. 2)
Elevation: 4,200 to 5,600 feet
Frost-free period: 100 to 135 days
Average annual precipitation: 8 to 16 inches
Minor components: Portneuf silt loam, Pocatello silt loam, Declo silt loam
Present uses: Irrigated and nonirrigated cropland
Limitations: Water erosion, wind erosion, low precipitation during the growing season

Nearly Level to Moderately Steep, Well Drained, Very Deep Soils on Fan Terraces and Valley Floors

Number of general soil map units: 2
Percentage of survey area: 30

5. Strevell-Mellor-Darkbull
Very deep, well drained, nearly level to moderately steep soils that formed in mixed alluvium

Percentage of survey area: 8
Landscape position: Coalesced fan terraces and stream terraces
Elevation: 4,300 to 6,000 feet
Frost-free period: 95 to 130 days
Average annual precipitation: 8 to 12 inches
Minor components: Idahome silt loam; Stanrod silt loam; Declo silt loam, saline
Present uses: Rangeland, irrigated cropland, wildlife habitat
Limitations: Salinity, water erosion, low precipitation during the growing season, low available water capacity

6. Declo-Darkbull

Very deep, well drained, nearly level to moderately steep soils that formed in mixed alluvium

Percentage of survey area: 22
Landscape position: Fan terraces, valley floors
Elevation: 4,200 to 6,000 feet
Frost-free period: 95 to 135 days
Average annual precipitation: 8 to 12 inches
Minor components: Gunnel gravelly silt loam, Nibbs gravelly silt loam, Kancan gravelly silt loam, Escalante fine sandy loam, Womack gravelly silt loam
Present uses: Irrigated cropland, rangeland, wildlife habitat
Limitations: Salinity, shallow depth to sand and gravel, low precipitation during the growing season, low available water capacity

Nearly Level to Steep, Well Drained, Moderately Deep and Very Deep Soils on Hillsides, Mountainsides, and Fan Terraces

Number of general soil map units: 2
Percentage of survey area: 12

7. Bancroft-Rexburg-Ririe
Very deep, well drained, nearly level to steep soils that formed in loess and silty alluvium

Percentage of survey area: 10
Landscape position: Hillsides, mountainsides, fan terraces

Figure 3.-Typical landscape in the Trevino-Paulville-Somsen general soil map unit. Trevino soils are in the foreground, and Somsen soils are in the background. Paulville soils are in depressional areas.

Elevation: 4,600 to 6,000 feet
Frost-free period: 80 to 100 days
Average annual precipitation: 12 to 16 inches
Minor components: Heglar silt loam, Richmond gravelly silt loam, Ireland stony silt loam, Searla gravelly loam, Ricrest loam, Kucera silt loam
Present uses: Nonirrigated cropland, rangeland, wildlife habitat
Limitations: Water erosion, wind erosion, slope, the short frost-free period

8. Raftriver-Acord

Moderately deep and very deep, well drained, nearly level to moderately steep soils that formed in mixed alluvium that has some loess

Percentage of survey area: 2
Landscape position: Mountainsides, fan terraces
Elevation: 4,700 to 6,400 feet
Frost-free period: 70 to 95 days
Average annual precipitation: 12 to 16 inches
Minor components: Aninto stony loam, Koosharem silt loam
Present uses: Nonirrigated cropland, rangeland, wildlife habitat
Limitations: Water erosion, wind erosion, moderate depth to a duripan, low available water capacity, the short frost-free period

Rock Outcrop and Gently Sloping to Steep, Well Drained, Shallow to Very Deep Soils on Mountainsides, Hillsides, Ridges, and Fan Terraces

Number of general soil map units: 6
Percentage of survey area: 25

9. Jimsage-Hutchley-Vipont

Shallow, moderately deep, and very deep, well drained, gently sloping to steep soils that formed in mixed alluvium and residuum of quartz latite that has some loess

Percentage of survey area: 7
Landscape position: Mountainsides, cuestas ridges
Elevation: 4,800 to 7,200 feet
Frost-free period: 65 to 95 days
Average annual precipitation: 12 to 18 inches
Minor components: Vitale stony loam, Watercanyon silt loam, Rexburg silt loam, Harroun stony silt loam, rubble land, rock outcrop, Doodlelink gravelly loam
Present uses: Rangeland, wildlife habitat
Limitations: Slope, shallow to moderate depth to bedrock, water erosion, the short frost-free period, low available water capacity

10. Ireland-Hymas

Shallow and moderately deep, well drained, strongly sloping to steep soils that formed in residuum of limestone or quartz latite and alluvium that has some loess

Percentage of survey area: 5
Landscape position: Mountainsides, ridgetops
Elevation: 4,800 to 7,200 feet
Frost-free period: 65 to 95 days
Average annual precipitation: 12 to 18 inches
Minor components: Pavohroo silt loam, Rexburg silt loam, Jimsage gravelly loam, Hades gravelly loam, Ricrest loam, rock outcrop
Present uses: Rangeland, wildlife habitat
Limitations: Slope, cobbles and stones on and below the surface, the short frost-free period, water erosion

11. Acord-Aninto

Very deep, well drained, gently sloping to moderately steep soils that formed in alluvium derived from mica schist and quartzite that has some loess

Percentage of survey area: 4
Landscape position: Mountainsides, fan terraces, toe slopes
Elevation: 4,700 to 6,500 feet
Frost-free period: 70 to 95 days
Average annual precipitation: 12 to 16 inches
Minor components: Hades gravelly loam, Poisonhol very stony loam, Manila stony loam
Present uses: Rangeland, wildlife habitat
Limitations: Stones on and below the surface, the short frost-free period

12. Conneridge-Chen-Yeates Hollow

Shallow to deep, well drained, gently sloping to steep soils that formed in mixed alluvium and in residuum of rhyolite, mica schist, and quartzite

Percentage of survey area: 3
Landscape position: Mountainsides, foothills, ridges, mesa tops
Elevation: 5,100 to 7,100 feet
Frost-free period: 70 to 95 days
Average annual precipitation: 12 to 18 inches
Minor components: Birchcreek very stony loam, Vipont very stony loam, Povey stony loam
Present uses: Rangeland, wildlife habitat
Limitations: Slope, stones and cobbles on and below the

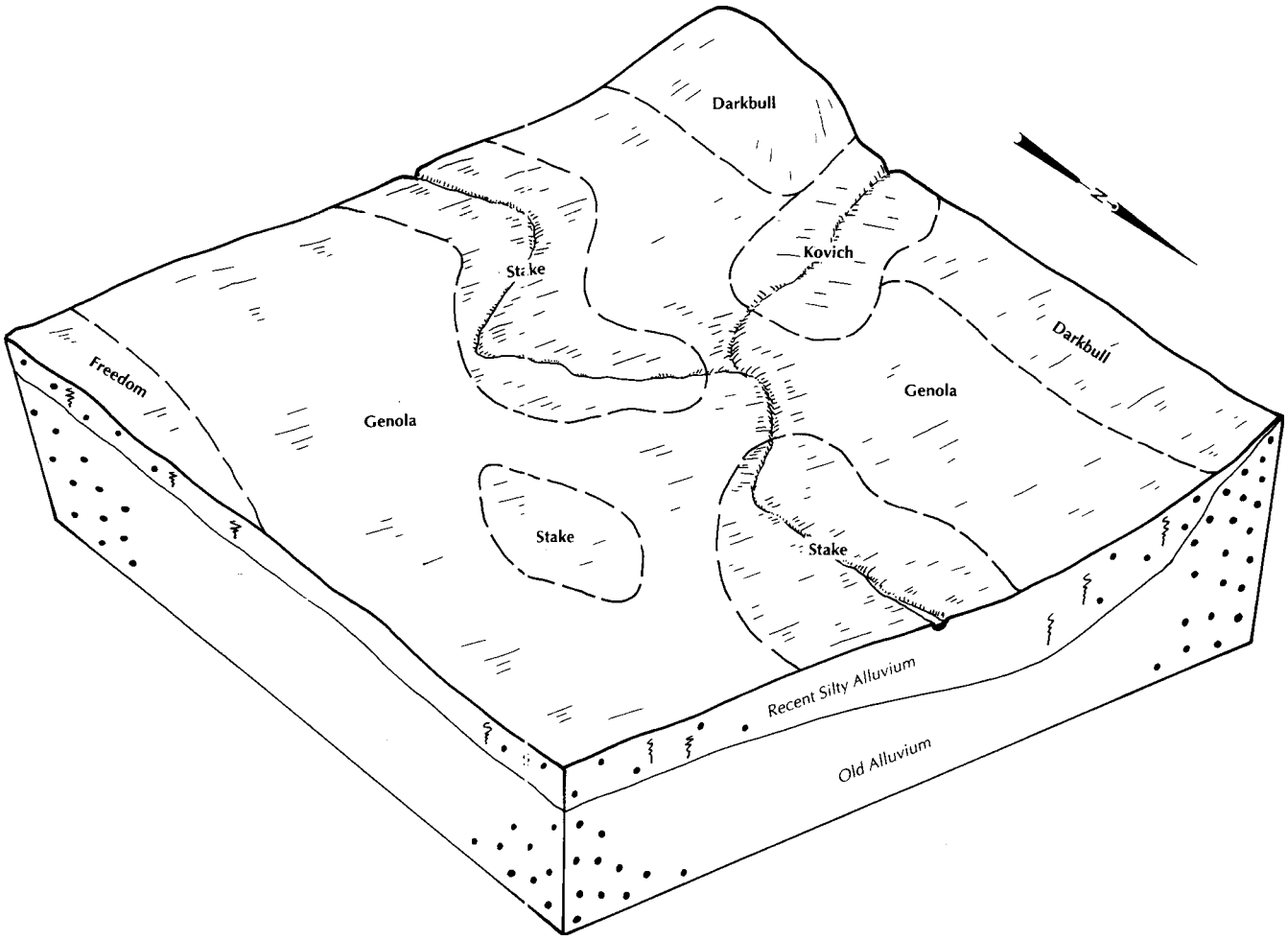

Figure 4.-Typical pattern of soils and parent material in the Genola-Kovich-Stake general soil map unit.

surface, shallow to moderate depth to bedrock, low available water capacity, the short frost-free period

13. Rock Outcrop-Itca-Birchcreek

Rock outcrop and shallow and moderately deep, well drained, moderately steep and steep soils that formed in alluvium and residuum of mica schist and quartzite

Percentage of survey area: 3
Landscape position: Mountainsides
Elevation: 5,400 to 7,200 feet
Frost-free period: 75 to 95 days
Average annual precipitation: 12 to 16 inches
Minor components: Ola sandy loam, Riceton loamy coarse sand, Kanlee sandy loam, Arbone loams, Vipont very stony loam
Present uses: Rangeland, wildlife habitat
Limitations: Rock outcrop, shallow to moderate depth to bedrock, slope, low available water capacity, the short frost-free period

14. Povey-Pachic Cryoborolls

Deep and very deep, well drained, strongly sloping to steep soils that formed in mixed alluvium

Percentage of survey area: 3
Landscape position: Mountainsides
Elevation: 6,500 to 8,400 feet
Frost-free period: 60 to 70 days
Average annual precipitation: 16 to 20 inches
Minor components: Middlehill extremely stony sandy loam, rock outcrop
Present uses: Rangeland, wildlife habitat
Limitations: Slope, stones on and below the surface, low available water capacity, the short frost-free period

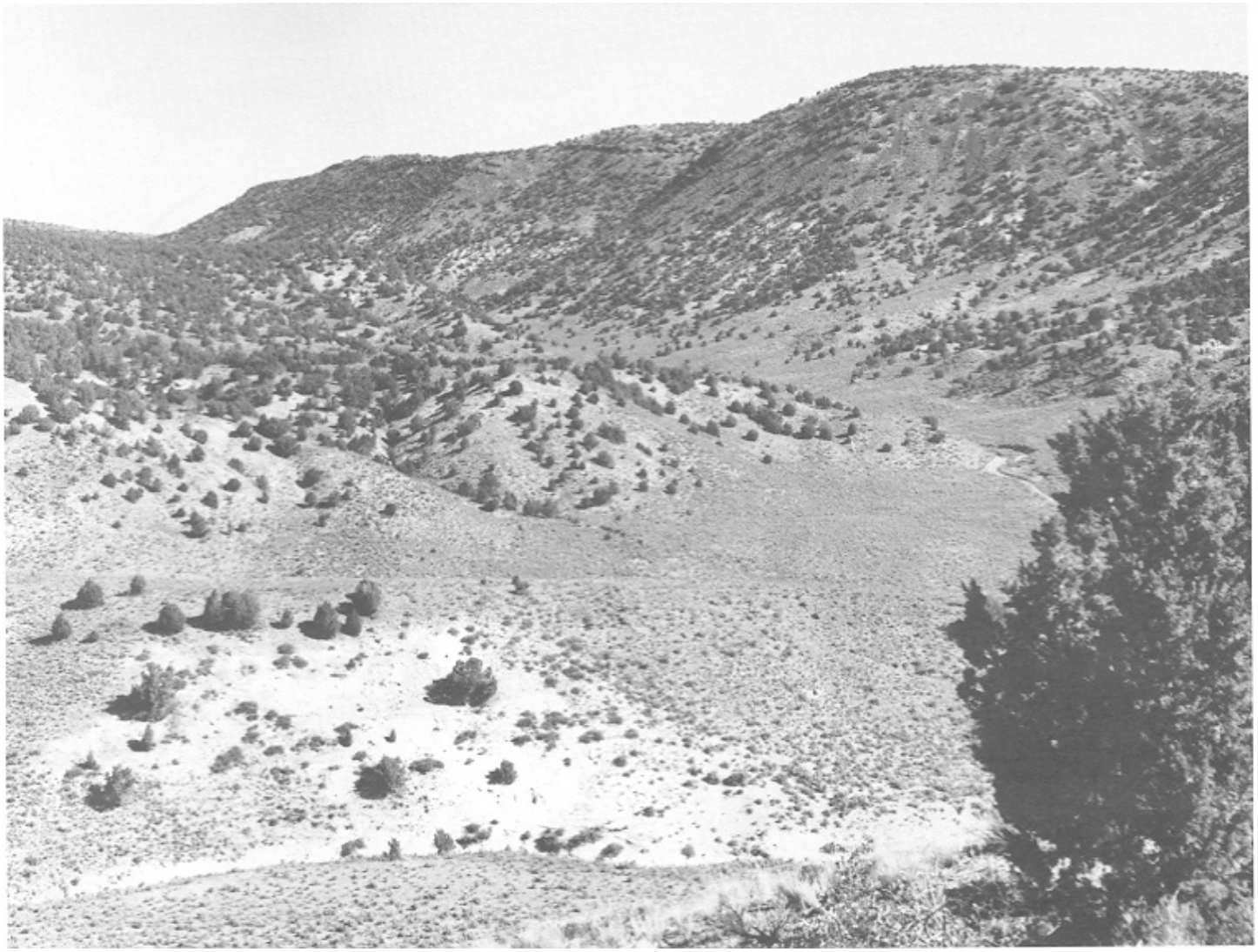

Figure 5.-Typical landscape in the Coalbank-Cottontliomas-Stines general soil map unit. Coalbank soils are on the north-facing slopes. Cottonthomas soils are on the toe slopes and fan terraces. Stines soils are on the upper half of the slopes in the background. Hardister soils are in the foreground and on the wide valley flat. Bluehill soils are in the middle ground.

Nearly Level and Gently Sloping, Well Drained and Poorly Drained, Very Deep Soils on Flood Plains, Stream Terraces, Fan Terraces, and Alluvival Fans

Number of general soil map units: 1
Percentage of survey area: 6

15. Genola-Kovich-Stake

Very deep, well drained and poorly drained, nearly level and gently sloping soils that formed in mixed alluvium (fig. 4)

Percentage of survey area: 6

Landscape position: Flood plains, fan terraces, stream terraces, alluvial fans
Elevation: 4,200 to 5,700 feet
Frost-free period: 80 to 135 days
Average annual precipitation: 8 to 16 inches
Minor components: Jett silt loam, Downata silt loam, Freedom silt loam, Mellor silt loam, Cumulic Haplaquolls that have a surface layer of clay loam, Manassa silt loam, Darkbull loam
Present uses: Irrigated cropland, hayland, rangeland
Limitations: Flooding, shallow to moderate depth to a water table, salinity, the short frost-free period

Nearly Level to Very Steep, Well Drained, Deep and Very Deep Soils on Mesa Sides, Hillsides, Mountainsides, and Fan Terraces

Number of general soil map units: 1
Percentage of survey area: 6

16. Coalbank-Cottonthomas-Stines

Deep and very deep, well drained, nearly level to very steep soils that formed in alluvium or residuum derived from volcanic ash

Percentage of survey area: 6
Landscape position: Hillsides, mountainsides, fan terraces, mesa sides (fig. 5)
Elevation: 4,800 to 7,200 feet
Frost-free period: 60 to 100 days
Average annual precipitation: 12 to 18 inches
Minor components: Wilsongulch very stony loam, Bluehill fine sandy loam, Tomsherry fine sandy loam, Chen very cobbly loam, Hardister fine sandy loam, Cumulic Haplaquolls that have a surface layer of clay loam
Present uses: Rangeland, wildlife habitat, hayland in some areas on narrow flood plains and nearly level bottoms
Limitations: Slope, water erosion, wind erosion, flooding in the less sloping areas, cobbles and stones, the short frost-free period

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of 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 limit: 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 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. These 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 precisely 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 substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Darkbull loam, saline, 1 to 3 percent slopes, is a phase of the Darkbull series.

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

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

miscellaneous areas are somewhat similar in all areas. Bahem-Portneuf complex, 0 to 1 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. Coalbank-Bluehill association, 40 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. Pits is an example.

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 imitations, 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-Acord very stony loam, 4 to 12 percent slopes

Composition

Acord soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Coalesced fan terraces
Elevation: 5,000 to 6,400 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days
Rock fragments on surface: Kind-stones, cobbles, and gravel; percentage of surface covered-35 to 50

Characteristics of the Acord Soil

Typical profile:
0 to 4 inches-brown very stony loam
4 to 10 inches-brown cobbly clay loam
10 to 30 inches-yellowish brown and light yellowish brown very cobbly and very stony clay
30 to 41 inches-light yellowish brown and very pale brown cobbly clay and very cobbly clay loam
41 to 60 inches-yellowish brown very cobbly coarse sandy clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 4 to 6 inches
Restriction affecting rooting depth: A clay layer at a depth of 3 to 13 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

- Aninto very stony loam in slightly convex areas
- A soil that is similar to Jimsage soils and is deep to very deep; near the upper end of fans at the mouths of small drainageways and on north-facing slopes
- A soil that has a calcareous loamy or silty surface layer and has skeletal material starting at a depth of 20 to 40 inches; on the lower end of fans
- Small areas in the Albion Valley where the surface stones have been removed so that agricultural equipment can be used

Use and Management

Major use: Rangeland
Major management factors: Stones, cobbles, and gravel on and below the surface; hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by the surface and subsurface rock fragments and by water erosion.

Capability Classification

Vlls, nonirrigated

2-Acord very stony loam, 15 to 30 percent slopes

Composition

Acord soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides, fan terraces
Elevation: 5,100 to 6,200 feet
Average annual precipitation: About 15 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days
Rock fragments on surface: Kind-stones, cobbles, and, in small areas, boulders; percentage of surface covered-3 to 15

Characteristics of the Acord Soil

Typical profile:
0 to 6 inches-dark grayish brown very stony loam
6 to 12 inches-brown stony clay loam
12 to 31 inches-light yellowish brown very cobbly clay
31 to 60 inches-very pale brown very cobbly clay loam and very cobbly coarse sandy clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 4 to 6 inches
Restriction affecting rooting depth: A clay layer at a depth of 3 to 13 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

• A soil that is similar to Manila soils and that has a surface layer of stony loam; in depressional areas
• A soil that is similar to the Acord soil and that is less than 35 percent clay
• Vipont very stony loam on north-facing slopes and in slight depressional areas

Use and Management

Major use: Rangeland
Major management factors: Stones, cobbles, and boulders on and below the surface; hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Range seeding of adapted species is limited by the surface and subsurface rock fragments and by water erosion.

Capability Classification

VIIs, nonirrigated

3-Acord silt loam, 2 to 4 percent slopes

Composition

Acord soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Wide, shallow old drainageways on coalesced fan terraces
Elevation: 4,700 to 4,900 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Acord Soil

Typical profile:
0 to 15 inches-brown silt loam
15 to 22 inches-pale brown very cobbly clay loam
22 to 60 inches-very pale brown very cobbly clay and very cobbly clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 7 to 8 inches
Restriction affecting rooting depth: A clay layer at a depth of about 22 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

• A soil that has less than 35 percent clay in the subsoil in small drainageways and depressional areas
• A soil that has less than 35 percent rock fragments in the upper 25 to 40 inches

Use and Management

Major uses: Irrigated cropland, pasture
Major management factors: Stones, cobbles, and gravel on and below the surface; slow permeability; hazard of wind erosion

Irrigated cropland and pasture

Suitable crops: Wheat, alfalfa
General management considerations:
• Because of the slow permeability, sprinklers are the most suitable irrigation method.
• Irrigation water should be applied at a rate slow enough to prevent runoff and in an amount that avoids subsurface puddling.
• Coarse fragments on the surface interfere with the use of tillage equipment.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIIs, irrigated; IVs, nonirrigated

4-Aninto stony loam, 4 to 12 percent slopes

Composition

Aninto soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Fan terraces, hillsides
Elevation: 5,500 to 6,500 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Aninto Soil

Typical profile:
0 to 4 inches-brown stony loam
4 to 8 inches-brown gravelly loam
8 to 28 inches-brown and light yellowish brown very flaggy clay
28 to 39 inches-light yellowish brown cobbly clay
39 to 60 inches-very pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 6 to 8 inches
Restriction affecting rooting depth: A clay layer at a depth of about 6 to 10 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

• Acord soils that have a surface layer of stony loam in landscape positions similar to those of the Aninto soil
• Hades loam in slight depressional areas and on north-facing slopes
• Manila soils that have a surface layer of very stony loam or stony loam in the slightly lower areas

Use and Management

Major use: Rangeland
Major management factors: Stones on and below the surface, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, Idaho fescue, bluebunch wheatgrass
General management considerations:
• The use of equipment is limited by the surface stones.
• Range seeding of adapted species is limited by the surface and subsurface stones and by water erosion.

Capability Classification

IVs, nonirrigated

5-Aninto-Manila complex, 8 to 20 percent slopes

Composition

Aninto soil and similar soils-55 percent
Manila soil and similar soils-30 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces, toe slopes
Elevation: 5,500 to 6,500 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Aninto Soil

Position on landscape: Slightly convex areas, south-facing slopes
Typical profile:
0 to 4 inches-brown stony loam
4 to 8 inches-brown gravelly loam
8 to 28 inches-brown and light yellowish brown very flaggy clay
28 to 39 inches-light yellowish brown cobbly clay
39 to 60 inches-very pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 6 to 8 inches
Restriction affecting rooting depth: A clay layer at a depth of about 8 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Characteristics of the Manila Soil

Position on landscape: Slightly concave areas, north facing slopes
Typical profile:
0 to 6 inches-dark grayish brown stony loam
6 to 9 inches-dark grayish brown cobbly clay loam
9 to 12 inches-dark grayish brown clay
12 to 33 inches-brown clay
33 to 52 inches-light yellowish brown and pale brown clay loam and clay
52 to 60 inches-pale brown loam and stony loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 7 to 10 inches
Restriction affecting rooting depth: A clay layer at a depth of about 9 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

• Hades soils that have a surface layer of cobbly loam on steep north-facing slopes
• Cumulic Haplaquolls in narrow drainageways
• A soil that is more than 40 inches deep, is more than 35 percent rock fragments, and supports a stand of

basin big sagebrush; in areas along the Birch Creek drainageway
• Soils that have slopes of more than 20 percent

Use and Management

Major use: Rangeland
Major management factors: Aninto soil-stones on and below the surface, hazards of water erosion and wind erosion, slope in some areas; Manila oilstones on the surface, slow permeability, hazard of water erosion, a short growing season, slope in some areas

Rangeland

Dominant vegetation in potential natural plant community: Aninto soil-low sagebrush, Idaho fescue, bluebunch wheatgrass; Manila soil-mountain big sagebrush, Idaho fescue

General management considerations:
• Range seeding of adapted species and the use of equipment are limited by stones on and below the surface, the slope in some areas, and water erosion.

Capability Classification

IVs, nonirrigated

6-Arbone loam, 4 to 12 percent slopes

Composition

Arbone soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Coalesced fan terraces
Elevation: 5,600 to 6,300 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Arbone Soil

Typical profile:
0 to 10 inches-grayish brown loam
10 to 35 inches-brown loam
35 to 60 inches-light brownish gray loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils in shallow drainageways that have more than 35 percent rock fragments throughout
• A soil that is similar to Chayson soils and that has a surface layer of loam
• Small areas of a soil that has an accumulation of clay in the subsoil
• Rock outcrop
• An Arbone soil that has a surface layer of silt loam in areas of the Sublett Mountains

Use and Management

Major uses: Rangeland, nonirrigated cropland
Major management factors: Hazards of water erosion and wind erosion, a short growing season

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass

General management considerations:
• Range seeding of adapted species is limited by water erosion and wind erosion.

Nonirrigated cropland

General management considerations:
• The short growing season limits crop production.
• A tillage pan forms if the soil is excessively cultivated.

Capability Classification

Ille, nonirrigated

7-Arbone silt loam, 12 to 20 percent slopes

Composition

Arbone soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Hillsides, mountainsides
Elevation: 5,400 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Arbone Soil

Typical profile:
0 to 13 inches-brown silt loam
13 to 30 inches-white silt loam
30 to 60 inches-very pale brown gravelly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 8 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that have more than 35 percent rock fragments throughout at the higher elevations
- Soils that have slopes of more than 20 percent
- Bancroft silt loam on the less sloping east- and north-facing slopes

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: Hazards of water erosion and wind erosion, a short growing season, slope

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:

- The short growing season limits crop production.
- Rock fragments on the surface and the slope limit the use of some equipment.

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:

- Range seeding of adapted species is limited by water erosion, wind erosion, and the slope.

Capability Classification

lVe, nonirrigated

8-Arbone-Ireland complex, 12 to 20 percent slopes

Composition

Arbone soil and similar soils-55 percent
Ireland soil and similar soils-20 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Foothills
Elevation: 5,200 to 5,800 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 80 days

Characteristics of the Arbone Soil

Position on landscape: Hillsides, toe slopes
Typical profile:
0 to 10 inches-grayish brown and brown silt loam
10 to 27 inches-light gray and white silt loam
27 to 60 inches-very pale brown gravelly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 8 to 10 inches
Potential rooting depth: 60 inches
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Characteristics of the Ireland Soil

Position on landscape: Ridgetops, shoulder slopes
Typical profile:
0 to 11 inches-brownish gray cobbly loam
11 to 18 inches-very pale brown extremely cobbly loam
18 to 29 inches-pale brown very cobbly loam
29 inches-limestone
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

- Bancroft silt loam in the less sloping, more stable areas
- A soil that is similar to Hymas soils on ridgetops and near rock outcrop
- A soil that is similar to Bluehill fine sandy loam in slightly undulating areas that have slopes of 6 to 12 percent; in T. 15 S., R. 29 E., sec. 14, 24, and 25
- Kucera silt loam on north-facing slopes of 25 to 40 percent
- Small areas of rock outcrop consisting of limestone, basalt, and tufaceous sandstone; on ridgetops, on side slopes of steep ridges, and in the less sloping undulating areas

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: Arbone soil-hazards of wind erosion and water erosion, a short growing season; Ireland soil-low available water capacity, a short growing season, hazard of water erosion, coarse fragments on the surface

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:

- The short growing season limits crop production.
- A tillage pan forms if the soils are excessively cultivated.
- Coarse fragments on the surface interfere with the use of tillage equipment.

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass

General management considerations:

• Range seeding of adapted species is limited by cobbles and gravel on and below the surface in some areas, by small drainageways that are difficult to cross with equipment, by wind erosion, and by water erosion.

Capability Classification

VIs, nonirrigated

9-Bahem silt loam, 1 to 3 percent slopes

Composition

Bahem soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,000 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Bahem Soil

Typical profile:
0 to 7 inches-pale brown silt loam
7 to 46 inches-light gray and very pale brown silt loam
46 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

• Declo silt loam in eroded areas
• Strevell silt loam, nonsaline, in or near drainageways
• Darkbull silt loam in drainageways

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Hazard of wind erosion, low precipitation

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay
General management considerations:

• Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
• Sprinklers are the most suitable irrigation method.
• A tillage pan forms if the soil is excessively cultivated.
• The hazard of water erosion is increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:

• Forage production is limited mainly by the low precipitation during the growing season.
• Range seeding of adapted species is limited by wind erosion.

Capability Classification

IIIe, irrigated; VIc, nonirrigated

10-Bahem silt loam, 3 to 8 percent slopes

Composition

Bahem soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,300 to 5,000 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Bahem Soil

Typical profile:
0 to 7 inches-pale brown silt loam
7 to 46 inches-light gray and very pale brown silt loam
46 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Trevino silt loam near rock scarps
• Declo silt loam near drainageways

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Hazards of water erosion and wind erosion, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by water erosion, wind erosion, and the low precipitation.

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay

General management considerations:

- A tillage pan forms if the soil is excessively cultivated.
- Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
- The soil is easily eroded if a furrow irrigation system is used.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

IVe, irrigated; IVe, nonirrigated

11-Bahem-Pocatello complex, 8 to 20 percent slopes

Composition

Bahem soil and similar soils-55 percent
Pocatello soil and similar soils-30 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terrace breaks
Elevation: 4,200 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 130 days

Characteristics of the Bahem Soil

Position on landscape: North-facing and west-facing slopes

Typical profile:

0 to 7 inches-pale brown silt loam
7 to 28 inches-pale brown and very pale brown silt loam
28 to 60 inches-pale brown silt loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Characteristics of the Pocatello Soil

Position on landscape: South-facing slopes, convex areas

Typical profile:

0 to 10 inches-pale brown silt loam
10 to 60 inches-very pale brown silt loam that has increasing amounts of gravel below a depth of 50 inches

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 12 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Portneuf silt loam in the less sloping and more stable areas
- Soils that are similar to Scoon and Taunton soils in the less sloping areas
- Soils that have slopes of less than 8 percent or more than 20 percent
- Soils that have 15 to 30 percent pebbles near drainageways

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Hazards of water erosion and wind erosion, slope, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by water erosion and the rapid runoff.

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay

General management considerations:

- The soils are easily eroded if a furrow irrigation system is used.
- Sprinklers are the most suitable irrigation method.
- A tillage pan forms if the soils are excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIe, irrigated and nonirrigated

12-Bahem-Portneuf complex, 0 to 1 percent slopes

Composition

Bahem soil and similar soils-55 percent
Portneuf soil-30 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Nearly level areas on basalt plains and fan terraces
Elevation: 4,300 to 4,800 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 125 days

Characteristics of the Bahem Soil

Typical profile:
0 to 10 inches-light brownish gray silt loam
10 to 35 inches-light gray silt loam
35 to 60 inches-very pale brown and pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Characteristics of the Portneuf Soil

Typical profile:
0 to 10 inches-pale brown silt loam
10 to 36 inches-very pale brown silt loam that has 2 to 20 percent very hard, very firm nodules
36 to 60 inches-very pale brown and pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 11 to 12 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Pocatello silt loam in landscape positions similar to those of the Bahem and Portneuf soils

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, oats, sugar beets, potatoes, alfalfa hay
General management considerations:
• Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
• Sprinklers are the most suitable irrigation method.
• A tillage pan forms if the soils are excessively cultivated.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIc, irrigated

13-Bahem-Trevino complex, 0 to 8 percent slopes

Composition

Bahem soil and similar soils-60 percent
Trevino soil and similar soils-25 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 130 days

Characteristics of the Bahem Soil

Position on landscape: Areas between ridges
Slope: 0 to 4 percent
Typical profile:
0 to 10 inches-light brownish gray silt loam
10 to 35 inches-light gray silt loam
35 to 60 inches-very pale brown and pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Characteristics of the Trevino Soil

Position on landscape: Ridges
Slope: 2 to 8 percent

Typical profile:
0 to 7 inches-brown and pale brown stony loam
7 to 15 inches-pale brown silt loam
15 to 19 inches-very pale brown cobbly loam
19 inches-basalt
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- A Somsen soil that has a surface layer of loam or silt loam in transitional positions between ridges and depressional areas
- Rock outcrop on ridgetops
- Paulville silt loam in concave areas

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Shallow depth to bedrock in some areas, coarse fragments on the surface, hazards of water erosion and wind erosion, low precipitation

Irrigated cropland
Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay
General management considerations:
- Coarse fragments on the surface interfere with the use of tillage equipment.
- The depth to bedrock limits the production of some crops.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.
- Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
- Sprinklers are the most suitable irrigation method.
- A tillage pan forms if the soils are excessively cultivated.

Rangeland
Dominant vegetation in potential natural plan community: Bahem soil-Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass; Trevino soil--Wyoming big sagebrush, bluebunch wheatgrass, Sandberg bluegrass
General management considerations:
- Range seeding of adapted species is limited by wind erosion, the low precipitation during the growing season, and coarse fragments on the surface in some areas.

Capability Classification

IVe, irrigated; Vle, nonirrigated

14-Bancroft silt loam, 1 to 3 percent slopes

Composition

Bancroft soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,800 to 5,500 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Bancroft Soil

Typical profile:
0 to 9 inches-grayish brown and brown silt loam
9 to 20 inches-brown and pale brown silt loam
20 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff:: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Rexburg silt loam on north-facing slopes
- Watercanyon silt loam in slightly eroded areas
- Soils that are similar to the Bancroft soil and that are more than 15 percent rock fragments; on the upper end of fans

Use and Management

Major use: Nonirrigated cropland
Major management factors: Hazard of wind erosion, a short growing season

Nonirrigated cropland
Suitable crops: Wheat, barley
General management considerations:
- The short growing season limits crop production.
- A tillage pan forms if the soil is excessively cultivated.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

Ille, nonirrigated

15-Bancroft silt loam, 3 to 12 percent slopes

Composition

Bancroft soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Bancroft Soil

Typical profile:
0 to 14 inches-dark grayish brown and grayish brown silt loam
14 to 25 inches-pale brown silty clay loam
25 to 60 inches-pale brown and very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Rexburg silt loam on north-facing slopes
- Watercanyon silt loam in slightly eroded areas and on south-facing slopes
- A soil that is similar to the Bancroft soil and that is more than 15 percent rock fragments; on the upper end of fans and near drainageways
- Soils that have slopes of more than 12 percent

Use and Management

Major uses: Rangeland, nonirrigated cropland
Major management factors: Hazards of water erosion and wind erosion, a short growing season

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass General management considerations:

- Rangeland seeding of adapted species is limited by water erosion and wind erosion.

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:

- The short growing season limits crop production.
- Continuous cropping is not a common practice because of the low precipitation.
- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

Ille, nonirrigated

16-Bancroft-Bezzant complex, 4 to 12 percent slopes

Composition

Bancroft soil and similar soils-65 percent
Bezzant soil and similar soils-20 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,200 to 5,600 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 95 days

Characteristics of the Bancroft Soil

Position on landscape: East- and north-facing slopes
Typical profile:
0 to 6 inches-brown loam
6 to 14 inches-brown clay loam
14 to 33 inches-very pale brown silty clay loam
33 to 48 inches-very pale brown loam
48 to 60 inches-very pale brown very gravelly loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Characteristics of the Bezzant Soil

Position on landscape: South- and east-facing slopes
Rock fragments on surface: Kind-cobbles and gravel; percentage of surface covered-15 to 25
Typical profile:
0 to 10 inches-brown cobbly loam
10 to 15 inches-white cobbly loam
15 to 23 inches-very pale brown very cobbly loam
23 to 31 inches-very pale brown very cobbly clay loam
31 to 60 inches-reddish yellow very cobbly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate

Available water capacity: 4 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Ricrest and Searla gravelly loams on 12 to 20 percent slopes near escarpments
- Small, slightly depressional areas of a soil that is more than 35 percent clay and less than 35 percent rock fragments in the subsoil

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: Hazards of water erosion and wind erosion, cobbles on and below the surface in some areas, slope in some areas

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.
- Coarse fragments on the surface and the slope make seedbed preparation difficult in some areas.

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by water erosion, by wind erosion, and by coarse fragments on the surface in some areas.

Capability Classification

IVe, nonirrigated

17-Bezzant gravelly loam, 2 to 12 percent slopes

Composition

Bezzant soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Dissected, coalesced fan terraces
Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days
Rock fragments on surface: Kind-gravel; percentage of surface covered-25 to 50

Characteristics of the Bezzant Soil

Typical profile:
0 to 10 inches-brown gravelly loam
10 to 60 inches-pale brown and very pale brown very cobbly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe

Contrasting Inclusions

- Arbone loam in shallow depressional areas
- Ricrest loam in drainageways at the higher elevations
- Soils that have short steep slopes of 20 to 40 percent; on side slopes of drainageways
- Soils that have been leached of lime in the upper 15 to 20 inches

Use and Management

Major use: Rangeland
Major management factors: Gravel and cobbles on and below the surface, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by water erosion and coarse fragments on the surface.

Capability Classification

VIe, nonirrigated

18-Birchcreek very stony loam, 30 to 55 percent slopes

Composition

Birchcreek soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides
Elevation: 5,600 to 6,100 feet
Average annual precipitation: About 14 inches

Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Birchcreek Soil

Typical profile:

0 to 3 inches-dark grayish brown very stony loam
3 to 13 inches-dark grayish brown and brown very cobbly clay loam
13 to 23 inches-yellowish brown very cobbly clay
23 inches-unweathered bedrock

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: A clay layer at a depth of about 13 inches
Runoff: Rapid
Hazard of water erosion: Severe

Contrasting Inclusions

• A soil in areas of slumps that has a surface layer of very stony loam, has less than 35 percent rock fragments, and is more than 35 percent clay
• Yeates Hollow very stony loam in concave areas and on steep north-facing slopes
• Acord very stony loam on toe slopes
• Rock outcrop
• A soil that is more than 40 inches deep, is less than 35 percent clay, and supports a stand of basin big sagebrush and bluebunch wheatgrass; along the Birch Creek drainageway

Use and Management

Major use: Rangeland

Major management factors: Stones on and below the surface, slope, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass General management considerations:
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• The use of equipment is limited by the stones on the surface and by the slope.
• Range seeding of adapted species is limited by the stones on the surface, the low available water capacity, water erosion, and the slope.

Capability Classification

VIIs, nonirrigated

19-Birchcreek extremely stony loam, 20 to 55 percent slopes

Composition

Birchcreek soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Mountainsides
Elevation: 6,200 to 7,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Birchcreek Soil

Typical profile:

0 to 8 inches-brown extremely stony loam
8 to 15 inches-brown very gravelly clay loam
15 to 22 inches-yellowish brown extremely gravelly clay
22 inches-unweathered bedrock

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: A very gravelly layer at a depth of about 8 inches, a clay layer at a depth of about 15 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Contrasting Inclusions

• Yeates Hollow very stony loam in concave areas and on steep north-facing slopes
• Acord very stony loam on toe slopes and in areas of slumps
• Rock outcrop
• Small areas of Birchcreek soils that have an extremely flaggy surface layer
• Areas that have a very stony surface layer and that support mountain big sagebrush
• Soils that have slopes of less than 20 percent

Use and Management

Major use: Rangeland
Major management factors: Stones on the surface, slope, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, bluebunch wheatgrass
General management considerations:
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.

• The use of equipment is limited by the stones on the surface and the slope.
• Range seeding of adapted species is limited by the stones on the surface, the slope, water erosion, and the low available water capacity.

Capability Classification

Vlls, nonirrigated

20-Birchcreek-Hades complex, 15 to 50 percent slopes

Composition

Birchcreek soil and similar soils--60 percent
Hades soil and similar soils-25 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides, foothills
Elevation: 5,600 to 6,600 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Birchcreek Soil

Position on landscape: Mountainsides
Slope: 20 to 50 percent
Typical profile:
0 to 3 inches-dark grayish brown very stony loam
3 to 13 inches-dark grayish brown and brown very cobbly clay loam
13 to 23 inches-yellowish brown very cobbly clay
23 inches-unweathered bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: A clay layer at a depth of about 13 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Characteristics of the Hades Soil

Position on landscape: Toe slopes, concave areas
Slope: 15 to 35 percent
Typical profile:
0 to 10 inches-dark grayish brown gravelly loam
10 to 20 inches-dark brown gravelly silt loam
20 to 45 inches-dark brown and light yellowish brown gravelly silty clay loam
45 to 60 inches-light yellowish brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Yeates Hollow very stony loam in concave areas and in landscape positions similar to those of the Birchcreek soil
• Chen soils that have a surface layer of very stony loam on ridgetops
• A soil that is similar to Manila soils in slumps that support low sagebrush and bluebunch wheatgrass
• Rock outcrop
• Small areas of Birchcreek soils that have an extremely flaggy surface layer
• Areas that have a very stony surface layer and that support mountain big sagebrush
Soils that have slopes of less than 15 percent

Use and Management

Major use: Rangeland
Major management factors: Stones on and below the surface in some areas, slope, low available water capacity in some areas, hazards of wind erosion and water erosion

Rangeland

Dominant vegetation in potential natural plant community:
Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• The use of equipment is limited by the surface stones, the slope, and rock outcrop.
• Range seeding of adapted species is limited by the surface stones, the low available water capacity, wind erosion, water erosion, and the slope.

Capability Classification

Vlls, nonirrigated

21-Birchcreek-Itca complex, 25 to 55 percent slopes

Composition

Birchcreek soil and similar soils-45 percent
Itca soil and similar soils-30 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: North-facing mountainsides
Elevation: 5,600 to 7,200 feet

Average annual precipitation: About 16 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 75 days

Characteristics of the Birchcreek Soil

Position on landscape: Smooth to slightly concave slopes
Rock fragments on surface: Kind-stones and cobbles; percentage of surface covered-20 to 35
Typical profile:
0 to 5 inches-brown very stony loam
5 to 9 inches-brown very gravelly clay loam
9 to 31 inches-yellowish brown very stony clay
31 inches-unweathered bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: A clay layer at a depth of about 9 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or *very* severe

Characteristics of the Itca Soil

Position on landscape: Slightly convex slopes, areas near rock outcrop
Rock fragments on surface: Kind-stones and cobbles; percentage of surface covered-25 to 40
Typical profile:
0 to 3 inches-brown very stony loam
3 to 8 inches-brown extremely stony clay loam
8 to 17 inches-yellowish brown extremely stony clay
17 inches-unweathered bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Slow
Available water capacity: 1 to 2 inches
Restriction affecting rooting depth: A clay layer at a depth of about 8 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Contrasting Inclusions

• Hutchley very gravelly loam on shoulder slopes and in slightly convex, open areas that support low sagebrush
• Small areas of a soil that is deep to very deep, that has more than 35 percent rock fragments, that has a dark surface layer more than 20 inches thick, arid that supports mountain mahogany in slightly concave areas
• Rock outcrop consisting of quartzite and mica schist
• Talus below the rock outcrop and in drainageways

Use and Management

Major uses: Woodland, grazable woodland
Major management factors: Stones and cobbles on and below the surface, slope, shallow depth to bedrock in some areas, hazard of water erosion, low available water capacity

Woodland

Dominant vegetation in potential natural plant community: Pinyon pine, juniper, mountain big sagebrush, bluebunch wheatgrass
Site index for pinyon pine: Birchcreek soil-55; Itca soil-65
Yield: Birchcreek soil-15 cubic feet per acre from a stand of trees 100 years old; Itca soil-20 cubic feet per acre from a stand of trees 100 years old
General management considerations:
• The depth to bedrock and the low available water capacity limit production.

Grazable woodland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Production is limited mainly by the low available water capacity and the depth to bedrock.
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• The use of forage by livestock is limited by the dense stand of trees, the slope, and surface stones.
• Range seeding of adapted species is limited by the dense stand of trees, the slope, surface stones, the low available water capacity, and water erosion.

Capability Classification

VIIs, nonirrigated

22-Blownout land

Setting

Position on landscape: Lower end of fan terraces
Elevation: 4,500 to 4,900 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Blownout Land

• Because of extensive wind erosion, areas of Blownout land have been scoured and some of the windblown material has been redeposited nearby. These depositions occur as active dunes that are mostly devoid of vegetation.
• In some places, scoured material has been moved completely away from the site and a flat or concave

barren area, generally overlying bedrock, remains.

• As much as 25 percent of the unit includes small areas of other soils that support vegetation. These areas occur as islands of soil material and are surrounded by denuded sandy or barren areas. They are associated with areas of rangeland but provide no forage for animals.

Capability Classification

VIII

23-Bluehill fine sandy loam, 30 to 60 percent slopes

Composition

Bluehill soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: South-facing slopes of mesas and fan terraces
Elevation: 4,700 to 5,900 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 105 days

Characteristics of the Bluehill soil

Typical profile:
0 to 3 inches-light brownish gray fine sandy loam
3 to 13 inches-pale brown very fine sandy loam
13 to 30 inches-very pale brown loam
30 inches-weakly consolidated volcanic ash
Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Weakly consolidated volcanic ash at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Wilsongulch very stony loam near mesa tops
• Hardister fine sandy loam on toe slopes
• Outcrops of volcanic ash
• Soils less than 20 inches deep to weakly consolidated volcanic ash in convex areas and eroded areas

Use and Management

Major use: Rangeland
Major management factors: Slope, low available water capacity, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, Indian ricegrass, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low precipitation during the growing season.
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• Range seeding of adapted species is limited by the slope, water erosion, wind erosion, and the low precipitation during the growing season.

Capability Classification

VIII, nonirrigated

24-Calcixerollic Xerochrepts, 20 to 50 percent slopes

Composition

Calcixerollic Xerochrepts and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Moderately steep and steep fan terrace breaks and hillsides
Elevation: 4,800 to 5,600 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 105 days
Representative profile:
0 to 5 inches-pale brown stony silt loam
5 to 60 inches-pale brown and very pale brown very gravelly silt loam and gravelly silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 6 to 9 inches
Restriction affecting rooting depth: Very gravelly or cobbly layers at a depth of 40 inches or less
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that are more than 35 percent coarse fragments throughout in drainageways and eroded areas
• Heglar silt loam in the less sloping areas and in landscape positions similar to those of the Xerochrepts
• Pocatello silt loam in slightly convex, eroded areas
• Soils that are similar to Ririe, Rexburg, and Kucera silt foams on north-facing slopes at the higher elevations

Use and Management

Major use: Rangeland
Major management factors: Hazards of water erosion and wind erosion; stones, cobbles, and gravel on and below the surface; slope

Rangeland

Dominant vegetation in potential natural plant community: Basin big sagebrush, bluebunch wheatgrass General management considerations:

- The slopes generally are 150 to 500 feet long and have been dissected by water erosion.
- The unit includes soils that are weakly developed and that generally are dry during the summer.
- The hazards of water erosion and wind erosion and the slope make movement across the unit difficult or impossible.
- The slope and the numerous erosion channels make using equipment for range improvements difficult.
- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- Range seeding of adapted species is limited by the slope, the numerous dissections, coarse fragments on the surface, water erosion, and wind erosion.

Capability Classification

VIIe, nonirrigated

25-Chatburn silt loam, 1 to 4 percent slopes

Composition

Chatburn soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Valley floors, coalesced fan terraces
Elevation: 4,600 to 4,900 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Chatburn Soil

Typical profile:
0 to 11 inches-brown silt loam
11 to 14 inches-pale brown silty clay loam
14 to 60 inches-very pale brown and light gray silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8 to 10 inches
Restriction affecting rooting depth: A very hard, friable, platy layer at a depth of about 16 to 19 inches
Runoff: Slow
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Ririe silt loam in slightly concave areas
- Soils that have a hardpan at a depth of less than 20 inches

Use and Management

Major use: Irrigated cropland
Major management factors: Hazards of water erosion and wind erosion, a short growing season

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:

- The short growing season limits crop production.
- The soil is easily eroded if a furrow irrigation system is used.
- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

IIIe, irrigated

26-Chayson gravelly silt loam, 2 to 10 percent slopes

Composition

Chayson soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Chayson Soil

Typical profile:
0 to 3 inches-grayish brown gravelly silt loam
3 to 12 inches-brown gravelly silty clay loam and gravelly clay loam
12 to 18 inches-pale brown clay loam
18 to 28 inches-very pale brown gravelly loam
28 inches-lime-silica cemented hardpan
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 3 to 4 inches

Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils in drainageways and slightly concave: areas that do not have a hardpan and that have more than 35 percent rock fragments
- Soils that have a hardpan at a depth of 40 to 60 inches on the upper part of fan terraces

Use and Management

Major uses: Rangeland, nonirrigated cropland
Major management factors: Moderate depth to a hardpan, a short growing season, low available water capacity, coarse fragments on the surface, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass, Idaho fescue
General management considerations:

- Range seeding of adapted species is limited by the low available water capacity, water erosion, wind erosion, and coarse fragments on the surface.

Nonirrigated cropland

Suitable crops: Nonirrigated wheat
General management considerations:

- The short growing season, the depth to hardpan, and the low available water capacity limit crop production.
- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.
- Coarse fragments on the surface interfere with the use of tillage equipment.

Capability Classification

IVs, nonirrigated

27-Chen very cobbly loam, 2 to 10 percent slopes

Composition

Chen soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Mesa tops
Elevation: 5,400 to 6,200 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Chen Soil

Typical profile:
0 to 3 inches-grayish brown very cobbly loam
3 to 6 inches-grayish brown very cobbly clay
6 to 10 inches-brown *very* cobbly clay
10 to 13 inches-brown extremely cobbly clay
13 inches-unweathered bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Very slow
Available water capacity: Less than 1 inch
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

- Rock outcrop
- Soils that are less than 10 inches deep to bedrock

Use and Management

Major use: Rangeland
Major management factors: Shallow depth to bedrock, cobbles on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, Idaho fescue, bluebunch wheatgrass
General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season, the depth to bedrock, and the low available water capacity.
- The use of forage by livestock is limited by poor access to the mesa tops, rock fragments on the surface, rock outcrop, and the lack of permanent water developments.
- Range seeding of adapted species is limited by poor access, rock fragments on the surface, wind erosion, water erosion, and the low available water capacity.

Capability Classification

VIIs, nonirrigated

28-Chen-Vipont association, 30 to 50 percent slopes

Composition

Chen soil and similar soils-60 percent
Vipont soil and similar soils-30 percent
Contrasting inclusions-10 percent

Setting

Elevation: 5,200 to 6,400 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 85 days

Characteristics of the Chen Soil

Position on landscape: South-facing mountainsides *Rock fragments on surface:* Kind-stones, cobbles, and gravel; percentage of surface covered-25 to 40
Typical profile:
0 to 3 inches-grayish brown extremely stony loam
3 to 14 inches-brown very gravelly clay
14 inches-unweathered bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Very slow
Available water capacity: Less than 1 inch
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Vipont Soil

Position on landscape: North-facing mountainsides
Rock fragments on surface: Kind-stones; percentage of surface covered-3 to 4
Typical profile:
0 to 8 inches-dark brown very stony loam
8 to 26 inches-brown extremely cobbly clay loam
26 inches-unweathered bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

• A soil that is similar to Jimsage soils and that has a surface layer of cobbly loam; in and near drainagaways
• Conneridge very stony loam on south-facing toe slopes
• Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, cobbles and stones on and below this surface, shallow depth to bedrock in the Chen soil, moderate depth to bedrock in the Vipont soil, hazard of water erosion, slope

Rangeland

Dominant vegetation in potential natural plant community: Chen soil-low sagebrush, Idaho fescue, bluebunch wheatgrass; Vipont soil-mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low available water capacity, the shallow depth to bedrock, and coarse fragments on the surface.
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• Range seeding of adapted species is limited by the rock fragments on the surface, the slope, depth to bedrock in some areas, the low available water capacity, and water erosion.

Capability Classification

VIIs, nonirrigated

29-Clavicon stony loam, 30 to 50 percent slopes

Composition

Clavicon soil and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Mountainsides
Elevation: 5,700 to 7,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Clavicon Soil

Typical profile:
0 to 4 inches-dark grayish brown stony loam
4 to 16 inches-dark brown very gravelly loam
16 to 28 inches-very pale brown very cobbly loam
28 inches-slightly fractured, unweathered bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

• Hymas soils that have a surface layer of very gravelly loam on ridgetops and steep slopes at the higher elevations

• Lizzant soils that have a surface layer of very gravelly loam in the less sloping areas between ridges and on toe slopes
• A soil that is similar to Ireland soils and that has a surface layer of very gravelly loam; on steer north-facing slopes in slightly concave areas
• Rock outcrop
• Soils along the Utah border that are similar to Povey and Middlehill soils at elevations as high as 7,400 feet

Use and Management

Major uses: Woodland, grazable woodland
Major management factors: Hazard of water erosion, low available water capacity, slope, cobbles and gravel on and below the surface

Woodland

Dominant vegetation in potential natural plan! community: Pinyon pine, mountain big sagebrush, bluebunch wheatgrass
Site index for pinyon pine: 50
Yield: 15 cubic feet per acre from a stand of trees 100 years old

Grazable woodland

Dominant vegetation in potential natural plans community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• The use of forage by livestock is limited by the thick stand of trees and the slope.
• Range seeding of adapted species is limited by the thick stand of trees, the slope, rock fragments on the surface, the low available water capacity, and water erosion.

Capability Classification

VIls, nonirrigated

30-Coalbank fine sandy loam, 40 to 65 percent slopes

Composition

Coalbank soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: North-facing mesa sides and hillsides
Elevation: 4,800 to 5,900 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Coalbank Soil

Typical profile:
0 to 10 inches-grayish brown fine sandy loam
10 to 21 inches-brown fine sandy loam
21 to 46 inches-pale brown fine sandy loam
46 to 55 inches-light gray fine sand
55 inches-weakly consolidated volcanic ash
Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 6 to 10 inches
Restriction affecting rooting depth: Weakly consolidated volcanic ash at a depth of 40 to more than 60 inches
Runoff: Rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

Cottonthomas fine sandy loam on toe slopes of less than 20 percent
• Wilsongulch very stony sandy loam on the steeper slopes and near mesa tops
• Ash outcrop
• Coalbank fine sandy loam on the upper part of toe slopes of less than 40 percent

Use and Management

Major use: Rangeland
Major management factors: Slope, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, Idaho fescue
General management considerations:
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• Range seeding of adapted species is limited by the slope, water erosion, and wind erosion.

Capability Classification

VIe, nonirrigated

31-Coalbank-Bluehill association, 40 to 60 percent slopes

Composition

Coalbank soil and similar soils-50 percent
Bluehill soil and similar soils-25 percent
Contrasting inclusions-25 percent

Setting

Elevation: 4,700 to 5,900 feet
Average annual precipitation: About 14 inches

Average annual air temperature: About 45 degrees F
Frost-free period: About 95 days

Characteristics of the Coalbank Soil

Position on landscape: North-facing slopes on mesa sides
Typical profile:
0 to 10 inches-grayish brown fine sandy loam
10 to 21 inches-brown fine sandy loam
21 to 46 inches-pale brown fine sandy loam
46 to 55 inches-light gray fine sand
55 inches-weakly consolidated volcanic ash
Depth class: Deep and very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 6 to 10 inches
Restriction affecting rooting depth: Weakly consolidated volcanic ash at a depth of 40 to more than 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Characteristics of the Bluehill Soil

Position on landscape: South-facing slopes on mesa sides
Typical profile:
0 to 3 inches-light brownish gray fine sandy loam
3 to 13 inches-pale brown very fine sandy loam
13 to 30 inches-very pale brown loam
30 inches-weakly consolidated volcanic ash
Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Weakly consolidated volcanic ash at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Stines very stony sandy loam on north-facing slopes near hilltops and mesa tops
- Cottonthomas fine sandy loam on the less sloping northerly aspects
- Hardister fine sandy loam on valley bottoms
- Wilsongulch stony loam on south-facing slopes near hilltops and mesa tops
- Rock outcrop
- Coalbank fine sandy loam on the upper part of toe slopes of less than 40 percent

Use and Management

Major use: Rangeland
Major management factors: Slope, the low available water capacity in the Bluehill soil, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Coalbank soil-mountain big sagebrush, Idaho fescue; Bluehill soil-Wyoming big sagebrush, Indian ricegrass, bluebunch wheatgrass
General management considerations:
- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- Range seeding of adapted species is limited by the slope, the low available water capacity, water erosion, and wind erosion.

Capability Classification

VIIe, nonirrigated

32-Conneridge very stony loam, 20 to 50 percent slopes

Composition

Conneridge soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides, ridges
Elevation: 5,100 to 7,100 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 80 days
Rock fragments on surface: Kind-stones and pebbles; percentage of surface covered-30 to 60

Characteristics of the Conneridge Soil

Typical profile:
0 to 3 inches-grayish brown very stony loam
3 to 7 inches-brown very gravelly loam
7 to 13 inches-brown very stony loam
13 to 17 inches-yellowish brown very gravelly loam
17 to 23 inches-pale brown extremely gravelly loam
23 inches-unweathered bedrock that has continuous thin coatings of lime
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 5 inches
Restriction affecting rooting *depth:* Bedrock at a depth of 20 to 40 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Contrasting Inclusions

- Soils that are less than 20 inches deep to bedrock and have more than 35 percent rock fragments; near rock outcrop and in landscape positions similar to those of the Conneridge soil
- Vipont very stony loam on, steep north- and south-facing slopes
- Soils that are deep and very deep, that *hate* more than 35 percent rock fragments, and that support stands of mountain mahogany and aspen; on steep north-facing slopes in concave areas
- A soil on steep north-facing slopes that is similar to Ricrest soils and that has a surface layer of gravelly silt loam
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, stones on and below the surface, a short growing season, hazard of water erosion, slope

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, bluebunch wheatgrass *General management considerations:*

- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited by the low available water capacity, the stones on and below the surface, water erosion, and the slope.

Capability Classification

Vlls, nonirrigated

33-Conneridge-Rexburg association, 20 to 50 percent slopes

Composition

Conneridge soil and similar soils-65 percent
Rexburg soil and similar soils-20 percent
Contrasting inclusions-15 percent

Setting

Elevation: 4,700 to 5,700 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Conneridge Soil

Position on landscape: Steep south-facing mountainsides, moderately sloping north-facing mountainsides
Slope: 20 to 40 percent
Rock fragments on surface: Kind-gravel and stones in some areas; percentage of surface covered-10 to 35
Typical profile:
0 to 3 inches-grayish brown very stony loam
3 to 7 inches-brown *very* gravelly loam
7 to *13* inches-brown very stony loam
13 to 17 inches-yellowish brown *very* gravelly loam
17 to 23 inches-pale brown extremely gravelly loam
23 inches-unweathered bedrock that has continuous thin coatings of lime
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Characteristics of the Rexburg Soil

Position on landscape: Steep north-facing mountainsides
Slope: 30 to 50 percent
Typical profile:
0 to 14 inches-brown silt loam
14 to 22 inches-pale brown silt loam
22 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Watercanyon silt loam on toe slopes and eroded north-facing slopes
- Hyenas very stony loam on ridgetops, on shoulder slopes, and near rock outcrop
- Rock outcrop
- Vitale soils that have a surface layer of gravelly loam on steep south-facing slopes
- A soil that is similar to Rexburg soils and that is calcareous to the surface; on narrow valley bottoms

Use and Management

Major use: Rangeland
Major management factors of the Conneridge soil: Low

available water capacity; content of grave, cobbles, and stones; hazard of water erosion; slope

Major management factors of the Rexburg soil: Hazards of water erosion and wind erosion, slope

Rangeland

Dominant vegetation in potential natural plant community: Conneridge soil-low sagebrush, bluebunch wheatgrass; Rexburg soil-mountain big sagebrush, bluebunch wheatgrass

General management considerations:

- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- The use of forage by livestock is limited by the slope and the surface stones in some areas.
- Range seeding of adapted species is limited by the slope, the low available water capacity in some areas, and the surface stones in some areas.

Capability Classification

Conneridge soil-VIIs, nonirrigated; Rexburg soil-VIIe, nonirrigated

34-Cottonthomas fine sandy loam, 3 to 12 percent slopes

Composition

Cottonthomas soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces, hillsides
Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Cottonthomas Soil

Typical profile:
0 to 11 inches-brown fine sandy loam
11 to 35 inches-very pale brown and pale brown loam
35 to 60 inches-very pale brown and pale brown fine sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 7 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Tomsherry loam in landscape positions similar to those of the Cottonthomas soil
- Bluehill fine sandy loam

Use and Management

Major use: Rangeland

Major management factors: Hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass

General management considerations:

- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IVe, nonirrigated

35-Cottonthomas-Tomsherry complex, 0 to 12 percent slopes

Composition

Cottonthomas soil and similar soils-50 percent
Tomsherry soil and similar soils-35 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Cottonthomas Soil

Position on landscape: North-facing slopes, slightly eroded areas

Typical profile:
0 to 11 inches-brown fine sandy loam
11 to 35 inches-very pale brown and pale brown loam
35 to 60 inches-very pale brown and pale brown fine sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 7 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Slow to rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Characteristics of the Tomsherry Soil

Position on landscape: South- and west-facing *slopes,* stable areas

Typical profile:
0 to 11 inches-brown fine sandy loam
11 to *32* inches-white and very pale brown fine sandy loam
32 to 36 inches-lime-silica cemented hardpan
36 to 60 inches-very pale brown and pale brown loamy fine sand
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 2 to 7 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Bluehill fine sandy loam on steep south-facing slopes
- Stines soils that have a surface layer of very gravelly fine sandy loam on steep south-facing slopes
- Soils that have a hardpan at a depth of less than 20 inches

Use and Management

Major use: Rangeland
Major management factors: Moderate depth to a hardpan and low available water capacity in the Tomsherry soil, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low available water capacity and moderate depth of the Tomsherry soil.
- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IVe, nonirrigated

36-Cumulic Haplaquolls, 0 to 4 percent slopes

Composition

Cumulic Haplaquolls and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Flood plains, low stream terraces
Elevation: 4,800 to 6,300 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 85 days

Characteristics of the Cumulic Haplaquolls

Representative profile:
0 to 28 inches-very dark gray clay loam
28 to 40 inches-dark gray sandy clay loam
40 to 60 inches-grayish brown or pale brown sandy loam
Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderately slow
Available water capacity: 7 to 11 inches
Restriction affecting rooting depth: Water table at a depth of 18 to 30 inches
Depth to seasonal high water table: December through July-18 to 30 inches; rest of year-30 to 50 inches
Flooding: Occasional
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

- Hardister fine sandy loam on small fans on side slopes along drainageways; in the Goose Creek area
- Cobbly or gravelly soils near the Goose Creek channel
- Soils that are sandy loam throughout and that are in landscape positions similar to those of the Cumulic Haplaquolls; in the Goose Creek area
- A soil that is similar to Kovich soils; near the active stream channel in the Birch Creek area

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Hazard of flooding, a water table at a depth of 18 to 30 inches, a short growing season

Irrigated cropland

Suitable crops: Alfalfa hay
General management considerations:
- The short growing season limits crop production.
- Crop production and the use of equipment are limited by the seasonal high water table and the flooding.

Rangeland

Dominant vegetation in potential natural plant community: Sedge, bluegrass
General management considerations:
- Forage production is limited mainly by the high water table.
- Management is needed to allow livestock easy access to the streams while minimizing the amount of damage to the streambanks.

Capability Classification

IVw, irrigated and nonirrigated

37-Darkbull loam, 0 to 1 percent slopes

Composition

Darkbull soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 115 days

Characteristics of the Darkbull Soil

Typical profile:
0 to 7 inches-pale brown loam
7 to 13 inches-very pale brown loam
13 to 20 inches-very pale brown sandy loam
20 to 60 inches-stratified white and very gale brown very gravelly sandy loam, very gravelly loamy sand, and very gravelly sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Declo silt loam in the slightly higher landscape positions
- Strevell silt loam in landscape positions similar to those of the Darkbull soil
- Escalante fine sandy loam in the slightly higher landscape positions

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Low available water capacity, depth to very gravelly material, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity.
- Range seeding of adapted species is limited by the low precipitation during the growing season, wind erosion, and the low available water capacity.

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:

- A tillage pan forms if the soil is excessively cultivated.

Capability Classification

Vls, nonirrigated; Ills, irrigated

38-Darkbull loam, 1 to 4 percent slopes

Composition

Darkbull soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Darkbull Soil

Typical profile:
0 to 7 inches-pale brown loam
7 to 13 inches-very pale brown loam
13 to 20 inches-very pale brown sandy loam
20 to 60 inches-stratified white and very pale brown very gravelly sandy loam, very gravelly loamy sand, and very gravelly sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Declo silt loam in the slightly higher landscape positions
- Strevell silt loam in landscape positions similar to those of the Darkbull soil

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Low available water capacity, depth to very gravelly material, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass,. Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity.
- Range seeding of adapted species is limited by the low available water capacity, the low precipitation during the growing season, wind erosion, and water erosion.

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay

General management considerations:

- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.
- The production of some crops is limited by the low available water capacity and the shallow depth to coarse textured material.

Capability Classification

VIs, nonirrigated; IIIs, irrigated

39-Darkbull loam, saline, 1 to 3 percent slopes

Composition

Darkbull soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,200 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 115 days

Characteristics of the Darkbull Soil

Typical profile:

0 to 12 inches-pale brown loam
12 to 23 inches-very pale brown gravelly sandy loam
23 to 60 inches-stratified pale brown very gravelly sandy loam and sand

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

- Escalante fine sandy loam in the slightly higher landscape positions
- Declo silt loam in the slightly higher landscape positions
- Strevell silt loam in the slightly higher landscape positions and in landscape positions similar to those of the Darkbull soil

Use and Management

Major use: Rangeland
Major management factors: Salinity, low available water capacity, depth to very gravelly material, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Black greasewood, bottlebrush squirreltail

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season, the salinity, the shallow depth to very gravelly material, and the low available water capacity.
- Range seeding of adapted species is limited by the salinity, wind erosion, and the low available water capacity.

Capability Classification

VIs, nonirrigated; IIIs, irrigated

40-Darkbull gravelly loam, 4 to 20 percent slopes

Composition

Darkbull soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,900 to 5,200 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Darkbull Soil

Typical profile:

0 to 6 inches-light brownish gray gravelly loam
6 to 49 inches-light brownish gray and pale brown very gravelly loam
49 to 60 inches-stratified extremely gravelly loamy sand to very gravelly sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Potential rooting depth: 60 inches or more
Runoff: Medium to *very* rapid
Hazard of water erosion: Moderate to very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Bluehill fine sandy loam near outcrop of weakly consolidated volcanic ash and in the more sloping areas
• Outcrop of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, depth to very gravelly material, law precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
• Forage production is limited mainly by the low precipitation during the growing season, the shallow *depth to very gravelly material, and the low available* water capacity.
• Range seeding of adapted species is limited by water erosion, wind erosion, the content of gravel, and the low available water capacity.

Capability Classification

VIe, nonirrigated

41-Darkbull gravelly loam, cool, 4 to 8 percent slopes

Composition

Darkbull soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,400 to 5,700 feet
Average annual precipitation: About 12 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 95 days
Rock fragments on surface: Kind-gravel; percentage of surface covered-25 to 40

Characteristics of the Darkbull Soil

Typical profile:
0 to 5 inches-brown gravelly loam
5 to 10 inches-pale brown gravelly loam
10 to 16 inches-very pale brown very gravelly loam
16 to 60 inches-very pale brown *very* gravely and very cobbly sand and loamy sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Strevell and Declo silt loams in the slightly higher landscape positions
• Soils that have slopes of more than 12 percent near drainageways

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, depth to *very* gravelly material, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
• Forage production is limited mainly by the low precipitation during the growing season, the shallow depth to very gravelly material, and the low available water capacity.
• Range seeding of adapted species is limited by the low precipitation during the growing season, the low available water capacity, water erosion, wind erosion, and gravel on and below the surface.

Capability Classification

VIe, nonirrigated

42-Darkbull silt loam, strongly saline, 1 to 3 percent slopes

Composition

Darkbull soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,600 to 5,000 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 115 days

Characteristics of the Darkbull Soil

Typical profile:
0 to 4 inches-very pale brown silt loam
4 to 12 inches-pale brown gravelly loam

12 to 23 inches-light brownish gray and very pale brown very gravelly sandy loam
23 to 60 inches-very pale brown extremely cobbly loamy sand

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 3 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

- Declo silt loam, saline, in the slightly higher landscape positions
- Strevell silt loam in the slightly higher landscape positions and in landscape positions similar to those of the Darkbull soil

Use and Management

Major use: Rangeland
Major management factors: Salinity, low available water capacity, depth to very gravelly material, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Shadscale, bottlebrush squirreltail *General management considerations:*

- Range recovery is slow because of the salinity.
- Forage production is limited mainly by the low precipitation during the growing season, the salinity, the shallow depth to very gravelly material, and the low available water capacity.
- Range seeding of adapted species is limited by the salinity, the low available water capacity, the content of gravel, and wind erosion.

Capability Classification

Vls, nonirrigated

43-Darkbull, saline-Strevell, nonsaline complex, 4 to 12 percent slopes

Composition

Darkbull soil and similar soils-45 percent
Strevell soil and similar soils-40 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Dissected fan terraces
Elevation: 5,200 to 5,600 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 100 days

Characteristics of the Darkbull Soil

Position on landscape: Slightly convex areas
Slope: 6 to 12 percent
Rock fragments on surface: Kind-gravel; percentage of surface covered-25 to 40
Typical profile:
0 to 5 inches-light gray gravelly loam
5 to 13 inches-white very gravelly sandy loam
13 to 25 inches-very pale brown extremely gravelly coarse sandy loam
25 to 60 inches-very pale brown stratified *very* gravelly sandy loam, sandy loam, and extremely gravelly loamy sand

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Characteristics of the Strevell Soil

Position on landscape: Drainageways, slightly concave areas
Slope: 4 to 8 percent
Rock fragments on surface: Kind-gravel; percentage of surface covered-25 to 40
Typical profile:
0 to 3 inches-light gray gravelly silt loam
3 to 19 inches-very pale brown silt loam
19 to 33 inches-very pale brown gravelly silt loam
33 to 60 inches-very pale brown very gravelly sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Declo silt loam in and near drainageways and in gently sloping to moderately sloping areas
- Darkbull gravelly silt loam, cool, at the higher elevations near the Utah border

Use and Management

Major use: Rangeland
Major management factors: Salinity, low available water

capacity, and depth to extremely gravelly material in the Darkbull soil; low precipitation; hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Darkbull soil-shadscale, bottlebrush squirreltail; Strevell soil-Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season, the salinity, the shallow depth to extremely gravelly material, and the low available water capacity.
- Range recovery on the Darkbull soil is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity and low available water capacity in the Darkbull soil, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

VIe, nonirrigated

44-Davey sandy loam, 0 to 2 percent slopes

Composition

Davey soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Low river terraces
Elevation: 4,200 to 4,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 49 degree: F
Frost-free period: About 135 days

Characteristics of the Davey Soil

Typical profile:
0 to 7 inches-brown and pale brown sandy loam 7 to 19 inches-pale brown sandy loam 19 to 25 inches-pale brown loamy sand 25 to 60 inches-multicolored gravelly sand

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 4 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Very slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

- Soils that are loamy sand or sand throughout on dunes
- Vining sandy loam near basalt outcrop
- A soil that borders water areas that are subject to seasonal overflow

Use and Management

Major use: Rangeland
Major management factors: Low precipitation, depth to droughty soil material, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Wyoming big sagebrush, Indian ricegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by wind erosion and the droughty soil material.

Capability Classification

VIs, nonirrigated

45-Davey fine sandy loam, 0 to 2 percent slopes

Composition

Davey soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Slightly concave areas on low river terraces, old drainageways
Elevation: 4,200 to 4,300 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 49 degrees F
Frost-free period: About 135 days

Characteristics of the Davey Soil

Typical profile:
0 to 3 inches-pale brown fine sandy loam
3 to 22 inches-pale brown sandy loam
22 to 28 inches-very pale brown loamy coarse sand
28 to 49 inches-multicolored coarse sand
49 to 60 inches-multicolored very gravelly coarse sand

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 4 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

- Vining sandy loam near basalt outcrop
- A soil that borders water areas that are subject to seasonal overflow

Use and Management

Major use: Rangeland
Major management factors: Depth to droughty soil material, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plan- community: Basin big sagebrush, basin wildrye General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by wind erosion, the low precipitation, and the droughty soil material.

Capability Classification

Vls, nonirrigated

46-Declo silt loam, 0 to 1 percent slopes

Composition

Declo soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Coalesced fan terraces, valley floors
Elevation: 4,200 to 4,600 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 120 days

Characteristics of the Declo Soil

Typical profile:
0 to 18 inches-pale brown silt loam
18 to 35 inches-very pale brown silt loam
35 to 60 inches-pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

- Bahem and Portneuf soils in the slightly higher landscape positions

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion, low precipitation

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay
General management considerations:

- A tillage pan forms if the soil is excessively cultivated.
- Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIc, irrigated

47-Declo silt loam, 1 to 3 percent slopes

Composition

Declo soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Coalesced fan terraces
Elevation: 4,200 to 5,000 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 120 days

Characteristics of the Declo Soil

Typical profile:
0 to 8 inches-pale brown silt loam
8 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate or severe

Contrasting Inclusions

- Declo silt loam, saline, in slightly concave areas
- Darkbull and Strevell loams in and near drainageways

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Hazard of wind erosion, low precipitation

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay

General management considerations:

- A tillage pan forms if the soil is excessively cultivated.
- Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by wind erosion.

Capability Classification

IIe, irrigated; VIc, nonirrigated

48-Declo silt loam, 3 to 8 percent slopes

Composition

Declo soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Coalesced fan terraces
Elevation: 4,400 to 5,600 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Declo Soil

Typical profile:
0 to 8 inches-pale brown silt loam
8 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Declo silt loam, saline, in slightly concave areas
- Darkbull and Strevell foams in and near drainageways

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Slope, hazards of water erosion and wind erosion, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by water erosion and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay

General management considerations:

- The soil is easily eroded if a furrow irrigation system is used.
- The short growing season limits crop production.
- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIe, nonirrigated; IIIe, irrigated

49-Declo silt loam, saline, 0 to 1 percent slopes

Composition

Declo soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,300 to 5,200 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 115 days

Characteristics of the Declo Soil

Typical profile:
0 to 8 inches-pale brown and very pale brown silt loam
8 to 37 inches-very pale brown and white silt loam
37 to 60 inches-very pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 8 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate or severe
Salinity: Moderately saline

Contrasting Inclusions

- Strevell silt loam in eroded areas
- Darkbull loam in drainageways
- Escalante fine sandy loam in the slightly higher landscape positions

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Salinity, hazard of wind erosion, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Black greasewood, bottlebrush squirreltail General management considerations:

- Forage production is limited by the salinity and the low precipitation.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, alfalfa hay
General management considerations:

- The salinity limits crop production.
- If the land is well managed, good yields car be produced after a proper conditioning period.
- A tillage pan forms if the soil is excessively cultivated.
- The soil is easily eroded if a furrow irrigation system is used.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

Vls, nonirrigated; Ills, irrigated

50-Declo silt loam, saline, 1 to 3 percent slopes

Composition

Declo soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,600 to 5,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 110 days

Characteristics of the Declo Soil

Typical profile:
0 to 8 inches-pale brown and very pale brown silt loam
8 to 37 inches-very pale brown and white silt loam
37 to 60 inches-very pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 8 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate or severe
Salinity: Moderately saline

Contrasting Inclusions

- Strevell silt loam in eroded areas
- Darkbull loam in and near drainageways

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Salinity, hazard of wind erosion, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Black greasewood, bottlebrush squirreltail
General management considerations:

- Forage production is limited by the salinity and the low precipitation.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, and wind erosion.

Irrigated cropland
Suitable crops: Wheat, potatoes, sugar beets, alfalfa hay
General management considerations:

- The salinity limits crop production.
- If the land is well managed, good yields can be produced after a proper conditioning period.
- A tillage pan forms if the soil is excessively cultivated.
- The soil is easily eroded if a furrow irrigation system is used.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

VIe, nonirrigated; IIIe, irrigated

51-Declo silt loam, saline, 3 to 8 percent slopes

Composition

Declo soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,600 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Declo Soil

Typical profile:
0 to 8 inches-pale brown and very pale brown silt loam
8 to 37 inches-very pale brown and white silt loam
37 to 60 inches-very pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 8 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

- Strevell silt loam in eroded areas
- Darkbull loam in and near drainageways

Use and Management

Major use: Rangeland
Major management factors: Salinity, hazards of water erosion and wind erosion, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Black greasewood, bottlebrush squirreltail
General management considerations:
- Forage production is limited by the salinity and the low precipitation.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

VIe, nonirrigated; IVe, irrigated

52-Declo silt loam, strongly saline, 1 to 3 percent slopes

Composition

Declo soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,000 to 5,600 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 100 days

Characteristics of the Declo Soil

Typical profile:
0 to 2 inches-pale brown silt loam
2 to 28 inches-very pale brown and light gray silt loam
28 to 60 inches-light gray sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 7 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Saline

Contrasting Inclusions

- Strevell silt loam, nonsaline, in the slightly concave areas
- Darkbull loam in and near drainageways

Use and Management

Major use: Rangeland
Major management factors: Salinity, hazard of wind erosion, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Shadscale, bottlebrush squirreltail
General management considerations:
- Forage production is limited by the salinity and the low precipitation.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, and wind erosion.

Capability Classification

VIe, nonirrigated

53--Declo-Darkbull complex, 1 to 8 percent slopes

Composition

Declo soil and similar soils-55 percent
Darkbull soil and similar soils-30 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,700 to 5,200 feet

Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 110 days

Characteristics of the Declo Soil

Position on landscape: Smooth slopes
Typical profile:
0 to 8 inches-pale brown and very pale brown silt loam
8 to 26 inches-pale brown and white silt loam
26 to 60 inches-very pale brown silt Ioam and loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Moderate

Characteristics of the Darkbull Soil

Position on landscape: Slightly eroded areas in and near drainageways and on short terrace breaks
Typical profile:
0 to 7 inches-pale brown loam
7 to 13 inches-very pale brown loam
13 to 20 inches-very pale brown sandy loam
20 to 28 inches-white and very pale brown very gravelly sandy loam and loamy sand
28 to 60 inches-very pale brown very gravelly sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Strevell loam in landscape positions similar to those of the Darkbull soil
- Areas on terrace breaks that have slopes of more than 20 percent
- Soils that have a hardpan at a depth of 25 to 40 inches

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity in the Darkbull soil, slope in some areas, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by the low precipitation, wind erosion, and water erosion.

Capability Classification

VIe, nonirrigated

54-Declo-Stanrod association, 4 to 8 percent slopes

Composition

Declo soil and similar soils-45 percent
Stanrod soil and similar soils-30 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,300 to 5,600 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 100 days

Characteristics of the Declo Soil

Position on landscape: Wide, shallow drainageways
Slope: 4 to 8 percent
Typical profile:
0 to 3 inches-pale brown silt loam
3 to 8 inches-very pale brown silt loam
8 to 37 inches-very pale brown and white silt loam
37 to 60 inches-very pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Characteristics of the Stanrod Soil

Position on landscape: Slightly convex areas
Slope: 4 to 6 percent
Typical profile:
0 to 3 inches-very pale brown silt loam
3 to 8 inches-very pale brown silty clay loam
8 to 53 inches-white and very pale brown silt loam
53 to 60 inches-very pale brown gravelly silt loam
Depth class: Very deep

Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: A layer that has a high content of salt at a depth of about 3 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate
Salinity: Saline

Contrasting Inclusions

• Darkbull and Strevell silt loams in or near drainageways
• Mellor silt loam in landscape positions similar to those of the Stanrod soil

Use and Management

Major use: Rangeland
Major management factors: Declo soil-hazards of water erosion and wind erosion, low precipitation; Stanrod soil-salinity, low available water capacity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Declo soil-Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass; Stanrod soil shadscale, bottlebrush squirreltail
General management considerations:
• Forage production is limited by the salinity and low available water capacity in the Stanrod soil and the low precipitation.
• Range recovery of the Stanrod soil is slow because of the salinity.
• Range seeding of adapted species is limited by the salinity and low available water capacity in the Stanrod soil, numerous small drainageways that are difficult to cross with machinery, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

VIe, nonirrigated

55-Donnardo gravelly loam, 2 to 4 percent slopes

Composition

Donnardo soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,400 to 5,600 feet
Average annual precipitation: About 12 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 100 days

Characteristics of the Donnardo Soil

Typical profile:
0 to 11 inches-grayish brown gravelly loam
11 to 15 inches-light brownish gray very gravelly loam
15 to 60 inches-pale brown and light gray very cobbly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate

Contrasting Inclusions

• Small areas of seeps in shallow drainageways and depressional areas
• Darkbull gravelly loam in the slightly higher mounded areas

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Depth to very gravelly or very cobbly material, low precipitation, hazard of water erosion

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:
• A tillage pan forms if the soil is excessively cultivated.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Rangeland

General management considerations:
• The rangeland in this unit has all been reseeded.
• Forage production is limited mainly by the low precipitation during the growing season.
• Range seeding of adapted species is limited by the low precipitation and water erosion.

Capability Classification

IVs, irrigated; VIs, nonirrigated

56-Downata silt loam, 0 to 2 percent slopes

Composition

Downata soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Flood plains, low stream terraces
Elevation: 4,400 to 5,100 feet

Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Downata Soil

Typical profile:
0 to 10 inches-dark gray silt loam
10 to 32 inches-dark gray silty clay loam
32 to 60 inches-grayish brown silty clay loam
Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow
Available water capacity: 10 to 12 inches
Restriction affecting rooting depth: A seasonal high water table at a depth of 0 to 20 inches from March through June and 25 to 45 inches during the rest of the year
Runoff: Very slow
Hazard of water erosion: Slight

Contrasting Inclusions

• Soils that have thin layers of fine sandy loam or gravelly sandy loam in old stream channels
• Soils that have more than 35 percent clay in the control section in nearly level or level areas
• Soils that are well drained and that have a water table at a depth of more than 60 inches; on high stream terraces

Use and Management

Major uses: Hayland, pasture
Major management factors: Depth to the water table, a short growing season

Hayland and pasture

Suitable crops: Alfalfa hay
General management considerations:
• Crop production and the use of equipment are limited by the seasonal high water table.
• Equipment should be used after the water :able has subsided and the surface has drained.
• The short growing season limits crop production.

Capability Classification

Vw, irrigated and nonirrigated

57-Escalante sandy loam, 4 to 8 percent slopes

Composition

Escalante soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Dissected alluvial fan terraces
Elevation: 5,100 to 5,300 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 100 days

Characteristics of the Escalante Soil

Typical profile:
0 to 5 inches-brown sandy loam
5 to 12 inches-pale brown sandy loam
12 to 60 inches-pale brown, very pale brown, and light yellowish brown sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 8 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

• A soil that is similar to Darkbull soils in and near drainageways
• Soils that have stones on the surface and have more than 35 percent rock fragments; on the upper part of alluvial fans
• Small areas on short, steep slopes in drainageways along the Raft River

Use and Management

Major use: Rangeland
Major management factors: Low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
• Forage production is limited by the low precipitation.
• Range seeding of adapted species is limited by water erosion, wind erosion, and the low precipitation during the growing season.

Capability Classification

VIe, nonirrigated

58-Escalante fine sandy loam, 1 to 3 percent slopes

Composition

Escalante soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,400 feet

Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 120 days

Characteristics of the Escalante Soil

Typical profile:
0 to 3 inches-brown fine sandy loam
3 to 12 inches-pale brown very fine sandy loam
12 to 28 inches-very pale brown very fine sandy loam
28 to 60 inches-light yellowish brown very fine sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 8 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate or severe

Contrasting Inclusions

- Strevell soils that have a surface layer of loam in slightly concave areas
- Small areas that have short steep slopes in the Almo area near the Raft River
- Soils that have been leached of lime from the surface to a depth of about 10 inches

Use and Management

Major use: Rangeland
Major management factors: Low precipitation, hazard of wind erosion

Rangeland
Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
- Forage production is limited by the low precipitation.
- Range seeding of adapted species is limited by wind erosion and the low precipitation during the growing season.

Capability Classification

VIc, nonirrigated

59-Farmell silty clay loam, 0 to 1 percent slopes

Composition

Farmell soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Playas, depressional areas on basalt plains
Elevation: 4,250 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 125 days

Characteristics of the Farmell Soil

Typical profile:
0 to 10 inches-pale brown silty clay loam
10 to 60 inches-pale brown and very pale brown silty clay
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that have bedrock at a depth of 35 to 40 inches
- Soils that have a very gravelly layer above a depth of 30 inches in and near small drainageways

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland
Suitable crops: Wheat, barley, alfalfa hay
General management considerations:
- A tillage pan forms if the soil is excessively cultivated.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIc, irrigated

60-Freedom silt loam, 0 to 1 percent slopes

Composition

Freedom soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces, high stream terraces
Elevation: 4,300 to 4,900 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 120 days

Characteristics of the Freedom Soil

Typical profile:
0 to 4 inches-light brownish gray silt loam
4 to 7 inches-pale brown silt loam
7 to 26 inches-light brownish gray silt loam
26 to 60 inches-light brownish gray silty clay loam and silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Saline

Contrasting Inclusions

• Genola silt loam in slightly concave areas and old stream channels

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Salinity, low precipitation hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:
• The salinity limits crop production.
• A tillage pan forms if the soil is excessively cultivated.
• The soil is easily eroded if a furrow irrigation system is used.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Black greasewood, bottlebrush squirreltail *General management considerations:*
• Forage production is limited mainly by the salinity and the low precipitation during the growing season.
• Range recovery is slow because of the salinity.
• Range seeding of adapted species is limited by the salinity and wind erosion.

Capability Classification

IVs, irrigated; VIs, nonirrigated

61-Genola silt loam, 0 to 1 percent slopes

Composition

Genola soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Flood plains, low stream terraces
Elevation: 4,400 to 5,200 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Genola Soil

Typical profile:
0 to 7 inches-light brownish gray silt loam
7 to 12 inches-pale brown silt loam
12 to 27 inches-light gray silt loam
27 to 41 inches-light brownish gray silt loam
41 to 50 inches-gray silty clay loam
50 to 60 inches-light gray clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 7 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Flooding: Rare

Contrasting Inclusions

• Stake silty clay loam in slightly concave areas
• Freedom silt loam on the slightly higher stream terraces along the sides of the flood plains
• Jett silt loam in old stream channels and concave areas

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay *General management considerations:*
• Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
• A tillage pan forms if the soil is excessively cultivated.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIc, irrigated; IVc, nonirrigated

62-Genola silt loam, saline, 0 to 1 percent slopes

Composition

Genola soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Flood plains, low stream terraces
Elevation: 4,400 to 5,200 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Genola Soil

Typical profile:
0 to 43 inches-pale brown silt loam
43 to 60 inches-light brownish gray silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Saline

Contrasting Inclusions

- Freedom and Manassa silt loams in the slightly higher landscape positions and on the higher stream terraces along the sides of the flood plains
- Jett silt loam in old stream channels

Use and Management

Major use: Rangeland, irrigated cropland on a small percent of the acreage
Major management factors: Salinity, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Black greasewood, bottlebrush squirreltail
General management considerations:

- Forage production is limited by the salinity and the low precipitation during the growing season.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley
General management considerations:

- The salinity and the low available water capacity limit the production of some crops.
- Salt-tolerant crops can be grown while the rangeland is being reclaimed.
- The high content of salt reduces the amount of moisture available to plants.
- Suitable irrigation methods are sprinkler, border, and corrugation systems.
- Sprinklers are the most suitable irrigation method.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIIs, irrigated; VIs, nonirrigated

63-Gullied land

Setting

Position on landscape: Junction of a fan terrace and the Raft River flood plain
Elevation: 4,600 to 5,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Gullied Land

- Gullied land results from the erosion of the river escarpment by wind and water action.
- In a few scattered areas, the eroded sandy material has been redeposited nearby and has a dune appearance. These areas are often subsequently eroded by water action and thus acquire an almost badland appearance.
- Because the gullies are so deep, landshaping is impossible.
- Only the areas on the narrow bottom of the gullies support vegetation. Scattered black greasewood, pickleweed, and alkali sacaton are the most common species. These areas have no value for rangeland or as a source of livestock feed.

Capability Classification

64-Gunnel gravelly silt loam, 4 to 12 percent slopes

Composition

Gunnel soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Coalesced fan terraces
Elevation: 4,800 to 6,000 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 100 days
Rock fragments on surface: Kind-gravel; percentage of surface covered-25 to 40

Characteristics of the Gunnel Soil

Typical profile:
0 to 4 inches-pale brown gravelly silt loam
4 to 9 inches-very pale brown gravelly silt loam

9 to 18 inches-very pale brown very gravelly sandy loam
18 to 37 inches-lime-silica cemented hardpan
37 to 60 inches-very pale brown extremely cobbly loamy coarse sand that has thin layers of a weakly cemented hardpan in the upper 10 inches

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 2 inches
Restriction affecting rooting depth: A hardpan at a depth of 10 to 20 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Darkbull gravelly loam in drainageways and on the sides of drainageways
- Declo loam near drainageways

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, depth to very gravelly material, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Black sagebrush, bluebunch wheatgrass
General management considerations:

- Forage production is limited mainly by the low available water capacity and the low precipitation during the growing season.
- Range seeding of adapted species is limited by the low available water capacity, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

Vle, nonirrigated

65-Gunnel-Xerollic Calciorthids association, 4 to 45 percent slopes

Composition

Gunnel soil and similar soils-45 percent
Xerollic Calciorthids and similar soils-30 percent
Contrasting inclusions-25 percent

Setting

Elevation: 5,000 to 5,700 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 105 days

Characteristics of the Gunnel Soil

Position on landscape: Long, narrow tops of a dissected pediment
Slope: 4 to 12 percent
Typical profile:
0 to 7 inches-pale brown gravelly silt loam
7 to 19 inches-very pale brown very gravelly fine sandy loam
19 to 25 inches-lime-silica cemented hardpan
25 to 60 inches-very pale brown extremely cobbly loamy coarse sand that has thin layers of a weakly cemented hardpan in the upper 15 inches

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 2 inches
Restriction affecting rooting depth: A hardpan at a depth of 10 to 20 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Characteristics of the Xerollic Calciorthids

Position on landscape: Moderately steep and steep slopes on dissected pediments
Slope: 20 to 45 percent
Typical profile:
0 to 6 inches-pale brown gravelly loam
6 to 60 inches-stratified extremely gravelly loam, extremely gravelly sandy clay loam, and gravelly loam

Depth class: Very deep
Drainage class: Well drained to somewhat excessively drained
Permeability: Moderate or moderately rapid
Available water capacity: 3 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Darkbull gravelly loam, 4 to 20 percent slopes, on narrow bottoms and on toe slopes
- Saxby very gravelly loam on the eroded ends of pediments and on steep slopes
- Soils on shoulder slopes of 12 to 20 percent

Use and Management

Major use: Rangeland
Major management factors: Gunnel soil-shallow depth

to a hardpan, low available water capacity, low precipitation, hazards of water erosion and wind erosion; Xerollic Calciorthids-hazards of water erosion and wind erosion, low precipitation, slope in some areas, low available water capacity in some areas

Rangeland

Dominant vegetation in potential natural plant community: Gunnel soil-black sagebrush, bluebunch wheatgrass; Xerollic Calciorthids-Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited by the low available water capacity in some areas and the low precipitation.
- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- Range seeding of adapted species is limited by poor access, the numerous deep drainageways, the low precipitation during the growing season, the slope in some areas, and the low available water capacity.

Capability Classification

Gunnel soil-VIe, nonirrigated; Xerollic Calciorthids VIIe, nonirrigated

66-Hades gravelly loam, 4 to 12 percent slopes

Composition

Hades soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Hillsides, alluvial fans
Elevation: 5,400 to 5,600 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 85 days

Characteristics of the Hades Soil

Typical profile:
0 to 14 inches-dark grayish brown gravelly loam
14 to 35 inches-dark brown gravelly clay loam
35 to 60 inches-brown gravelly silty clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that have more than 35 percent clay in the control section in the less sloping areas
- Soils that have bedrock at a depth of less than 60 inches on the upper part of toe slopes

Use and Management

Major use: Rangeland
Major management factors: Hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass

General management considerations:

- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IVe, nonirrigated

67-Hardister fine sandy loam, 0 to 8 percent slopes

Composition

Hardister soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Valley floors, stream terraces
Elevation: 4,900 to 5,600 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 100 days
Typical profile:
0 to 4 inches-grayish brown fine sandy loam
4 to 33 inches-grayish brown and brown sandy loam
33 to 60 inches-light brownish gray sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 7 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that have 15 to 35 percent pebbles or cobbles near active stream channels

Use and Management

Major use: Rangeland
Major management factors: Hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Basin big sagebrush, Idaho fescue, bluebunch wheatgrass

General management considerations:

- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IIIe, nonirrigated

68-Harroun stony silt loam, 4 to 20 percent slopes

Composition

Harroun soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Hillsides, cuestas
Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 100 days

Characteristics of the Harroun Soil

Typical profile:
0 to 4 inches-light brownish gray stony silt loam
4 to 11 inches-pale brown very gravelly silt loam
11 to 16 inches-pale brown very cobbly loam
16 to 22 inches-lime-silica cemented hardpan
22 to 60 inches-very pale brown very cobbly loam
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 2 inches
Restriction affecting rooting depth: A hardpan at a depth of 10 to 20 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that are similar to the Harroun soil and in similar landscape positions and that have less than 35 percent rock fragments
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Shallow depth to a hardpan, low available water capacity, stones and cobbles on and below the surface, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Black sagebrush, bluebunch wheatgrass

General management considerations:

- Forage production is limited mainly by the low available water capacity and the hardpan.
- Range seeding of adapted species is limited by stones on and below the surface, the low available water capacity, water erosion, and wind erosion.

Capability Classification

VIs, nonirrigated

69-Heglar silt loam, 1 to 3 percent slopes

Composition

Heglar soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Coalesced fan terraces (fig. 6)
Elevation: 4,400 to 5,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 120 days

Characteristics of the Heglar Soil

Typical profile:
0 to 9 inches-pale brown silt loam
9 to 21 inches-pale brown and *very* pale brown silt loam
21 to 53 inches-very pale brown silt loam
53 to 60 inches-pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

- A soil that is similar to Taunton silt loam and that is in landscape positions similar to those of the Heglar soil
- A soil that is similar to Bancroft silt loam and that is in slight depressional areas at the higher elevations
- Soils that have 15 to 30 percent gravel on the surface and that have a layer consisting of more than 35 percent rock fragments at a depth of 20 inches or less; in the more eroded areas and on the south-facing slopes of drainageways, in T. 10 S., R. 28 E., sec. 16, 17, 20, 29, and 32
- Soils that have a dark surface layer and that have been leached of carbonates to a depth of more than 20

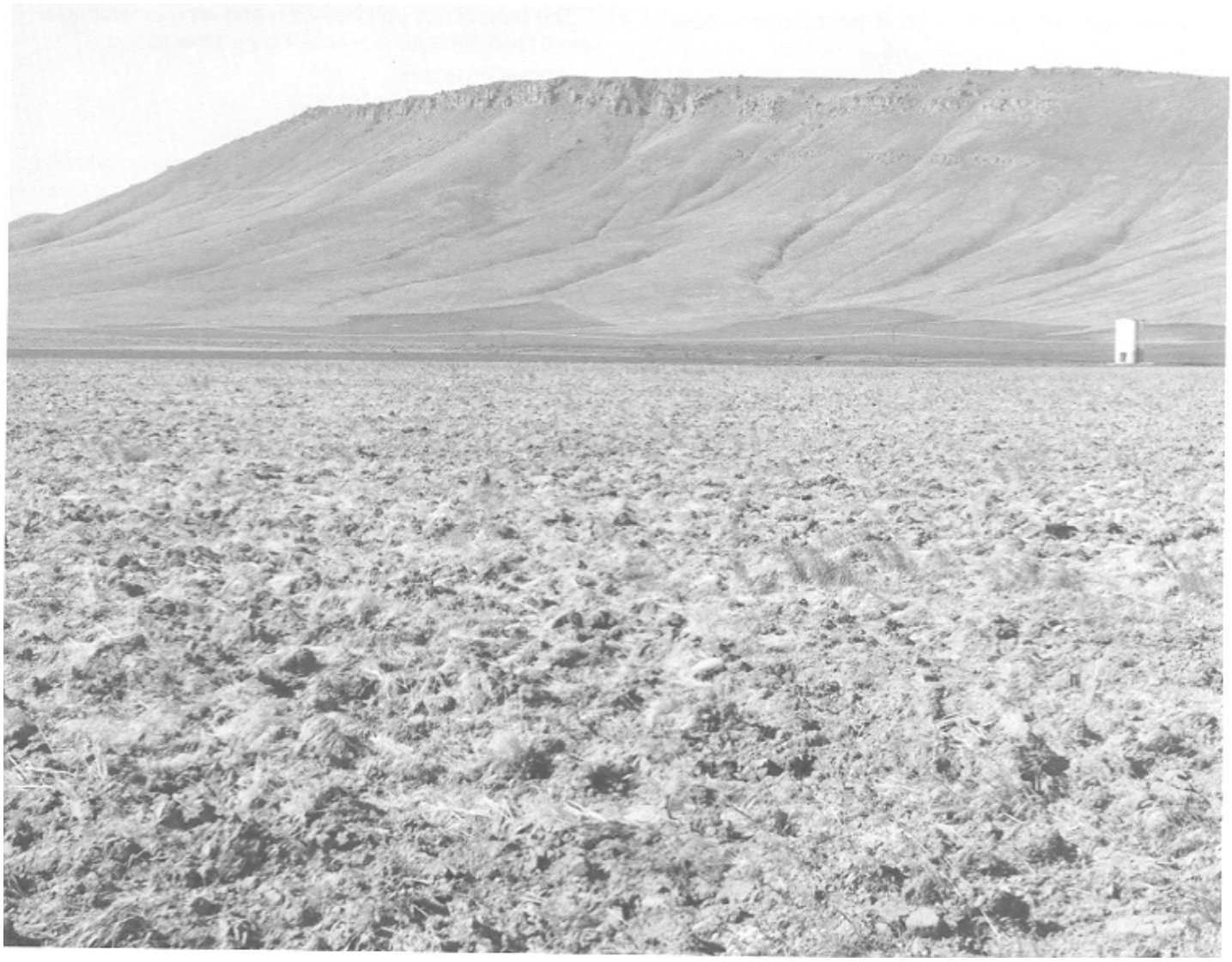

Figure 6.-An area of Heglar silt loam, 1 to 3 percent slopes, in the foreground, and an area of the Watercanyon-Vitale-Rexburg association, 30 to 50 percent slopes, In the background.

inches; on the bottom of shallow drainageways, in T. 10 S., R. 28 E., sec. 16, 17, 20, 29, and 32

• Pocatello silt loam on the eroded south-facing sides of drainageways, in T. 10 S., R. 28 E., sec. 16, 17, 20, 29, and 32

Use and Management

Major use: Nonirrigated and irrigated cropland

Major management factors: Hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley

General management considerations:

A tillage pan forms if the soil is excessively cultivated.

• The soil is easily eroded if a furrow irrigation system is used.

• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Irrigated cropland

Suitable crops: Wheat, barley *General management considerations:*

• Sprinklers are the most suitable irrigation method.

• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

Ille, irrigated and nonirrigated

70-Heglar silt loam, 3 to 8 percent slopes

Composition

Heglar soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Coalesced fan terraces, hillsides
Elevation: 4,400 to *5,600* feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Heglar Soil

Typical profile:
0 to 12 inches-pale brown silt loam
12 to 38 inches-very pale brown silt loam
38 to 60 inches-very pale brown and pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water *erosion:* Moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

- A soil that is similar to Taunton silt loam and that is in landscape positions similar to those of the Heglar soil
- A soil that is similar to Bancroft silt loam in slight depressional areas at the higher elevations
- In T. 10 S., R. 28 E., sec. 15, 16, 17, 20, 21, 28, 29, 32, and 33 and in T. 11 S., R. 28 E., sec. 4 and 5, a soil that is similar to Strevell silt loam on the sides of drainageways that have slopes of 8 to 15 percent; soils, in the more eroded areas and on the south-facing slopes of drainageways, that have 15 to 30 percent gravel on the surface and a layer consisting of more than 35 percent rock fragments at depth of 20 inches or less; soils on the bottom of shallow drainageways that have a dark surface layer and that have been leached of carbonates to a depth of more than 20 inches; and Pocatello silt loam on the eroded south-facing sides of drainageways

Use and Management

Major uses: Nonirrigated cropland, irrigated cropland, rangeland
Major management factors: Hazards of water *erosion* and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
- A tillage pan forms if the soil is excessively cultivated

increased if the surface is left bare after tillage.

Irrigated cropland

Suitable crops: Wheat, barley
General management considerations:
- A tillage pan forms if the soil is excessively cultivated.
- The soil is easily eroded if a furrow irrigation system is used.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IIIe, nonirrigated; IVe, irrigated

71-Heglar silt loam, 8 to 12 percent slopes

Composition

Heglar soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Coalesced fan terraces, hillsides
Elevation: 4,500 to 5,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Heglar Soil

Typical profile:
0 to 5 inches-pale brown silt loam
5 to 13 inches-pale brown and very pale brown silt loam
13 to 60 inches-very *pale brown, pale brown, and* light gray silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard ofwater erosion: Severe
Hazard of wind erosion: Severe

Contrasting Inclusions

- A soil that is similar to Darkbull soils and that has 15 to 30 percent gravel on the surface; in eroded areas and on the south-facing slopes of drainageways

• Pocatello silt loam on the eroded south-facing sides of drainageways
• Soils in landscape positions similar to those of the Heglar soil and that have a hardpan at a depth of 15 to 25 inches

Use and Management

Major uses: Rangeland, nonirrigated cropland
Major management factors: Slope, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
• Range seeding of adapted species is limited by water erosion and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
• The slope limits the use of some equipment.
• A tillage pan forms if the soil is excessively cultivated.
• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

IVe, nonirrigated

72-Heglar-Kucera association, 20 to 45 percent slopes

Composition

Heglar soil and similar soils-55 percent
Kucera soil and similar soils-35 percent
Contrasting inclusions-10 percent

Setting

Elevation: 4,600 to 5,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 95 days

Characteristics of the Heglar Soil

Position on landscape: Moderately steep west- and south-facing slopes on hillsides
Slope: 20 to 30 percent
Typical profile:
0 to 12 inches-pale brown silt loam
12 to 45 inches-very pale brown silt loam
45 to 60 inches-light yellowish brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Characteristics of the Kucera Soil

Position on landscape: North- and east-facing slopes on hillsides
Slope: 20 to 45 percent
Typical profile:
0 to 5 inches-grayish brown silt loam
5 to 21 inches-brown silt loam
21 to 35 inches-pale brown silt loam
35 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that have slopes of less than *20* percent or more than 45 percent
• Soils that have a surface layer of gravelly or very gravelly silt loam and have 20 to 35 percent rock fragments in the substratum; in and near drainageways

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: Slope, hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops:
• Because of the slope and the hazard of water erosion, the most suitable crops are those that provide permanent plant cover.
General management considerations:
• The slope limits the use of some equipment.
• A tillage pan forms if the soils are excessively cultivated.
• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community:

Heglar soil-Wyoming big sagebrush, bluebunch wheatgrass; Kucera soil-mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• The use of forage by livestock is limited by the slope on the Kucera soil.

• Range seeding of adapted species is limited by the slope, water erosion, and wind erosion.

Capability Classification

Heglar soil-VIe, nonirrigated; Kucera soil-VIIe, nonirrigated

73-Heglar-Pocatello complex, 4 to 30 percent slopes

Composition

Heglar soil and similar soils-70 percent
Pocatello soil and similar soils-25 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Foothills
Elevation: 4,400 to 4,650 feet
Average annual precipitation: About 13 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 120 days

Characteristics of the Heglar Soil

Position on landscape: North- and east-facing hillsides and toe slopes
Slope: 4 to 20 percent
Typical profile:
0 to 12 inches-pale brown silt loam
12 to 60 inches-very pale brown and pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Characteristics of the Pocatello Soil

Position on landscape: Strongly sloping and moderately steep south-facing hillsides and shoulder slopes
Slope: 15 to 30 percent
Typical profile:
0 to *9* inches-pale brown silt loam
9 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that have a surface layer of gravelly or very gravelly silt loam and a substratum of very gravelly sandy loam on moderately steep and steep south-facing slopes near drainageways
• Soils that have slopes of more than 30 percent

Use and Management

Major use: Nonirrigated cropland
Major management factors: Slope, hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops:
• Because of the slope and the hazards of water erosion and wind erosion, the most suitable crops are those that provide permanent plant cover.
• Nonirrigated wheat is currently grown.
General management considerations:
• The slope limits the use of some equipment.
• A tillage pan forms if the soils are excessively cultivated.
• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIe, nonirrigated

74-Hutchley gravelly loam, 12 to 20 percent slopes

Composition

Hutchley soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: West-facing slopes on cuestas
Elevation: 5,200 to 6,200 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 85 days

Characteristics of the Hutchley Soil

Typical profile:
0 to 9 inches-dark brown gravelly loam
9 to 12 inches-brown very gravelly loam
12 to 15 inches-brown very cobbly clay loam
15 inches-slightly fractured bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Rapid or very rapid

Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Vitale gravelly loam in slight depressional areas
- Watercanyon silt loam below small, rock ledges
- Rock outcrop
- Soils that have bedrock at a depth of less than

10 inches in landscape positions similar to those of the Hutchley soil and near rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Shallow depth to bedrock, low available water capacity, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, bluebunch wheatgrass
General management considerations:

- Forage production is limited mainly by the low available water capacity and the shallow depth to bedrock.
- Range seeding of adapted species is limited by the low available water capacity, water erosion, and wind erosion.

Capability Classification

VIe, nonirrigated

75-Hutchley very gravelly silt loam, 10 to 35 percent slopes

Composition

Hutchley soil and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: East- and south-facing mountainsides
Elevation: 5,500 to 7,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 75 days

Characteristics of the Hutchley Soil

Typical profile:
0 to 3 inches-light brownish gray very gravelly silt loam
3 to 7 inches-brown very gravelly loam
7 to 14 inches-brown very gravelly clay loam 14 inches-bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 1 to 2 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Moderate to very rapid
Hazard of water erosion: Moderate to very severe

Contrasting Inclusions

- Vitale gravelly loam in drainageways and concave areas
- Jimsage gravelly loam in drainageways and on short north-facing slopes
- A soil that is similar to Jimsage soils and that has more than 35 percent clay in the subsoil
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Shallow depth to bedrock, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, bluebunch wheatgrass
General management considerations:

- Forage production is limited mainly by the low available water capacity and the depth to bedrock.
- Range seeding of adapted species is limited by the low available water capacity and water erosion.

Capability Classification

VIe, nonirrigated

76-Hutchley-Vipont complex, 4 to 35 percent slopes

Composition

Hutchley soil and similar soils-45 percent
Vipont soil and similar soils-35 percent
Contrasting inclusions-20 percent

Setting

Elevation: 5,200 to 7,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 80 days

Characteristics of the Hutchley Soil

Position on landscape: West-facing slopes on cuestas, hillsides, and mountainsides
Rock fragments on surface: Kind-pebbles; percentage of surface covered-15 to 30
Typical profile:
0 to 3 inches-dark brown gravelly silt loam

3 to 9 inches-yellowish brown gravelly loam
9 to 13 inches-yellowish brown very gravelly clay loam
13 inches-bedrock

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Medium to very rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate or severe

Characteristics of the Vipont Soil

Position on landscape: South-facing slopes on cuestas, hillsides, and mountainsides
Rock fragments on surface: Kind-stones; percentage of surface covered-3 to 5
Typical profile:
0 to 12 inches-dark grayish brown very stony loam
12 to 22 inches-brown very cobbly clay loam
22 inches-bedrock

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: About 2 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Medium to very rapid
Hazard of water erosion: Moderate to very severe

Contrasting Inclusions

- Soils that are less than 10 inches to bedrock in eroded areas and near rock outcrop
- Jimsage gravelly loam on short steep north-facing slopes and near drainageways
- Rock outcrop and rubble land below the rock outcrop
- A soil that is similar to the Vipont soil and that has less than 35 percent coarse fragments in the subsoil

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, shallow depth to bedrock in the Hutchley soil, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Hutchley soil-low sagebrush, bluebunch wheatgrass; Vipont soil-mountain big sagebrush, bluebunch wheatgrass
General management considerations:

- Forage production is limited by the low available water capacity and the shallow depth to bedrock.
- Uniform distribution of grazing is difficult because of the lack of permanent water developments.
- Range seeding of adapted species is limited by the low available water capacity, water erosion, and wind erosion.

Capability Classification

Vls, nonirrigated

77-Hutchley-Vipont complex, 35 to 55 percent slopes

Composition

Hutchley soil and similar soils-45 percent
Vipont soil and similar soils-40 percent
Contrasting inclusions-15 percent

Setting

Elevation: 5,000 to 7,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Hutchley Soil

Position on landscape: Smooth and slightly convex slopes on mountainsides
Rock fragments on surface: Kind-pebbles and cobbles; percentage of surface covered-35 to 50
Typical profile:
0 to 3 inches-brown very gravelly silt loam
3 to 11 inches-brown very gravelly loam
11 inches-bedrock

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Vipont Soil

Position on landscape: South-facing slopes and slightly concave areas on mountainsides
Rock fragments on surface: Kind-stones; percentage of surface covered-5 to 10
Typical profile:
0 to 12 inches-dark brown very stony loam
12 to 22 inches-brown very cobbly clay loam
22 inches-bedrock

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: About 2 to 5 inches

Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

• Soils that are similar to Jimsage gravelly loam and that have had lime removed to a depth of more than 40 inches; in drainageways
• Rock outcrop and rubble land below the rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Slope; low available water capacity; gravel, cobbles, and stones on and below the surface; shallow depth to bedrock in the Hutchley soil; hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Hutchley soil-low sagebrush, bluebunch wheatgrass; Vipont soil-mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low available water capacity and the shallow depth to bedrock in the Hutchley soil.
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• Range seeding of adapted species is limited by the slope, the low available water capacity, water erosion, and rock fragments on the surface.

Capability Classification

VIIs, nonirrigated

78-Hymas-Bezzant association, 10 to 30 percent slopes

Composition

Hymas soil and similar soils-45 percent
Bezzant soil and similar soils-40 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Foothills
Elevation: 5,900 to 6,400 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 80 days

Characteristics of the Hymas Soil

Position on landscape: Smooth and slightly convex slopes
Slope: 10 to 30 percent
Typical profile:
0 to 11 inches-brown very stony loam
11 to 15 inches-pale brown very stony loam
15 inches-unweathered bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Medium to very rapid
Hazard of water erosion: Moderate to very severe

Characteristics of the Bezzant Soil

Position on landscape: Slightly concave areas, toe slopes
Slope: 10 to 20 percent
Typical profile:
0 to 10 inches-brown cobbly loam
10 to 15 inches-white cobbly loam
15 to 23 inches-very pale brown very cobbly loam
23 to 31 inches-very pale brown very cobbly clay loam
31 to 60 inches-reddish yellow very cobbly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe

Contrasting Inclusions

• Soils near rock outcrop that are less than 10 inches deep to bedrock
• A soil that is similar to Birchcreek soils and that is less than 35 percent clay
• Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Hymas soil-stones on and below the surface, shallow depth to bedrock, low available water capacity, hazard of water erosion; Bezzant soil-cobbles on and below the surface, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community:
Hymas soil-low sagebrush, bluebunch wheatgrass; Bezzant soil-mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited by the low available water *capacity and* the *shallow depth to* bedrock.
• Range seeding of adapted species is limited by the

surface stones and cobbles, the low available water capacity, and water erosion.

Capability Classification

Hymas soil-VIs, nonirrigated; Bezzant soil-VIe, nonirrigated

79-Idahome silt loam, 1 to 3 percent slopes

Composition

Idahome soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Coalesced fan terraces, high stream terraces
Elevation: 4,400 to 5,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Idahome Soil

Typical profile:
0 to 5 inches-pale brown silt loam
5 to 18 inches-very pale brown silt loam
18 to 31 inches-white silt loam
31 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

- Declo and Strevell silt loams near drainageways
- Darkbull silt loam in drainageways
- A soil that is similar to Idahome silt loam and that does not have a layer of accumulated lime; in wide drainageways

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Salinity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Black greasewood, bottlebrush squirreltail
General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the salinity.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, water erosion, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:

- The salinity and the low available water capacity limit the production of some crops.
- Salt-tolerant crops can be grown while the rangeland is being reclaimed.
- The high content of salt reduces the amount of moisture available to plants.
- A tillage pan forms if the soil is excessively cultivated.
- The soil is easily eroded if a furrow irrigation system is used.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIs, nonirrigated; IIIs, irrigated

80-Ireland-Hades association, 5 to 45 percent slopes

Composition

Ireland soil and similar soils-50 percent
Hades soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Foothills
Elevation: 5,400 to 5,900 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Ireland Soil

Position on landscape: Hillsides
Slope: 25 to 45 percent
Typical profile:
0 to 6 inches-grayish brown stony silt loam
6 to 15 inches-brown very cobbly silt loam
15 to 26 inches-pale brown and very pale brown extremely stony silt loam
26 inches-fractured bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Hades Soil

Position on landscape: Toe slopes, small alluvial fans, valley bottoms
Slope: 5 to 20 percent
Typical profile:
0 to 6 inches-dark grayish brown gravelly loam
6 to 12 inches-dark grayish brown gravelly silty clay loam
12 to 42 inches-dark brown gravelly silty clay loam
42 to 60 inches-brown and pale brown gravelly clay loam and gravelly silty clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium to very rapid
Hazard of water erosion: Moderate to very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Bancroft silt loam on west- and north-facing slopes
- A soil that is similar to Jimsage soils in landscape positions that are lower than those of the Ireland soil in the more steeply sloping areas
- Hymas soils that have a surface layer of cobbly silt loam on ridgetops and near rock outcrop
- Arbone gravelly silt loam on south-facing slopes
- Rock outcrop

Use and Management

Major uses: Rangeland, nonirrigated cropland
Major management factors: Ireland soil-slope, low available water capacity, rock fragments on and below the surface, a short growing season, hazard of water erosion; Hades soil-a short growing season, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- The use of equipment is limited by poor access, the slope, and small steep-sided drainageways.
- Range seeding of adapted species is limited by the low available water capacity and the slope.

Nonirrigated cropland

Suitable crops:
- Because of the slope and the hazards of water erosion and wind erosion, the most suitable crops are those that provide permanent plant cover.

General management considerations:
- The short growing season and the low available water capacity limit crop production.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

Ireland soil-VIIs, nonirrigated; Hades soil-IVe, nonirrigated

81-Ireland-Hymas association, 35 to 55 percent slopes

Composition

Ireland soil and similar soils-60 percent
Hymas soil and similar soils-20 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Mountains, foothills
Elevation: 5,200 to 7,000 feet
Average annual precipitation: About 18 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Ireland Soil

Position on landscape: Mountainsides
Typical profile:
0 to 6 inches-grayish brown stony silt loam
6 to 15 inches-brown very cobbly silt loam
15 to 26 inches-pale brown and very pale brown extremely stony silt loam
26 inches-fractured bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Hymas Soil

Position on landscape: Ridgetops, convex areas, areas near rock outcrop
Typical profile:
0 to 6 inches-grayish brown cobbly silt loam
6 to 11 inches-brown very cobbly silt loam
11 to 16 inches-very pale brown extremely cobbly loam
16 inches-fractured bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: About 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Very rapid

Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Pavohroo silt loam in slight depressional areas that support aspen on steep north-facing slopes
- Rexburg silt loam on toe slopes and steep north--facing slopes near fields that are dryland farmed
- Rock outcrop
- A soil that is similar to Bezzant soils and that has a surface layer of very cobbly loam; near drainageways
- Hades gravelly loam on toe slopes and narrow valley bottoms

Use and Management

Major use: Rangeland
Major management factors: Ireland soil-slope, low available water capacity, stones on and below the surface, hazard of water erosion; Hymas soil-shallow depth to bedrock, slope, low available water capacity, cobbles on and below the surface, hazards of water erosion and wind erosion

Rangeland
Dominant vegetation in potential natural plant community: Ireland soil-mountain big sagebrush, bluebunch wheatgrass; Hymas soil-low sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low available water capacity and the shallow depth of the Hymas soil.
- Range seeding of adapted species is limited by the slope, the low available water capacity, rock fragments on and below the surface, water erosion, and wind erosion.

Capability Classification

Vlls, nonirrigated

82-Ireland-Pavohroo association, 35 to 50 percent slopes

Composition

Ireland soil and similar soils-50 percent
Pavohroo soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Elevation: 5,500 to 7,000 feet
Average annual precipitation: About 20 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 65 days

Characteristics of the Ireland Soil

Position on landscape: South-facing and north-facing slopes on foothills and mountainsides
Typical profile:
0 to 6 inches-brown stony silt loam
6 to 15 inches-brown very cobbly silt loam
15 to 26 inches-pale brown and very pale brown extremely stony silt loam
26 inches-fractured bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Pavohroo Soil

Position on landscape: Concave areas on south- and north-facing slopes on foothills and mountainsides
Typical profile:
2 inches to 0-organic mat
0 to 14 inches-brown silt loam
14 to 24 inches-brown gravelly clay loam
24 to 42 inches-light yellowish brown gravelly clay loam
42 to 52 inches-light yellowish brown gravelly loam
52 inches-fractured bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 6 to 10 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- Hymas gravelly loam on ridgetops and in convex areas
- Soils that are similar to Ricrest loam on steep and very steep north-facing slopes in areas that dominantly support sagebrush
- Soils that are similar to Doodlelink soils and that have a surface layer of gravelly or cobbly loam in drainageways and on toe slopes
- Rock outcrop

Use and Management

Major uses: Rangeland, woodland
Major management factors: Ireland soil-slope, low available water capacity, rock fragments on and below the surface, hazard of water erosion; Pavohroo soil-slope, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Ireland soil-mountain big sagebrush, bluebunch wheatgrass; Pavohroo soil-mountain snowberry, pine reedgrass

General management considerations:

- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited by the slope, the low available water capacity, rock fragments on and below the surface, and water erosion.

Woodland

Dominant vegetation in potential natural plant community: Pavohroo soil-Douglas-fir

Site index for Douglas-fir: 65

Yield: 85 cubic feet per acre from a stand of trees 40 years old

General management considerations:

- Water erosion, the slope, and plant competition are limitations.
- The slope limits the use of machinery.
- If the overstory canopy is removed, soil temperature increases and the regeneration of timber may be slowed.
- Competition from quaking aspen, shrubs, and grasses can also slow regeneration.
- If the site is not adequately prepared, competition from undesirable plants can prevent or prolong the natural or artificial reestablishment of trees.

Capability Classification

Ireland soil-VIIs, nonirrigated; Pavohroo soil-VIIe, nonirrigated

83-Ireland-Ricrest association, 30 to 50 percent slopes

Composition

Ireland soil and similar soils-50 percent
Ricrest soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Elevation: 5,200 to 6,000 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Ireland Soil

Position on landscape: Steep south-facing slopes on hillsides and mountainsides

Typical profile:

0 to 6 inches-grayish brown stony silt loam
6 to 15 inches-brown very cobbly silt loam
15 to 26 inches-pale brown and very pale brown extremely stony silt loam
26 inches-fractured bedrock

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Ricrest Soil

Position on landscape: Steep north-facing slopes on hillsides and mountainsides

Typical profile:

0 to 11 inches-very dark grayish brown loam
11 to 17 inches-dark grayish brown gravelly loam
17 to 47 inches-brown and very pale brown gravelly sandy clay loam
47 to 60 inches-light yellowish brown very gravelly sandy clay loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 7 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Hymas cobbly silt loam on ridgetops and near rock outcrop
- A soil that is similar to Jimsage soils in landscape positions lower than those of the Ireland soil in the more steeply sloping areas
- Arbone gravelly silt loam on the less sloping south-facing slopes
- Rock outcrop
- Koosharem silt loam that has slopes of 1 to 3 percent on narrow valley bottoms
- Soils that have slopes of less than 30 percent or more than 50 percent

Use and Management

Major use: Rangeland

Major management factors: Ireland soil-slope, stones and cobbles on and below the surface, low available water capacity, hazard of water erosion; Ricrest soil-slope, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass

General management considerations:

• Forage production is limited by the low available water capacity.

• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.

• Range seeding of adapted species is limited by the slope, the low available water capacity, rock fragments on and below the surface, and water erosion.

Capability Classification

Ireland soil-VIIs, nonirrigated; Ricrest soil-VIIe, nonirrigated

84-Itca-Birchcreek-Rock outcrop complex, 25 to 55 percent slopes

Composition

Itca soil and similar soils-35 percent Birchcreek soil and similar soils-25 percent Rock outcrop-15 percent

Contrasting inclusions-25 percent

Setting

Position on landscape: South-facing mountainsides

Elevation: 5,600 to 7,000 feet

Average annual precipitation: About 14 inches

Average annual air temperature: About 43 degrees F

Frost-free period: About 80 days

Characteristics of the Itca Soil

Position on landscape: Slightly convex areas, areas near the rock outcrop

Slope: 25 to 35 percent

Rock fragments on surface: Kind-stones and cobbles; percentage of surface covered-20 to 40

Typical profile:

0 to 3 inches-brown very stony loam
3 to 8 inches-brown extremely cobbly clay loam
8 to 17 inches-yellowish brown extremely cobbly clay
17 inches-unweathered bedrock

Depth class: Shallow

Drainage class: Well drained

Permeability: Slow

Available water capacity: 1 to 2 inches

Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches

Runoff: Very rapid

Hazard of water erosion: Very severe

Characteristics of the Birchcreek Soil

Position on landscape: Smooth slopes, slightly concave areas

Slope: 25 to 55 percent

Rock fragments on surface: Kind-stones and cobbles; percentage of surface covered-20 to 40

Typical profile:

0 to 5 inches-brown very stony loam
5 to 9 inches-brown very gravelly clay loam
9 to 31 inches-yellowish brown very stony clay
31 inches-bedrock

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Slow

Available water capacity: 2 to 4 inches

Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches

Runoff: Very rapid

Hazard of water erosion: Very severe

Characteristics of the Rock Outcrop

• Rock outcrop consists of quartzite ledges, small cliffs that have nearly vertical drops of 10 to 50 feet, and random protrusions.

• Small areas of mica schist also occur as random protrusions.

Contrasting Inclusions

• Soils that are similar to the Birchcreek soil but are less than 35 percent clay and that are in similar landscape positions and near talus

• Soils that are less than 20 inches deep to bedrock, have more than 35 percent rock fragments, and are less than 35 percent clay throughout; near the rock outcrop and on ridges

• A soil that is similar to Poisonhol very stony loam on toe slopes

• Talus and rubble land

Use and Management

Major uses: Woodland, grazable woodland

Major management factors: Stones and cobbles on and below the surface, slope, shallow depth to bedrock in the Itca soil, the rock outcrop, hazard of water erosion, low available water capacity

Woodland

Dominant vegetation in potential natural plant community: Itca and Birchcreek soils-pinyon pine, juniper, mountain big sagebrush, bluebunch wheatgrass, Idaho fescue

Site index for pinyon pine: Itca soil-65; Birchcreek soil-55

Yield: Itca soil-20 cubic feet per acre from a stand of trees 100 years old; Birchcreek soil-15 cubic feet per acre from a stand of trees 100 years old

General management considerations:

• Production is limited mainly by the low available water capacity and the shallow depth to bedrock in the Itca soil.

• Other limitations are the slope, water erosion, and coarse fragments on the surface.

Grazable woodland

Dominant vegetation in potential natural plant community:
Mountain big sagebrush, bluebunch wheatgrass, Idaho fescue

General management considerations:

• Production is limited mainly by the low available water capacity and the shallow depth to bedrock in the Itca soil.

• Uniform distribution of grazing is difficult because of the slope, the stand of trees, and the lack of permanent water developments.

• Range seeding of adapted species is limited by the dense stand of trees, the slope, rock fragments on the surface, and the low available water capacity.

Capability Classification

VIIs, nonirrigated

85-Jett silt loam, 0 to 1 percent slopes

Composition

Jett soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Flood plains, low stream terraces
Elevation: 4,300 to 5,100 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 120 days

Characteristics of the Jeff Soil

Typical profile:
0 to 41 inches-gray silt loam
41 to 50 inches-pale brown silt loam
50 to 65 inches-pale brown and grayish brown silty clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 12 to 13 inches
Potential rooting depth: 60 inches or more
Depth to seasonal high water table: February through June-48 to 60 inches; rest of year-more than 60 inches
Runoff. Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Flooding: Rare

Contrasting Inclusions

• Soils that have a surface layer of silty clay loam
• Soils that are less than 18 percent clay and are coarser in texture than the Jett soil; on low alluvial fans
• A soil that is subject to frequent flooding of long duration (4 weeks or more) during the spring due to the Raft River backing up behind the Yale Road river crossing; in sec. 35, T. 10 S., R. 27 E.
• Soils that have a water table at a depth of 30 to 48 inches in the spring and are in old stream channels and depressional areas
• Soils that have layers of loam and very fine sandy loam in areas along the Utah border

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, alfalfa hay
General management considerations:

• Suitable irrigation methods are sprinkler, border, and corrugation systems.

• Sprinklers are the most suitable irrigation method.

• The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIc, irrigated; VIc, nonirrigated

86- Jimsage-Doodlelink complex, 40 to 60 percent slopes

Composition

Jimsage soil and similar soils-50 percent
Doodlelink soil and similar soils-25 percent
Contrasting inclusions-25 percent

Setting

Elevation: 4,800 to 7,200 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 85 days

Characteristics of the Jimsage Soil

Position on landscape: Smooth and slightly convex areas on mountainsides
Typical profile:
0 to 6 inches-grayish brown gravelly loam
6 to 14 inches-brown very gravelly loam
14 to 23 inches-brown extremely gravelly loam
23 to 60 inches-very pale brown extremely gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 5 inches

Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Doodlelink Soil

Position on landscape: Concave areas on mountainsides
Typical profile:
0 to 10 inches-dark brown gravelly loam
10 to 22 inches-yellowish brown very cobbly loam
22 to 60 inches-light yellowish brown very cobbly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- Hutchley very cobbly silt loam on ridges
- Doodlelink gravelly loam on toe slopes of 15 to 30 percent
- Rock outcrop and rubble land on slopes below the rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Slope, rock fragments on and below the surface, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Jimsage soil-low sagebrush, bluebunch wheatgrass; Doodlelink soil-mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by the slope, rock fragments on and below the surface, and water erosion.

Capability Classification

VIIe, nonirrigated

87-Imsage-Vitale association, 30 to 65 percent slopes

Composition

Jimsage soil and similar soils-50 percent
Vitale soil and similar soils-25 percent
Contrasting inclusions-25 percent

Setting

Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Jimsage Soil

Position on landscape: North-facing mountainsides
Slope: 45 to 65 percent
Typical profile:
0 to 12 inches-brown gravelly loam
12 to 28 inches-brown *very* gravelly loam
28 to 60 inches-pale brown and very pale brown very gravelly and very cobbly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Vitale Soil

Position on landscape: South- and west-facing mountainsides *Slope:*
30 to 50 percent
Typical profile:
0 to 10 inches-brown stony loam
10 to 30 inches-yellowish brown very cobbly clay loam
30 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to *40* inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- Hutchley very gravelly silt loam on ridgetops and near rock outcrop
- Vertical rock outcrop and rubble land below the rock outcrop
- Small areas on narrow bottoms that include springs and intermittent streams
- A soil that is similar to the Jimsage soil and that has had the lime removed to a depth of 40 inches or more; in concave areas and drainageways

Use and Management

Major use: Rangeland
Major management factors: Jimsage soil-slope, gravel on and below the surface, hazard of water erosion; Vitale soil-slope, rock fragments on and below the surface, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community:
Jimsage soil-low sagebrush, bluebunch wheatgrass; Vitale soil-mountain big sagebrush, bluebunch wheatgrass

General management considerations:
• Range seeding of adapted species is limited by the slope, rock fragments on and below the surface, and water erosion.

Capability Classification

VIIe, nonirrigated

88-Kancan gravelly silt loam, 2 to 8 percent slopes

Composition

Kancan soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,800 feet
Average annual precipitation: About 11 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Kancan Soil

Typical profile:
0 to 3 inches-brown gravelly silt loam
3 to 10 inches-brown gravelly loam
10 to 16 inches-brown very gravelly sandy clay loam
16 to 27 inches-yellowish brown very gravelly coarse sandy loam
27 to 60 inches-very pale brown and pale brown very cobbly coarse sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that are similar to the Kancan soil and that do not have an accumulation of clay in the subsoil
• Soils that are similar to Nibbs gravelly silt loam in the slightly eroded areas at the lower elevations

Use and Management

Major use: Rangeland

Major management factors: Low available water capacity, rock fragments on and below the surface, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Low sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:
• Forage production is limited mainly by the low available water capacity and the low precipitation during the growing season.
• Range seeding of adapted species is limited by the low available water capacity, rock fragments on and below the surface, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

VIe, nonirrigated

89-Kanlee sandy loam, 4 to 12 percent slopes

Composition

Kanlee soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Pediments
Elevation: 5,700 to 6,400 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 80 days

Characteristics of the Kanlee Soil

Typical profile:
0 to 10 inches-dark grayish brown sandy loam
10 to 14 inches-dark brown sandy loam
14 to 20 inches-pale brown gravelly sandy clay loam
20 to 29 inches-yellowish brown coarse sandy loam
29 inches-weathered bedrock

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 6 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Ola sandy loam in landscape positions similar to those of the Kanlee soil
- A soil that is similar to the Kanlee soil and that has bedrock at a depth of less than 20 inches
- Soils that have more than 35 percent rock fragments in the subsoil on the steeper slopes

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass, Idaho fescue
General management considerations:

- Forage production is limited mainly by the low available water capacity
- Range seeding of adapted species is limited by the low available water capacity, water erosion, and wind erosion.

Capability Classification

IVe, nonirrigated

90-Kimmerling silty clay loam, 0 to 1 percent slopes

Composition

Kimmerling soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Flood plains, low stream terraces, seeps
Elevation: 4,900 to 5,300 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Kimmerling Soil

Typical profile:
0 to 35 inches-grayish brown silty clay loam
35 to 60 inches-gray silty clay
Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow
Available water capacity: 10 to 11 inches
Restriction affecting rooting depth: Water table at a depth of 12 to 24 inches
Depth to seasonal high water table: March through June-12 to 24 inches; rest of year-40 to 60 inches
Flooding: Occasional
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

- Jett silt loam in the slightly higher landscape positions

Use and Management

Major use: Rangeland
Major management factors: Occasional hazard of flooding, low precipitation, seasonal wetness

Rangeland

Dominant vegetation in potential natural plant community: Sedge, bluegrass
General management considerations:

- Forage production is limited mainly by the low precipitation.
- Range seeding of adapted species is limited by the seasonal wetness, the occasional hazard of flooding, and the low precipitation.

Capability Classification

Vlw, nonirrigated; Illw, irrigated

91-Koosharem silt loam, 1 to 3 percent slopes

Composition

Koosharem soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Narrow stream terraces
Elevation: 5,400 to 6,200 feet
Average annual precipitation: About 13 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 85 days

Characteristics of the Koosharem Soil

Typical profile:
0 to 24 inches-dark grayish brown silt loam
24 to 51 inches-very dark brown loam
51 to 60 inches-grayish brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils in and near the main stream channel that have

more than 35 percent coarse fragments in the control section
• Soils that are stratified with lenses of sand or sand and gravel in landscape positions similar to those of the Koosharem soil
• Cumulic Haplaquolls in areas where the stream channel is shallow

Use and Management

Major use: Rangeland
Major management factors: Hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Basin big sagebrush, basin wildrye, sedge, bluegrass
General management considerations:
• The use of forage by livestock is limited by stream cuts 5 to 6 feet deep that are difficult to cross.
• Range seeding of adapted species is limited by wind erosion.

Capability Classification

IVc, nonirrigated

92-Kovich silt loam, 0 to 3 percent slopes

Composition

Kovich soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Alluvial fans, flood plains, low stream terraces
Elevation: 4,900 to 5,700 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Kovich Soil

Typical profile:
0 to 13 inches-dark grayish brown silt loam
13 to 19 inches-dark grayish brown clay loam
19 to 27 inches-brown gravelly clay loam
27 to 35 inches-light yellowish brown gravelly loam
35 to 60 inches-stratified yellowish brown *very* gravelly sandy loam and light yellowish brown very gravelly loamy sand, very cobbly sand, and extremely cobbly sand
Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Available water capacity: 7 to 8 inches
Restriction affecting rooting depth: Water table at a depth of 12 to 36 inches
Depth to seasonal high water table: March through June-12 to 36 inches; rest of year-45 to 55 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that have more than 35 percent coarse fragments throughout and that are more prevalent in the Almo area; in slight depressional areas and in and near stream channels, in T. 15 S., R. 24 E., sec. 15 and 16
• Soils that have a dark surface layer less than 20 inches thick, that may have lime to the surface, that have 25 to 50 percent rock fragments, and that are more prevalent in the Albion area
• Downata silt loam
• Soils that are moderately well drained or well drained, that have 5 to 45 percent rock fragments, and that are more prevalent in the Albion area; in the higher landscape positions that occur as narrow fingers pointing downslope

Use and Management

Major use: Irrigated cropland
Major management factors: Seasonal high water table, a short growing season, hazard of wind erosion

Irrigated cropland

Suitable crops: Barley
General management considerations:
• Production is limited mainly by the seasonal high water table and the short growing season.
• Sprinklers are the most suitable irrigation method.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIIw, irrigated

93-Kucera silt loam, 25 to 55 percent slopes

Composition

Kucera soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: North-facing hillsides
Elevation: 5,000 to 6,500 feet
Average annual precipitation: About 15 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Kucera Soil

Typical profile:
0 to 21 inches-brown and grayish brown silt loam
21 to 35 inches-pale brown silt loam
35 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Rexburg silt loam in the slightly eroded areas
- Soils that have 10 to 45 percent rock fragments near toe slopes and in drainageways
- Soils that have no calcium carbonate in slightly concave areas

Use and Management

Major use: Rangeland
Major management factors: Slope, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass *General management considerations:*
- Range seeding of adapted species is limited by the slope, water erosion, and wind erosion.

Capability Classification

VIIe, nonirrigated

94-Lizzant very stony loam, 5 to 20 percent slopes

Composition

Lizzant soil and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Foothills
Elevation: 5,200 to 5,900 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Lizzant Soil

Typical profile:
0 to 10 inches-brown very stony loam
10 to 43 inches-very pale brown very gravelly loam
43 to 60 inches-very pale brown very stony loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe

Contrasting Inclusions

- Ireland soils that have a surface layer of stony loam in the more steeply sloping areas
- Hymas cobbly loam on ridgetops and near rock outcrop
- Clavicon stony loam on the steeper slopes at the higher elevations
- Soils that have slopes of more than 20 percent on the sides of drainageways
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Stones on and below the surface, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by stones on and below the surface and by water erosion.

Capability Classification

VIIs, nonirrigated

95-Manassa silt loam, 0 to 1 percent slopes

Composition

Manassa soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Flood plains, stream terraces
Elevation: 4,600 to 5,300 feet
Average annual precipitation: About 11 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 115 days

Characteristics of the Manassa Soil

Typical profile:
0 to 3 inches-light brownish gray silt loam and silty clay loam
3 to 23 inches-light brownish gray and light gray silty clay loam

23 to 50 inches-light gray silt loam
50 to 60 inches-light gray silty clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Saline

Contrasting Inclusions

• Soils that are similar to the Manassa soil and that have a water table between a depth of 30 and 60 inches at some time during the year

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Salinity, low available water capacity, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Black greasewood, bottlebrush squirreltail
General management considerations:
• Forage production is limited mainly by the low available water capacity and the salinity.
• Range recovery is slow because of the salinity.
• Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley
General management considerations:
• The salinity limits the production of some crops.
• A tillage pan forms if the soil is excessively cultivated.
• The soil is easily eroded if a furrow irrigation system is used.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

VIIs, nonirrigated and irrigated

96-Manila-Hades complex, 8 to 20 percent slopes

Composition

Manila soil and similar soils-50 percent
Hades soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,800 to 6,500 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 80 days

Characteristics of the Manila Soil

Position on landscape: Slightly convex and smooth areas
Typical profile:
0 to 4 inches-grayish brown loam 4 to 11 inches-brown clay loam 11 to 26 inches-brown clay
26 to 40 inches-brown cobbly clay
40 to 50 inches-brown very cobbly clay
50 to 60 inches-pale brown stony loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 7 to 11 inches
Restriction affecting rooting depth: A clay layer at a depth of 11 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe

Characteristics of the Hades Soil

Position on landscape: Slightly concave areas, areas near shallow drainageways
Typical profile:
0 to 18 inches-dark grayish brown gravelly loam
18 to 38 inches-brown gravelly clay loam
38 to 60 inches-light yellowish brown gravelly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe

Contrasting Inclusions

• A soil that is similar to the Hades soil and that has more than 35 percent rock fragments throughout
• Aninto very stony loam
• Acord soils that have a surface layer of stony loam
• Soils that have slopes of less than 8 percent

Use and Management

Major use: Rangeland
Major management factors: Hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community:
Manila soil-mountain big sagebrush, Idaho fescue;
Hades soil-mountain big sagebrush, bluebunch wheatgrass

General management considerations:
• Range seeding of adapted species is limited by water erosion.

Capability Classification

IVe, nonirrigated

97-McClenden silt loam, 1 to 3 percent slopes

Composition

McClenden soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Basalt plains in depressional areas, fan terraces
Elevation: 4,250 to 5,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: 115 days

Characteristics of the McClenden Soil

Typical profile:
0 to 9 inches-pale brown and light yellowish brown silt loam
9 to 18 inches-light yellowish brown silt loam
18 to 60 inches-very pale brown and pale brown loam
Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 7 to 12 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to more than 60 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Declo silt loam in the slightly higher landscape positions
• A soil that is similar to Paulville silt loam in the slightly concave areas
• Areas that have a surface layer of very fine sandy loam
• Soils that have slopes of more than 3 percent

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Low precipitation, hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, alfalfa hay, potatoes
General management considerations:
• A tillage pan forms if the soil is excessively cultivated.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Basin big sagebrush, basin wildrye
General management considerations:
• Forage production is limited mainly by the low precipitation during the growing season.
• Range seeding of adapted species is limited by wind erosion and the low precipitation.

Capability Classification

IIc, irrigated; VIc, nonirrigated

98-Mellor silt loam, 0 to 1 percent slopes

Composition

Mellor soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Low stream terraces
Elevation: 4,300 to 5,200 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 125 days

Characteristics of the Mellor Soil

Typical profile:
0 to 5 inches-light brownish gray silt loam
5 to 16 inches-light brownish gray silty clay loam
16 to 60 inches-very pale brown and pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

• Freedom and Genola silt loams near the Raft River
• Declo silt loam, saline, in the slightly eroded areas on the higher terraces

Use and Management

Major use: Rangeland
Major management factors: Salinity, low available water capacity, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Black greasewood, bottlebrush squirreltail *General management considerations:*

- Forage production is limited mainly by the salinity, the low available water capacity, and the low precipitation during the growing season.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, and wind erosion.

Capability Classification

VIIs, nonirrigated

99-Mellor silt loam, 2 to 4 percent slopes

Composition

Mellor soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,700 to 5,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Mellor Soil

Typical profile:

0 to 3 inches-pale brown silt loam
3 to 9 inches-pale brown silt loam and silty clay loam
9 to 17 inches-very pale brown and white silty clay loam
17 to 29 inches-light gray silt loam
29 to 60 inches-very pale brown and white loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 4 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

- Declo silt loam in drainageways
- Strevell silt loam, nonsaline, in the slightly eroded areas and drainageways
- Darkbull silt loam in drainageways and the more steeply sloping areas

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Salinity, low available water capacity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:

- Forage production is limited mainly by the salinity, the low available water capacity, and the low precipitation during the growing season.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low available water capacity, the low precipitation during the growing season, water erosion, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley *General management considerations:*

- The salinity and the low available water capacity limit the production of some crops.
- A tillage pan forms if the soil is excessively cultivated.
- The soil is easily eroded if a furrow irrigation system is used.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIs, nonirrigated and irrigated

100-Nibbs gravelly silt loam, 2 to 8 percent slopes

Composition

Nibbs soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,800 to 5,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 105 days

Characteristics of the Nibbs Soil

Typical profile:

0 to 7 inches-pale brown gravelly silt loam
7 to 18 inches-very pale brown gravelly loam
18 to 31 inches-very pale brown very gravelly loam
31 to 41 inches-very pale brown extremely gravelly sandy loam

41 to 60 inches-stratified, multicolored very gravelly sandy loam and extremely gravelly coarse sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Declo silt loam and Strevell silt loam, non-saline, at the lower elevations on fans
- Womack gravelly silt loam on the upper end of fans
- Darkbull gravelly silt loam in the slightly convex areas
- A Nibbs soil that supports Wyoming big sagebrush at the lower elevations on fans and in shallow, narrow drainageways

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Black sagebrush, bluebunch wheatgrass *General management considerations:*

- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited by water erosion, wind erosion, and the low precipitation during the growing season.

Irrigated cropland

Suitable crops: Wheat, alfalfa hay
General management considerations:

- The soil is easily eroded if a furrow irrigation system is used.
- Sprinklers are the most suitable irrigation method.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIe, nonirrigated; IIIe, irrigated

101-Ola sandy loam, 6 to 20 percent slopes

Composition

Ola soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces, hillsides
Elevation: 6,200 to 6,700 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 70 days

Characteristics of the Ola Soil

Typical profile:
0 to 30 inches-brown sandy loam
30 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 7 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils near rock outcrop that have more than 35 percent rock fragments
- Kanlee sandy loam near rock outcrop
- Riceton sandy loam in and near drainageways
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, Idaho fescue
General management considerations:

- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited the low available water capacity, water erosion, and wind erosion.

Capability Classification

IVe, nonirrigated

102-Pachic Cryoborolls, 15 to 45 percent slopes

Composition

Pachic Cryoborolls and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides
Elevation: 7,000 to 8,100 *feet*
Average annual precipitation: About 18 inches

Average annual air temperature: About 39 degrees F
Frost-free period: Less than 60 days

Characteristics of the Pachic Cryoborolls

Position on landscape: Slightly concave and smooth slopes
Representative profile:
0 to 3 inches-dark brown stony loam
3 to 13 inches-dark brown gravelly loam
13 to 24 inches-dark brown very gravelly clay loam
24 to 45 inches-pale brown and light yellowish brown extremely cobbly loam
45 to 60 inches-light yellowish brown extremely stony clay loam
Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderate or moderately slow
Available water capacity: 5 to 7 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to more than 60 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Contrasting Inclusions

- A soil that is similar to Middlehill soils on ridgetops and near rock outcrop
- Soils in slightly convex areas that support stands of mountain big sagebrush and bluebunch wheatgrass
- Rock outcrop
- Soils that have slopes of less than 15 percent or more than 45 percent

Use and Management

Major use: Rangeland
Major management factors: Slope, a short growing season, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Quaking aspen, pine reedgrass, mountain brome, slender wheatgrass
General management considerations:

- Forage production is limited mainly by the short growing season.
- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- The use of forage by livestock is limited by a stand of aspen and the slope.
- Range seeding of adapted species is limited by the stand of aspen, the slope, the short growing season, and water erosion.

Capability Classification

VIIs, nonirrigated

103-Pits

Characteristics of the Pits

- Pits are open excavations from which soil material or underlying gravel or sand has been removed.
- The removed material is normally used for the construction of dams and highways, for highway surfacing, or for concrete.
- In a few areas rock has been quarried from the pits. The material remaining in the pits is gravelly or cobbly, and the fine earth is loamy sand or sand or, in some areas, silt loam.
- A few pits have bedrock at the bottom. The side slopes of these pits are moderately sloping and steep and are very rough.
- A shallow water table is present at the bottom of a few pits.
- Most pits support only weeds or are barren.
- Some pits are being used as sanitary landfills. Others have been reclaimed and are used for cropland. These uses require that the surface layer, initially pushed aside as overburden, be returned to the site and used to cover the underlying strata or solid waste.
- Many pits are left as wasteland and are idle.
- The suitability for reclamation depends on the type of material left at the bottom of the pit, the amount of overburden stockpiled, and the depth to a water table.

Capability Classification

104-Pocatello silt loam, 0 to 1 percent slopes

Composition

Pocatello soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Fan terraces, high stream terraces
Elevation: 4,200 to 4,300 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 135 days

Characteristics of the Pocatello Soil

Typical profile:
0 to 5 inches-light brownish gray silt loam
5 to 27 inches-light gray silt loam
27 to 60 inches-light brownish gray silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 13 inches

Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

• Soils that are similar to Declo silt loam near areas of small intermittent streams

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay
General management considerations:
• Sprinklers are the most suitable irrigation method.
• A tillage pan forms if the soil is excessively cultivated.
• The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIc, irrigated; Vlc, nonirrigated

105-Pocatello silt loam, 15 to 35 percent slopes

Composition

Pocatello soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Hillsides
Elevation: 4,200 to 5,000 feet
Average annual precipitation: About 11 inches
Average annual air temperature: About *48* degrees F
Frost-free period: About 115 days

Characteristics of the Pocatello Soil

Typical profile:
0 to 5 inches-light brownish gray silt loam
5 to 27 inches-light gray silt loam
27 to 60 inches-light brownish gray silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Severe

Contrasting Inclusions

• Kucera silt loam in concave areas on north-facing slopes
• Ririe silt loam in slightly convex areas and in slightly eroded areas on north-facing slopes

Use and Management

Major use: Rangeland
Major management factors: Slope, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
• Forage production is limited mainly by the low precipitation during the growing season.
• Range seeding of adapted species is limited by the low precipitation during the growing season, the slope, water erosion, and wind erosion.

Capability Classification

Vle, nonirrigated

106-Poisonhol very stony loam, 2 to 8 percent slopes

Composition

Poisonhol soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Coalesced fan terraces
Elevation: 5,300 to 5,600 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days
Rock fragments on surface: Kind-stones and cobbles; percentage of surface covered-3 to 5

Characteristics of the Poisonhol Soil

Typical profile:
0 to 5 inches-grayish brown very stony loam
5 to 12 inches-grayish brown very cobbly clay loam
12 to 31 inches-very pale brown very stony loam
31 inches-lime-silica cemented hardpan
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate

Contrasting Inclusions

• Soils that have more than 35 percent coarse

fragments and that do not have a hardpan; in and near intermittent stream channels
- Soils that are similar to the Poisonhol soil and that have less than 35 percent rock fragments
- Soils that have a hardpan at a depth of less than 20 inches
- Soils that have slopes of less than 2 percent or more than 8 percent

Use and Management

Major use: Rangeland
Major management factors: Stones on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited by the low available water capacity, water erosion, and stones on the surface.

Capability Classification

Vls, nonirrigated

107-Poisonhol very stony loam, 8 to 15 percent slopes

Composition

Poisonhol soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Hillsides, toe slopes
Elevation: 5,400 to 5,800 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 85 days
Rock fragments on surface: Kind-stones, cobbles, and gravel; percentage of surface covered-20 to 30

Characteristics of the Poisonhol Soil

Typical profile:
0 to 5 inches-brown very stony loam
5 to 11 inches-brown very cobbly clay loam
11 to 15 inches-light yellowish brown very cobbly loam
15 to 39 inches-very pale brown very gravelly loam and extremely cobbly loam
39 inches-lime-silica cemented hardpan
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe

Contrasting Inclusions

- Soils that have more than 35 percent coarse fragments and that do not have a hardpan; in and near intermittent stream channels
- Soils that have a hardpan at a depth of less than 20 inches
- Soils that have slopes of more than 15 percent
- Soils near the higher elevations that have more than 35 percent clay in the subsoil

Use and Management

Major use: Rangeland
Major management factors: Stones on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited by a dense stand of juniper, the low available water capacity, water erosion, and stones on the surface.

Capability Classification

Vls, nonirrigated

108-Povey very stony loam, 35 to 55 percent slopes

Composition

Povey soil and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Mountainsides
Elevation: 6,700 to 8,400 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 40 degrees F
Frost-free period: Less than 60 days

Characteristics of the Povey Soil

Typical profile:
0 to 3 inches-very dark grayish brown very stony loam
3 to 25 inches-very dark grayish brown-extremely stony loam

25 to 36 inches-brown extremely stony loam
36 to 50 inches-light yellowish brown very cobbly sandy loam
50 inches-unweathered bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- A soil that is similar to the Povey soil and that has less than 35 percent rock fragments; in the less sloping concave areas
- Middlehill extremely stony sandy loam in convex areas and near rock outcrop
- A soil that is similar to the Pavohroo soil and that has less than 35 percent rock fragments; in concave areas that support aspen
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Slope, stones on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass *General management considerations:*

- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- The use of forage by livestock is limited by the slope and stones on the surface.
- Range seeding of adapted species is limited by the slope, stones on the surface, the low available water capacity, and water erosion.

Capability Classification

VIIe, nonirrigated

109-Povey-Middlehill complex, 20 to 55 percent slopes

Composition

Povey soil and similar soils-50 percent
Middlehill soil and similar soils-25 percent
Contrasting inclusions-25 percent

Setting

Elevation: 6,700 to 8,400 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 40 degrees F
Frost-free period: Less than 60 days

Characteristics of the Povey Soil

Position on landscape: Slightly concave mountainsides
Typical profile:
0 to 3 inches-very dark grayish brown very stony loam
3 to 25 inches-very dark grayish brown extremely stony loam
25 to 36 inches-brown extremely stony loam
36 to 50 inches-light yellowish brown very cobbly sandy loam
50 inches-bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Middlehill Soil

Position on landscape: Slightly convex and smooth mountainsides
Typical profile:
0 to 3 inches-brown extremely stony sandy loam
3 to 9 inches-brown extremely stony loam
9 to 16 inches-yellowish brown extremely cobbly sandy loam
16 to 24 inches-yellowish brown extremely stony loamy coarse sand
24 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- A soil that is similar to the Povey soil and that has less than 35 percent rock fragments; in the less sloping concave areas
- A soil that is similar to the Middlehill soil and that is less than 20 inches deep to bedrock; on ridgetops and near rock outcrop
- Rock outcrop
- A soil that is similar to the Middlehill soil and in the

same landscape positions and that is more than 18 percent clay
• Pachic Cryoborolls in concave areas that support aspen

Use and Management

Major use: Rangeland
Major management factors: Povey soil-slope, stones and cobbles on and below the surface, low available water capacity, hazard of water erosion; Middlehill soil-slope, low available water capacity, stones and cobbles on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Povey soil-mountain big sagebrush, bluebunch wheatgrass; Middlehill soil-black sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by cold soil temperatures and the short growing season.
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• The use of forage by livestock is limited by the slope and stones on the surface.
• Range seeding of adapted species is limited by the slope, stones on the surface, the low available water capacity, rock outcrop, the short growing season, and cold soil temperatures.

Capability Classification

Vlls, nonirrigated

110-Povey-Povey, dry complex, 35 to 60 percent slopes

Composition

Povey soil and similar soils-45 percent
Povey, dry soil and similar soils-30 percent
Contrasting inclusions-25 percent

Setting

Elevation: 6,500 to 8,100 feet
Average annual precipitation: About 18 inches
Average annual air temperature: About 40 degrees F
Frost-free period: Less than 60 days

Characteristics of the Povey Soil

Position on landscape: Bowl-shaped areas and steep north-facing slopes on mountainsides
Typical profile:
0 to 4 inches-dark brown very gravelly loam
4 to 15 inches-dark brown extremely cobbly loam
15 to 22 inches-dark brown extremely gravelly loam
22 to 45 inches-yellowish brown extremely gravelly loam
45 inches-bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Povey, Dry Soil

Position on landscape: Areas near ridgetops in windswept positions on mountainsides
Typical profile:
0 to 6 inches-dark brown gravelly loam
6 to 27 inches-brown and yellowish brown extremely gravelly loam
27 to 45 inches-yellowish brown extremely cobbly sandy loam
45 inches-bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

• A soil that is similar to the Povey soils and that has bedrock at a depth of less than 40 inches
• Soils that have bedrock at a depth of 10 to 20 inches on ridges
• Rock outcrop and nearly vertical rock escarpments below ridgetops

Use and Management

Major use: Rangeland
Major management factors: Slope, gravel on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Povey soil-mountain big sagebrush, bluebunch wheatgrass; Povey, dry soil-black sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low available water capacity.
• Range seeding of adapted species is limited by the

slope, gravel on and below the surface, the low available water capacity, and water erosion.

Capability Classification

VIIe, nonirrigated

111-Raftriver loam, 2 to 4 percent slopes

Composition

Raftriver soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,800 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Raftriver Soil

Typical profile:
0 to 4 inches-brown loam
4 to 23 inches-pale brown silt loam and very pale brown loam
23 to 29 inches-very pale brown very gravelly sandy loam
29 inches-lime-silica cemented hardpan
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

- Soils that are similar to Aninto stony loam on the side slopes of drainageways that have slopes of 15 to 30 percent
- Koosharem silt loam in drainageways
- Soils that are similar to Koosharem silt loam in drainageways and that have more than 35 percent rock fragments
- Soils on the upper part of fan terraces that have a hardpan at a depth of 40 to 60 inches
- Soils that are similar to Raftriver loam and that have a weakly cemented hardpan at a depth of less than 10 inches; on the lower end of fan terraces

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: A short growing season, low available water capacity, salinity, hazards of water erosion and wind erosion

Nonirrigated cropland

General management considerations:
- The short growing season and the low available water capacity limit crop production.
- A tillage pan forms if the soil is excessively cultivated.

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the limited growing season and the low available water capacity.
- Range seeding of adapted species is limited by water erosion, wind erosion, and the low available water capacity.

Capability Classification

IIIe, nonirrigated

112-Rexburg silt loam, 1 to 3 percent slopes

Composition

Rexburg soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,800 to 5,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 95 days

Characteristics of the Rexburg Soil

Typical profile:
0 to 15 inches-brown silt loam
15 to 21 inches-pale brown silt loam
21 to 60 inches-white and very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that are similar to Kucera silt loam in slightly concave areas
- Bancroft silt loam in landscape positions similar to those of the Rexburg soil

Use and Management

Major use: Nonirrigated cropland
Major management factors: Hazard of wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
• The hazard of wind erosion is increased if the surface is left bare after tillage.
• A tillage pan forms if the soil is excessively cultivated.

Capability Classification

IIIc, nonirrigated

113-Rexburg silt loam, 3 to 12 percent slopes

Composition

Rexburg soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,600 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 95 days

Characteristics of the Rexburg Soil

Typical profile:
0 to 12 inches-brown silt loam
12 to 18 inches-pale brown silt loam
18 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Watercanyon silt loam on south-facing slopes and in eroded areas
• Bancroft silt loam in slightly concave areas

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: Hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
• A tillage pan forms if the soil is excessively cultivated.
• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IIIe, nonirrigated

114-Rexburg silt loam, 12 to 20 percent slopes

Composition

Rexburg soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Hillsides
Elevation: 4,800 to 5,800 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Rexburg Soil

Typical profile:
0 to 12 inches-brown silt loam
12 to 18 inches-pale brown silt loam
18 to 60 inches-light gray and very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that are similar to Kucera silt loam in slightly concave areas on north-facing slopes
• Bancroft silt loam in landscape positions similar to those of the Rexburg soil
• Watercanyon silt loam on south-facing slopes and in eroded areas
• Soils that have 15 to 35 percent rock fragments at the higher elevations

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: A short growing season, slope, hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
- Production of some crops is limited by the short growing season.
- The slope limits the use of some equipment and practices.
- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass *General management considerations:*
- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IVe, nonirrigated

115-Rexburg silt loam, 20 to 50 percent slopes

Composition

Rexburg soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Hillsides, mountainsides
Elevation: 5,000 to 5,800 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Rexburg Soil

Typical profile:
0 to 14 inches-brown silt loam
14 to 22 inches-pale brown silt loam
22 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that are similar to Kucera silt loam in slightly concave areas on north-facing slopes
- Watercanyon silt loam on south-facing slopes and in eroded areas
- Soils that have 15 to 35 percent rock fragments at the higher elevations
- Soils, generally on north-facing slopes, that have slopes of more than 50 percent

Use and Management

Major use: Rangeland
Major management factors: Slope, a short growing season, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by the slope, water erosion, and wind erosion.

Capability Classification

VIIe, nonirrigated

116-Riceton loamy coarse sand, 4 to 12 percent slopes

Composition

Riceton soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 6,000 to 6,400 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 80 days

Characteristics of the Riceton Soil

Typical profile:
0 to 7 inches-grayish brown loamy coarse sand
7 to 33 inches-grayish brown and brown coarse sandy loam and gravelly coarse sandy loam
33 to 60 inches-brown gravelly coarse sandy loam and gravelly loamy coarse sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 4 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Ola sandy loam near rock outcrop
- Kanlee sandy loam in slightly concave areas near rock outcrop
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:

- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IVe, nonirrigated

117-Richmond-Rexburg association, 30 to 50 percent slopes

Composition

Richmond soil and similar soils-60 percent
Rexburg soil and similar soils-20 percent
Contrasting inclusions-20 percent

Setting

Elevation: 4,800 to 5,600 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 95 days

Characteristics of the Richmond Soil

Position on landscape: South-facing mountainsides and ridges
Rock fragments on surface: Kind-gravel; percentage of surface covered-35 to 50
Typical profile:
0 to 4 inches-brown gravelly silt loam
4 to 9 inches-pale brown very gravelly silt loam
9 to 18 inches-very pale brown very gravelly loam
18 inches-slightly fractured bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Characteristics of the Rexburg Soil

Position on landscape: North-facing mountainsides
Typical profile:
0 to 14 inches-brown silt loam
14 to 18 inches-pale brown silt loam
18 to 60 inches-pale brown and very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Watercanyon silt loam in eroded areas on north-facing slopes
- Ireland gravelly silt loam on north-facing slopes at the higher elevations
- Wheeler silt loam on steep south-facing slopes in eroded areas at the lower elevations
- Arbone gravelly silt loam on steep north-facing slopes in landscape positions below those of the Ireland soil
- Rock outcrop
- Hymas gravelly silt loam on north-facing ridgetops and shoulder slopes

Use and Management

Major use: Rangeland
Major management factors: Richmond soil-shallow depth to bedrock, low available water capacity, slope, gravel on and below the surface, hazards of water erosion and wind erosion; Rexburg soilhazards of water erosion and wind erosion, slope

Rangeland

Dominant vegetation in potential natural plant community: Richmond soil-black sagebrush, bluebunch wheatgrass; Rexburg soil-mountain big sagebrush, bluebunch wheatgrass
General management considerations:

- Forage production is limited mainly by the low available water capacity and shallow depth to bedrock in some areas.
- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- Range seeding of adapted species is limited by the slope, water erosion, wind erosion, rock fragments on the surface in some areas, and the low available water capacity in some areas.

Capability Classification

VIIe, nonirrigated

118-Ricrest-Searla complex, 12 to 20 percent slopes

Composition

Ricrest soil and similar soils-60 percent

Searla soil and similar soils-20 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Hillsides
Elevation: 5,700 to 6,100 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 90 days

Characteristics of the Ricrest Soil

Typical profile:
0 to 11 inches-very dark grayish brown loam
11 to 17 inches-dark grayish brown gravelly loam
17 to 47 inches-brown and very pale brown gravelly sandy clay loam
47 to 60 inches-light yellowish brown very gravelly sandy clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 7 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Characteristics of the Searla Soil

Typical profile:
0 to 5 inches-dark grayish brown gravelly loam
5 to 12 inches-dark grayish brown gravelly clay loam
12 to 32 inches-brown and yellowish brown very gravelly sandy clay loam
32 to 39 inches-light yellowish brown very gravelly sandy clay loam
39 to 60 inches-light yellowish brown *very* gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that are similar to the Ricrest soil and that are very cobbly to a depth of 40 inches or more
- Bancroft silt loam

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: Hazards of water erosion and wind erosion, slope

Nonirrigated cropland
Suitable crops: Wheat, barley
General management considerations:
- The slope limits the use of some equipment and practices.
- A tillage pan forms if the soils are excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Rangeland
Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IVe, nonirrigated

119-Ririe silt loam, 1 to 3 percent slopes

Composition

Ririe soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,700 to 5,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Ririe Soil

Typical profile:
0 to 10 inches-brown silt loam
10 to 18 inches-pale brown silt loam
18 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

- Soils that have more than 35 percent rock fragments in shallow drainageways
- Soils that have been eroded and have lime to the surface in slightly convex areas

Use and Management

Major uses: Nonirrigated and irrigated cropland, pasture

Major management factors: A short growing season, hazard of wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
- The short growing season limits the production of some crops.
- A tillage pan forms if the soil is excessively cultivated.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Irrigated cropland and pasture

Suitable crops: Wheat, barley, oats, alfalfa hay, potatoes
General management considerations:
- The short growing season limits the production of some crops.
- The soil is easily eroded if a furrow irrigation system is used.
- Sprinklers are the most suitable irrigation method.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIIc, nonirrigated; Ille, irrigated

120-Ririe silt loam, 3 to 8 percent slopes

Composition

Ririe soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Fan terraces, broad hilltops
Elevation: 4,600 to 5,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Ririe Soil

Typical profile:
0 to 12 inches-brown silt loam
12 to 18 inches-pale brown silt loam
18 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Heglar silt loam on south-facing slopes
- Rexburg silt loam in concave areas

Use and Management

Major use: Nonirrigated cropland
Major management factors: A short growing season, hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
- The short growing season limits the production of some crops.
- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

Ille, nonirrigated

121-Ririe silt loam, 12 to 20 percent slopes

Composition

Ririe soil and similar soils-85 percent
Contrasting inclusions-l5 percent

Setting

Position on landscape: Hillsides
Elevation: 4,700 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Ririe Soil

Typical profile:
0 to 12 inches-brown silt loam
12 to 18 inches-pale brown silt loam
18 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Kucera silt loam in concave areas on north-facing slopes
- Watercanyon silt loam in eroded areas
- A soil that is similar to Arbone silt loam near drainageways

Use and Management

Major uses: Nonirrigated cropland, rangeland
Major management factors: Slope, *a* short growing season, hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
• The short growing season limits the production of some crops.
• The slope limits the use of some equipment and practices.
• A tillage pan forms if the soil is excessively cultivated.
• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass *General management considerations:*
• Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IVe, nonirrigated

122-Ririe-Heglar association, 5 to 30 percent slopes

Composition

Ririe soil and similar soils-50 percent
Heglar soil and similar soils-40 percent
Contrasting inclusions-10 percent

Setting

Elevation: 4,500 to 5,100 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 100 days

Characteristics of the Ririe Soil

Position on landscape: North-facing and east-facing hillsides
Slope: 5 to 25 percent
Typical profile:
0 to 8 inches-brown silt loam
8 to 32 inches-pale brown silt loam
32 to 60 inches-very pale brown and pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Characteristics of the Heglar Soil

Position on landscape: South-facing and west-facing hillsides
Slope: 10 to 30 percent
Typical profile:
0 to 12 inches-pale brown silt loam
12 to 45 inches-very pale brown silt loam
45 to 60 inches-light yellowish brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that have slopes of less than 5 percent or more than 30 percent
• Kucera silt loam on north-facing slopes of 25 to 55 percent
• Soils that have gravel on and below the surface on low ridgetops and in drainageways
• Soils that have more than 35 percent rock fragments on slopes of 25 to 50 percent
• Rexburg silt loam on north-facing concave slopes
• Watercanyon silt loam on north-facing slopes of 15 to 25 percent at the higher elevations
• Soils that are similar to the Heglar soil and that have slopes of 30 to 50 percent

Use and Management

Major use: Nonirrigated cropland

Major management factors: Hazards of water erosion and wind erosion, slope in some areas

Nonirrigated cropland

Suitable crops:

• Because of the slope and the hazard of water erosion, the most suitable crops are those that provide permanent plant cover.

General management considerations:
• A tillage pan forms if the soils are excessively cultivated.
• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

Ririe soil-IVe, nonirrigated; Heglar soil-Vle, nonirrigated

123-Rock outcrop-Kanlee complex, 3 to 30 percent slopes

Composition

Rock outcrop-50 percent
Kanlee soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Mountainsides
Elevation: 6,000 to 7,000 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 41 degrees F
Frost-free period: About 75 days

Characteristics of the Rock Outcrop

- Rock outcrop consists of areas of randomly protruding, large weathered bedrock.
- The exposures have been sculpted into many unusual shapes by wind erosion and water erosion.
- The exposures range from about 10 to more than 100 feet in height, are 20 to 100 feet wide, and are up to several hundred feet long.
- Slopes range from about 20 percent to vertical.

Characteristics of the Kanlee Soil

Typical profile:
0 to 2 inches-brown sandy loam
2 to 19 inches-brown and yellowish brown sandy clay loam
19 to 24 inches-pale brown coarse sandy loam
24 to 35 inches-multicolored decomposing bedrock
35 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 6 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Medium to very rapid
Hazard of water erosion: Moderate to very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Ola sandy loam on north-facing slopes
- A soil that is similar to the Kanlee soil and that has bedrock at a depth of less than 20 inches

Use and Management

Major use: Rangeland
Major management factors: The rock outcrop, hazards of water erosion and wind erosion, low available water capacity in some areas

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass, Idaho fescue
General management considerations:
- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited by the intricate pattern of soil and rock outcrop, the low available water capacity, water erosion, and wind erosion.

Capability Classification

VIIe, nonirrigated

124-Rock outcrop-Ola complex, 35 to 55 percent slopes

Composition

Rock outcrop-50 percent
Ola soil and similar soils-35 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides
Elevation: 6,200 to 6,700 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 75 days

Characteristics of the Rock Outcrop

- Rock outcrop consists of areas of randomly protruding, large weathered and nonweathered bedrock.
- The exposures range from about 10 to more than 100 feet in height and are up to several hundred feet long.
- Slopes range from about 40 percent to vertical.

Characteristics of the Ola Soil

Typical profile:
0 to 16 inches-dark grayish brown coarse sandy loam
16 to 22 inches-grayish brown coarse sandy loam
22 to 30 inches-grayish brown gravelly coarse sandy loam
30 inches-decomposing bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that have bedrock at a depth of 40 inches or more in concave areas
- Soils that have bedrock at a depth of less than 20 inches near the rock outcrop
- Soils that have slopes of less than 35 percent or more than 55 percent
- Soils that are similar to Middlehill and Povey soils at elevations above 6,700 feet

Use and Management

Major use: Rangeland
Major management factors: Slope, the rock outcrop, low available water capacity, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, Idaho fescue
General management considerations:

- Forage production is limited mainly by the low available water capacity.
- Uniform distribution of grazing is difficult because of the slope, the lack of permanent water developments, and the rock outcrop.
- Range seeding of adapted species is limited by the slope, the rock outcrop, the low available water capacity, water erosion, and wind erosion.

Capability Classification

125-Rock outcrop-Trevino complex, 1 to 8 percent slopes

Composition

Rock outcrop-45 percent
Trevino soil and similar soils-40 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 135 days

Characteristics of the Rock Outcrop

- Rock outcrop consists of areas of randomly protruding exposures of bedrock.
- The exposures range from about 1 to more than 20 feet in height, are 20 to more than 100 feet wide, and are up to several hundred feet long.
- Slopes range from about 1 percent to nearly vertical on short slopes.

Characteristics of the Trevino Soil

Position on landscape: Basalt ridges and plains
Slope: 1 to 8 percent; 2 to 4 percent in most areas
Rock fragments on surface: Cobbles and stones
Typical profile:

0 to 3 inches-pale brown very stony silt loam
3 to 5 inches-brown silt loam
5 to 13 inches-pale brown silt loam
13 to 18 inches-light yellowish brown fine sandy loam
18 inches-unweathered bedrock

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Vining fine sandy loam in shallow depressional areas
- Soils near the rock outcrop that have a surface layer of very stony silt loam and that have bedrock at a depth of less than 10 inches
- Soils that are extremely stony or very stony throughout
- A soil that is similar to the Trevino soil and that has a surface layer of very stony fine sandy loam
- Areas that are about 70 percent rock outcrop, 20 percent Trevino stony and very stony silt foams, and 10 percent a soil that is similar to the Trevino soil and that is 5 to 10 inches deep to bedrock; in T. *9* S., R. 27 E., sec. 23 and 26
- Small areas included with the rock outcrop that have nearly vertical slopes ranging from less than 2 feet to more than 15 feet in height

Use and Management

Major use: Rangeland
Major management factors: The rock outcrop, low precipitation, hazards of water erosion and wind erosion, shallow depth to bedrock, low available water capacity, cobbles and stones on the surface

Rangeland

Dominant vegetation in potential natural plant community: Trevino soil-Wyoming big sagebrush, bluebunch wheatgrass, Sandberg bluegrass
General management considerations:

- Forage production is limited mainly by the low available water capacity and shallow depth of the Trevino soil and the low precipitation during the growing season.

• The amount of rock outcrop, cobbles and stones on the surface, and the overall roughness of the map unit make it impractical for mechanical treatment.

Capability Classification

VII

126-Rubble land-Jimsage complex, 50 to 70 percent slopes

Composition

Rubble land-45 percent
Jimsage soil and similar soils-30 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Mountainsides
Elevation: 5,000 to 7,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 85 days

Characteristics of the Rubble Land

• Rubble land consists of large areas of talus and stones.
• It occurs on all aspects below rock outcrop and as exposures on the steep slopes.
• It is nearly devoid of vegetation except for some scattered sagebrush.

Characteristics of the Jimsage Soil

Typical profile:
0 to 5 inches-dark brown gravelly loam
5 to 26 inches-dark brown very gravelly and extremely gravelly loam
26 to 60 inches-pale brown and very pale brown very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

• Vitale very gravelly loam in the less steeply sloping areas
• Hutchley soils that have a surface layer of very cobbly loam on ridgetops
• Rock outcrop
• Vipont very stony loam on north-facing slopes in concave areas

Use and Management

Major use: Rangeland

Major management factors: The rubble land, rock outcrop, slope, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community:
Jimsage soil-low sagebrush, bluebunch wheatgrass
General management considerations:
• Range seeding of adapted species is limited by the slope, water erosion, and rock outcrop.

Capability Classification

VIII

127-Sandall very gravelly loam, 35 to 55 percent slopes

Composition

Sandall soil and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Hillsides, mountainsides
Elevation: 4,800 to 6,200 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 100 days

Characteristics of the Sandall Soil

Typical profile:
0 to 4 inches-brown very gravelly loam
4 to 8 inches-pale brown very gravelly loam 8 to 16 inches-very pale brown gravelly loam
16 to 37 inches-very pale brown extremely cobbly loam
37 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

• Rock outcrop
• A soil that is similar to the Sandall soil and that has bedrock at a depth of 10 to 20 inches
• Soils on toe slopes that have more than 35 percent rock fragments and that are more than 60 inches deep
• Ireland, Searla, and Ricrest soils that have a surface layer of very gravelly loam on north-facing slopes

Use and Management

Major use: Rangeland

Major management factors: Slope, low available water capacity, hazard of water erosion, gravel on and below the surface

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass

General management considerations:

- Forage production is limited mainly by the low available water capacity.
- Range seeding of adapted species is limited by the slope, gravel on and below the surface, the low available water capacity, and water erosion.

Capability Classification

Vlls, nonirrigated

128-Saxby very gravelly loam, 30 to 50 percent slopes

Composition

Saxby soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides
Elevation: 5,200 to 5,700 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 100 days

Characteristics of the Saxby Soil

Typical profile:
0 to 6 inches-pale brown very gravelly loam
6 to 13 inches-very pale brown very gravelly loam
13 to 17 inches-very pale brown extremely gravelly loam
17 inches-bedrock

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 2 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- Darkbull loam in the less sloping areas between mountains and on toe slopes
- Weakly consolidated outcrops of volcanic ash mainly on northerly aspects
- A soil that is similar to the Saxby soil and that has bedrock at a depth of less than 10 inches; on ridgetops and near rock outcrop
- Rock outcrop and rubble land below the rock outcrop on all aspects

Use and Management

Major use: Rangeland
Major management factors: Slope, shallow depth to bedrock, low precipitation, gravel on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Black sagebrush, bluebunch wheatgrass

General management considerations:

- Forage production is limited mainly by the low available water capacity and the shallow depth to bedrock.
- Range seeding of adapted species is limited by the slope, gravel on and below the surface, the low precipitation, the low available water capacity, and water erosion.

Capability Classification

Vlls, nonirrigated

129-Saxby stony loam, 4 to 8 percent slopes

Composition

Saxby soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Cuestas
Elevation: 5,000 to 5,300 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Saxby Soil

Typical profile:
0 to 3 inches-pale brown stony loam
3 to 14 inches-very pale brown very gravelly loam
14 inches-bedrock

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: About 1 to 2 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Darkbull gravelly silt loam on toe slopes

• A soil that is similar to the Saxby soil and has bedrock at a depth of less than 10 inches near the edge of the cuesta

Use and Management

Major use: Rangeland
Major management factors: Shallow depth to bedrock, low precipitation, low available water capacity, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low available water capacity, the shallow depth to bedrock, and the low precipitation during the growing season.
• Range seeding of adapted species is limited by gravel on and below the surface, the low precipitation, the low available water capacity, water erosion, and wind erosion.

Capability Classification

VIs, nonirrigated

130-Scoon very fine sandy loam, 1 to 4 percent slopes

Composition

Scoon soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Scoon Soil

Typical profile:
0 to 4 inches-light brownish gray very fine sandy loam
4 to 14 inches-pale brown very fine sandy loam
14 to 18 inches-very pale brown gravelly very fine sandy loam
18 inches-lime-silica cemented hardpan
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: A hardpan at a depth of 10 to 20 inches
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

• Thornock cobbly fine sandy loam and Taunton fine sandy loam near rock outcrop
• Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Shallow depth to a hardpan, low precipitation, low available water capacity, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low available water capacity, the shallow depth to the hardpan, and the low precipitation during the growing season.
• Range seeding of adapted species is limited by the low available water capacity, the low precipitation during the growing season, water erosion, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:
• Production is limited mainly by the low available water capacity and the shallow depth to the hardpan.
• A tillage pan forms if the soil is excessively cultivated.
• The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIs, nonirrigated; lVe, irrigated

131-Searla gravelly loam, 4 to 12 percent slopes

Composition

Searla soil and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Fan terraces, hillsides
Elevation: 5,400 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 85 days

Characteristics of the Searla Soil

Typical profile:
0 to 11 inches-brown gravelly loam

11 to 22 inches-brown and pale brown very gravelly sandy clay loam
22 to 60 inches-very pale brown very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Several large drainageways that dissect the unit
- Small areas of Chen soils and a soil that is similar to Birchcreek soils and has a surface layer of very gravelly clay loam; on the steep south-facing sides of drainageways
- Jimsage soils that have a surface layer of very stony silt loam and Hades gravelly loam; on the steep north-facing sides of drainageways
- Koosharem soils that have a surface layer of loam on the narrow bottoms
- Ririe silt loam in slight depressional areas
- A soil that is similar to the Searla soil and that does not have an accumulation of clay in the subsoil

Use and Management

Major use: Rangeland
Major management factors: Gravel on and below the surface, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:

- The use of forage by livestock is limited by a dense stand of juniper.
- Range seeding of adapted species is limited by the dense stand of juniper, water erosion, and wind erosion.

Capability Classification

IIIe, nonirrigated

132-Searla gravelly loam, 12 to 35 percent slopes

Composition

Searla soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Mountainsides, toe slopes
Elevation: 5,400 to 5,800 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 80 days

Characteristics of the Searla Soil

Typical profile:
0 to 12 inches-brown gravelly loam
12 to 35 inches-pale brown and very pale brown very gravelly sandy clay loam
35 to 60 inches-very pale brown very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- A soil that is similar to Bancroft silt loam on east-facing toe slopes
- A soil that is similar to Watercanyon silt loam in the eastern part of the survey area on south-facing slopes

Use and Management

Major use: Rangeland
Major management factors: Hazards of water erosion and wind erosion, gravel on and below the surface

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:

- The use of forage by livestock and the use of equipment are limited by a dense stand of juniper.
- Uniform distribution of grazing is difficult because of the dense stand of trees and the lack of permanent water developments.
- Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

VIe, nonirrigated

133-Searla-Ricrest complex, 30 to 75 percent slopes

Composition

Searla soil and similar soils-50 percent
Ricrest soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Elevation: 5,200 to 6,000 feet

Average annual precipitation: About 15 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days

Characteristics of the Searla Soil

Position on landscape: South-facing hillsides
Slope: 30 to 60 percent
Typical profile:
0 to 5 inches-dark grayish brown gravelly loam
5 to 12 inches-dark grayish brown gravelly clay loam
12 to 39 inches-brown, yellowish brown, and light yellowish brown very gravelly sandy clay loam
39 to 60 inches-light yellowish brown very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Characteristics of the Ricrest Soil

Position on landscape: North-facing hillsides
Slope: 40 to 75 percent
Typical profile:
0 to 11 inches-very dark grayish brown loam
11 to 17 inches-dark grayish brown gravelly loam
17 to 47 inches-brown and very pale brown gravelly sandy clay loam
47 to 60 inches-light yellowish brown very gravelly sandy clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 7 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Koosharem soils that have a surface layer of loam on narrow canyon bottoms
- Soils that are similar to the Searla and Ricrest soils on south-facing toe slopes of 12 to 30 percent
- Soils that have slopes of less than 30 percent

Use and Management

Major use: Rangeland
Major management factors: Slope, hazards of water erosion and wind erosion, gravel on and below the surface

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Range seeding of adapted species is limited by the slope, water erosion, and wind erosion.

Capability Classification

VIIe, nonirrigated

134-Somsen fine sandy loam, 1 to 3 percent slopes

Composition

Somsen soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Somsen Soil

Typical profile:
0 to 9 inches-pale brown fine sandy loam
9 to 20 inches-very pale brown gravelly fine sandy loam
20 to 29 inches-white gravelly fine sandy loam
29 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

- Davey sandy loam in depressional areas
- A soil that is similar to the Somsen soil and that has an accumulation of clay in the subsoil
- Thornock cobbly fine sandy loam near rock outcrop
- Rock outcrop
- Dunes about 1 to 3 feet high

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Low available water capacity, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity.
- Range seeding of adapted species is limited by the low precipitation during the growing season, the low available water capacity, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley, potatoes, alfalfa hay

General management considerations:

- The short growing season limits crop production.
- A tillage pan forms if the soil is excessively cultivated.

Capability Classification

VIe, nonirrigated; IIIe, irrigated

135-Sonlet stony loam, 20 to 50 percent slopes

Composition

Sonlet soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Hillsides, mountainsides
Elevation: 5,400 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 90 days
Rock fragments on surface: Kind-gravel, cobbles, and stones; percentage of surface covered-35 to 55 percent

Characteristics of the Sonlet Soil

Typical profile:

0 to 4 inches-pale brown stony loam
4 to 10 inches-very pale brown very gravelly loam 10 to 15 inches-very pale brown extremely gravelly loam
15 inches-bedrock that has thin coatings of lime on the surface

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 2 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Rock outcrop on all aspects
- Soils on toe slopes that have bedrock at a depth of 40 to more than 60 inches
- Soils that are in landscape positions similar to those of the Sonlet soil and that have less than 35 percent rock fragments

Use and Management

Major use: Rangeland
Major management factors: Slope, low available water capacity, rock fragments on and below the surface, shallow depth to bedrock

Rangeland

Dominant vegetation in potential natural plant community: Black sagebrush, bluebunch wheatgrass

General management considerations:

- Forage production is limited mainly by the low available water capacity and the shallow depth to bedrock.
- Range seeding of adapted species is limited by the slope, rock fragments on the surface, and the low available water capacity.

Capability Classification

VIIs, nonirrigated

136-Stake silty clay loam, 0 to 1 percent slopes

Composition

Stake soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Flood plains, low stream terraces
Elevation: 4,200 to 4,900 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 125 days

Characteristics of the Stake Soil

Typical profile:

0 to 13 inches-grayish brown silty clay loam
13 to 19 inches-gray silty clay loam
19 to 30 inches-dark gray silty clay
30 to 50 inches-gray silty clay loam
50 to 60 inches-light gray silt loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 8 to 12 inches

Potential rooting depth: 60 inches or more
Runoff.: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Genola silt loam in the slightly higher landscape positions
- Jett silt loam in landscape positions similar to those of the Stake soil
- Soils that are similar to the Stake soil and than: have as much as 40 percent rock fragments in the lower part

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:

- A tillage pan forms if the soil is excessively cultivated.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIc, irrigated

137-Stanrod-Strevell, nonsaline complex, 2 to 4 percent slopes

Composition

Stanrod soil and similar soils-55 percent
Strevell soil and similar soils-35 percent
Contrasting inclusions-10 percent

Setting

Elevation: 4,700 to 5,300 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Stanrod Soil

Position on landscape: Convex areas on fan terraces
Typical profile:

0 to 3 inches-light gray silt loam
3 to 8 inches-pale brown silty clay loam
8 to 30 inches-white silt loam
30 to 53 inches-very pale brown silt loam
53 to 60 inches-very pale brown gravelly silt loam

Depth class: Very deep
Drainage class: Well drained
Permeability. Moderately slow
Available water capacity: 2 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate
Salinity: Saline

Characteristics of the Strevell Soil

Position on landscape: Concave areas on fan terraces
Typical profile:

0 to 13 inches-pale brown and very pale brown silt loam
13 to 31 inches-very pale brown and white silt loam
31 to 50 inches-very pale brown very gravelly loam
50 to 60 inches-pale brown extremely gravelly coarse sand

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Darkbull and Declo silt loams in drainageways

Use and Management

Major use: Rangeland
Major management factors: Stanrod soil-salinity, low available water capacity, low precipitation, hazards of water erosion and wind erosion; Strevell soil-low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Stanrod soil-shadscale, bottlebrush squirreltail; Strevell soil-Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:

- Forage production is limited mainly by the salinity and low available water capacity in the Stanrod soil and the low precipitation during the growing season.
- Range seeding of adapted species is limited by numerous small drainageways that are difficult to cross with machinery, the salinity and low available water capacity in the Stanrod soil, the low precipitation, water erosion, and wind erosion.

Capability Classification

VIIs, nonirrigated

138-Sterling gravelly loam, 2 to 20 percent slopes

Composition

Sterling soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Hillsides
Elevation: 5,000 to 5,300 feet
Average annual precipitation: About 12 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 105 days

Characteristics of the Sterling Soil

Typical profile:
0 to 12 inches-brown gravelly loam
12 to 45 inches-very pale brown very gravelly loam
45 to 60 inches-very pale brown very cobbly loam
Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 3 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe

Contrasting Inclusions

- Soils that are similar to Koosharem soils and that are less than 18 percent clay; on the wide bottom of drainageways
- Soils that have slopes of more than 20 percent on the short slopes on sides of drainageways
- Soils near rock outcrop that have bedrock at a depth of 20 to 40 inches
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Gravel on and below the surface, low available water capacity, low precipitation, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity.
- Range seeding of adapted species is limited by gravel on and below the surface, the low available water capacity, the low precipitation, and water erosion.

Capability Classification

IVs, nonirrigated

139-Stines very stony sandy loam, 35 to 70 percent slopes

Composition

Stines soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: North-facing mesa sides, hillsides, and mountainsides
Elevation: 5,000 to 7,200 feet
Average annual precipitation: About 15 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 80 days
Rock fragments on surface: Kind-stones and cobbles; percentage of surface covered-15 to 35

Characteristics of the Stines Soil

Typical profile:
0 to 2 inches-grayish brown very stony sandy loam
2 to 9 inches-brown very gravelly sandy loam
9 to 33 inches-brown and pale brown very cobbly sandy loam
33 to 42 inches-light gray very cobbly sandy loam
42 inches-weakly consolidated volcanic ash
Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 3 to 7 inches
Restriction affecting rooting depth: Consolidated volcanic ash at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- Soils that have more than 35 percent rock fragments and that have consolidated volcanic ash at a depth of less than 20 inches
- Rock outcrop consisting of quartz latite and weakly consolidated ash
- Coalbank fine sandy loam near ash outcrop
- Stines very stony sandy loam on toe slopes of 20 to 35 percent

Use and Management

Major use: Rangeland
Major management factors: Slope, rock fragments on and below the surface, low available water capacity, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community:
Mountain big sagebrush, Idaho fescue, bluebunch wheatgrass

General management considerations:

- Forage production is limited mainly by the lour available water capacity.
- Range seeding of adapted species is limited by the slope, rock fragments on and below the surface, and water erosion.

Capability Classification

VIIs, nonirrigated

140-Strevell silt loam, 1 to 3 percent slopes

Composition

Strevell soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,200 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 120 days

Characteristics of the Strevell Soil

Typical profile:
0 to 7 inches-pale brown and very pale brown silt loam
7 to 13 inches-very pale brown silt loam
13 to 31 inches-very pale brown and white silt loam
31 to 50 inches-very pale brown very gravelly loam
50 to 60 inches-pale brown extremely gravelly loamy coarse sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Contrasting Inclusions

- Darkbull gravelly silt loam in drainageways
- Declo silt loam in the slightly higher landscape positions
- Bahem silt loam at the slightly higher elevations in the Idahome area

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Salinity, low precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Black greasewood, bottlebrush squirreltail

General management considerations:

- Forage production is limited mainly by the low precipitation and the salinity.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity, the low precipitation during the growing season, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay

General management considerations:

- The salinity limits the production of some crops.
- A tillage pan forms if the soil is excessively cultivated.
- The soil is easily eroded if a furrow irrigation system is used.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

VIs, nonirrigated; IIIs, irrigated

141-Strevell silt loam, nonsaline, 1 to 3 percent slopes

Composition

Strevell soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,400 to 5,000 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 120 days

Characteristics of the Strevell Soil

Typical profile:
0 to 5 inches-pale brown silt loam
5 to 29 inches-very pale brown silt loam
29 to 41 inches-white gravelly silt loam
41 to 60 inches-stratified light gray very gravelly sand and very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 6 to 8 inches

Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Darkbull gravelly silt loam in drainageways
- Declo silt loam in the slightly higher landscape positions
- Bahem silt loam in the slightly higher landscape positions in the Idahome area

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, sugar beets, potatoes, alfalfa hay
General management considerations:

- A tillage pan forms if the soil is excessively cultivated.
- Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIIs, irrigated

142-Strevell silt loam, nonsaline, to 12 percent slopes

Composition

Strevell soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Fan terrace breaks, s des of drainageways
Elevation: 4,800 to 5,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 100 days

Characteristics of the Strevell Soil

Typical profile:
0 to 5 inches-pale brown silt loam
5 to 29 inches-very pale brown silt loam
29 to 41 inches-white gravelly silt loam
41 to 60 inches-stratified light gray very gravelly sand and very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Darkbull gravelly silt loam in drainageways and eroded areas
- Declo silt loam in the slightly higher landscape positions

Use and Management

Major use: Rangeland
Major management factors: Low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season.
- Range seeding of adapted species is limited by water erosion and the low precipitation.

Capability Classification

VIe, nonirrigated

143-Strevell-Darkbull association, 3 to 8 percent slopes

Composition

Strevell soil and similar soils-65 percent
Darkbull soil and similar soils-25 percent
Contrasting inclusions-10 percent

Setting

Elevation: 5,200 to 5,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 105 days

Characteristics of the Strevell Soil

Position on landscape: Convex areas on dissected fan terraces
Typical profile:
0 to 3 inches-light gray silt loam
3 to 19 inches-very pale brown silt loam
19 to 33 inches-very pale brown gravelly silt loam
33 to 60 inches-stratified very pale brown very gravelly sandy loam and very gravelly loamy sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate

Available water capacity: 3 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate
Salinity: Moderately saline

Characteristics of the Darkbull Soil

Position on landscape: Concave areas and areas in shallow drainageways on dissected fan terraces
Typical profile:
0 to 4 inches-very pale brown silt loam
4 to 12 inches-pale brown sandy loam
12 to 23 inches-light brownish gray and very pale brown very gravelly sandy loam
23 to 60 inches-very pale brown very cobbly loamy coarse sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Stanrod silt loam in narrow convex areas
- Declo silt loam on the sides and bottom of drainageways

Use and Management

Major use: Rangeland
Major management factors: Strevell soil-low available water capacity, low precipitation, salinity, hazards of water erosion and wind erosion; Darkbull soil-low available water capacity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community:
Strevell soil-shadscale, bottlebrush squirreltail;
Darkbull soil-Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
- Forage production is limited mainly by the salinity of the Strevell soil, the low available water capacity and the low precipitation during the growing season.
- Range recovery is slow because of the salinity.
- Range seeding of adapted species is limited by the salinity of the Strevell soil; numerous, small to large dissections, which are difficult for machinery to cross; the low precipitation during the growing season; water erosion; and wind erosion.

Capability Classification

VIe, nonirrigated

144-Strevell, nonsaline-Darkbull complex, 2 to 4 percent slopes

Composition

Strevell soil and similar soils-50 percent
Darkbull soil and similar soils-45 percent
Contrasting inclusions-5 percent

Setting

Elevation: 5,100 to 5,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 45 degrees F
Frost-free period: About 100 days

Characteristics of the Strevell Soil

Position on landscape: Slightly convex areas on fan terraces
Rock fragments on surface: Kind-pebbles; percentage of surface covered-20 to 35
Typical profile:
0 to 3 inches-light gray gravelly silt loam
3 to 19 inches-very pale brown silt loam
19 to 33 inches-very pale brown gravelly loam
33 to 60 inches-stratified very pale brown very gravelly sandy loam and very gravelly loamy sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Characteristics of the Darkbull Soil

Position on landscape: Slightly concave areas on fan terraces
Rock fragments on surface: Kind-gravel and cobbles; percentage of surface covered-5 to 15
Typical profile:
0 to 4 inches-very pale brown silt loam
4 to 12 inches-pale brown gravelly sandy loam
12 to 23 inches-light gray and very pale brown very gravelly sandy loam
23 to 60 inches-very pale brown very cobbly loamy coarse sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches

Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Mellor silt loam in the slightly higher convex areas

Use and Management

Major use: Rangeland
Major management factors: Strevell soil-low precipitation, hazards of water erosion aid wind erosion; Darkbull soil-low available water capacity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plane community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity in the Darkbull soil.
- Range seeding of adapted species is limited by rock fragments on the surface, the low precipitation during the growing season, the low available water capacity, water erosion, and wind erosion.

Capability Classification

Vls, nonirrigated

145-Taunton silt loam, 4 to 8 percent slopes

Composition

Taunton soil and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Fan terraces, hillside:
Elevation: 4,400 to 5,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 115 days

Characteristics of the Taunton ;foil

Typical profile:
0 to 8 inches-pale brown silt loam
8 to 14 inches-white silt loam
14 to 23 inches-very pale brown loam
23 to 38 inches-very pale brown gravelly loam
38 inches-lime-silica cemented hardpan
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 7 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate or severe

Contrasting Inclusions

- Pocatello silt loam on east- and north-facing slopes in the Cotterel Mountain area
- Darkbull gravelly loam in shallow drainageways in the Cotterel Mountain area
- Somsen soils that have a surface layer of silt loam or loam near rock outcrop in the Cotterel Mountain area
- Rock outcrop at the higher elevations in the Cotterel Mountain area
- A soil that is similar to the Taunton soil and has an accumulation of clay in the subsoil in the Goose Creek area
- Darkbull gravelly silt loam on breaks to drainageways in the Goose Creek area
- Declo silt loam on the sides of shallow drainageways in the Goose Creek area

Use and Management

Major use: Rangeland
Major management factors: Low available water capacity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity.
- Range seeding of adapted species is limited by the low precipitation during the growing season, the low available water capacity, water erosion, and wind erosion.

Capability Classification

Vle, nonirrigated

146-Taunton-Somsen complex, 2 to 4 percent slopes

Composition

Taunton soil and similar soils-65 percent
Somsen soil and similar soils-20 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Taunton Soil

Position on landscape: Slightly concave areas
Typical profile:
0 to 5 inches-brown fine sandy loam
5 to 11 inches-yellowish brown fine sandy loam
11 to 36 inches-very pale brown and white fine sandy loam
36 inches-lime-silica cemented hardpan
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 7 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Severe

Characteristics of the Somsen Soil

Position on landscape: Slightly convex areas, areas near rock outcrop
Typical profile:
0 to 9 inches-pale brown fine sandy loam
9 to 29 inches-very pale brown and white c ravelly fine sandy loam
29 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

• Rock outcrop in landscape positions slightly higher than those of the Somsen soil
• Scoon very fine sandy loam in landscape positions similar to those of the Taunton soil
• Thornock cobbly fine sandy loam near rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Low available water capacity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
• Forage production is limited mainly by the low precipitation during the growing season.
• Range seeding of adapted species is limited by the low precipitation during the growing season, water erosion, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley, potatoes, alfalfa hay
General management considerations:
• A tillage pan forms if the soils are excessively cultivated.

Capability Classification

VIe, nonirrigated; IIIe, irrigated

147-Thornock cobbly fine sandy loam, 2 to 8 percent slopes

Composition

Thornock soil and similar soils-80 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Thornock Soil

Typical profile:
0 to 2 inches-pale brown cobbly fine sandy loam
2 to 6 inches-pale brown fine sandy loam
6 to 12 inches-very pale brown loam
12 to 15 inches-very pale brown cobbly loam
15 inches-bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

• Davey sandy loam in concave areas near the north end of the survey area

- Scoon fine sandy loam in the smooth, less :eloping areas
- Somsen fine sandy loam in the slightly concave areas
- Rock outcrop on low basalt ridges

Use and Management

Major use: Rangeland
Major management factors: Shallow depth to bedrock, low available water capacity, low precipitation, rock fragments on the surface, hazards of water erosion and wind erosion

Rangeland
Dominant vegetation in potential natural plant community. Wyoming big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low available water capacity and the low precipitation during the growing season.
- Range seeding of adapted species is limited by the low available water capacity, rock fragments on the surface, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

VIs, nonirrigated; IVs, irrigated

148-Trevino-Paulville complex, 0 to 8 percent slopes

Composition

Trevino soil and similar soils-60 percent
Paulville soil and similar soils-20 percent
Contrasting inclusions-20 percent

Setting

Elevation: 4,200 to 4,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Trevino Soil

Position on landscape: Basalt ridges
Slope: 2 to 8 percent
Rock fragments on surface: Kind-cobbles and stones; percentage of surface covered-5 to 20
Typical profile:
0 to 3 inches-brown stony silt loam
3 to 7 inches-pale brown stony silt loam
7 to 15 inches-pale brown silt loam
15 to 19 inches-very pale brown cobbly loam
19 inches-bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Severe

Characteristics of the Paulville Soil

Position on landscape: Concave areas between ridges on basalt plains
Slope: 0 to 4 percent
Typical profile:
0 to 6 inches-pale brown silt loam
6 to 12 inches-light yellowish brown silt loam
12 to 26 inches-light yellowish brown silty clay loam
26 to 36 inches-light yellowish brown silt loam
36 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 10 to 12 inches
Potential rooting depth: 60 inches or more
Runoff: Slow or medium
Hazard of water erosion: Slight or moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

- Rock outcrop on basalt ridges and as random protrusions
- Soils that are similar to Somsen soils and have a surface layer of silt loam on toe slopes
- Soils that are similar to Paulville silt loam and have bedrock at a depth of less than 40 inches in depressional areas
- A Trevino soil that has very few stones on the surface in T. 10 S., R. 26 E., sec. 19, 20, 21, 28, 29, and 30
- Soils that receive more spring and summer precipitation than is normal for the Trevino and Paulville soils in areas where the average annual precipitation ranges from about 11 to 13 inches and is sufficient for limited nonirrigated farming; in T. 10 S., R. 26 E., sec. 19, 20, 21, 28, 29, and 30

Use and Management

Major uses: Rangeland, nonirrigated cropland
Major management factors: Trevino soil-shallow depth to bedrock, low available water capacity, low precipitation, cobbles and stones on and below the surface, hazards of water erosion and wind erosion; Paulville soil-low precipitation, hazards of water erosion and wind erosion

Rangeland
Dominant vegetation in potential natural plant community: Trevino soil-Wyoming big sagebrush, bluebunch

wheatgrass; Paulville soil-Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass;

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity in the Trevino soil.
- Range seeding of adapted species is limited by stones and cobbles on the surface of the Trevino soil, the low available water capacity in the Trevino soil, and the low precipitation during the growing season.
- Seeding the more favorable areas of this map unit is difficult because of the pattern in which they occur with the less favorable areas.

Nonirrigated cropland

Suitable crops: Wheat, barley

General management considerations:

- Production is limited mainly by the low precipitation.
- Continuous cropping is not common because of the low precipitation.
- A tillage pan forms if the soils are excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIe, nonirrigated; IVe, irrigated

149-Trevino-Rock outcrop complex, 2 to 12 percent slopes

Composition

Trevino soil and similar soils-70 percent
Rock outcrop-20 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,500 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Trevino Soil

Position on landscape: Undulating areas between the rock outcrop
Rock fragments on surface: Kind-cobbles and stones; percentage of surface covered-5 to 20
Typical profile:

0 to 3 inches-brown stony silt loam
3 to 7 inches-pale brown stony silt loam
7 to 15 inches-pale brown silt loam
15 to 19 inches-very pale brown cobbly loam
19 inches-bedrock

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Severe

Characteristics of the Rock Outcrop

- Rock outcrop consists of areas of randomly protruding exposures of bedrock.
- The exposures range from about 1 to more than 20 feet in height, are 20 to more than 100 feet wide, and are up to several hundred feet long.
- Slopes range from about 1 percent to nearly vertical on short slopes.

Contrasting Inclusions

- A soil that is similar to Somsen soils and has a surface layer of silt loam on toe slopes
- A very deep, saline soil that formed in silty alluvium, that has 25 to 60 percent rock fragments, and that has slopes of 10 to 50 percent; at the base of a scarp about 40 to 60 feet high along the Raft River
- Soils in depressional areas that are 20 to 50 inches deep to bedrock
- A Trevino soil that has very few stones on the surface in T. 10 S., R. 26 E., sec. 19, 20, and 21
- Soils in depressional areas that are similar to Paulville silt loam and that have bedrock at a depth of less than 40 inches and soils on toe slopes that are similar to Somsen soils and that have a surface layer of silt loam; in areas where the average annual precipitation ranges from about 11 to 13 inches, in T. 10 S., R. 26 E., sec. 19, 20, and 21
- Soils in the Horse Butte area that receive additional spring and summer precipitation, which provides sufficient moisture for limited nonirrigated farming

Use and Management

Major uses: Rangeland, nonirrigated cropland
Major management factors: The rock outcrop, shallow depth to bedrock, low available water capacity, low precipitation, cobbles and stones on and below the surface

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass

General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity in the Trevino soil.
- Range seeding of adapted species is limited by the rock outcrop, the shallow depth to bedrock, stones and

cobbles on the surface, water erosion, wind erosion, the low available water capacity in the Trevino soil, and the low precipitation during the growing season.

• Seeding the more favorable areas of this map unit is difficult because of the pattern in which they occur with the less favorable areas.

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:
• Continuous cropping is not a common practice because of the low precipitation.
• A tillage pan forms if the soil is excessively cultivated.

Capability Classification

Vle, nonirrigated

150-Turbyfill-Quincy complex, 5 to 15 percent slopes

Composition

Turbyfill soil and similar soils-50 percent
Quincy soil and similar soils-40 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Lake terraces, terrace breaks
Elevation: 4,900 to 5,100 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 47 degrees F
Frost-free period: About 105 days

Characteristics of the Turbyfill Soil

Typical profile:
0 to 5 inches-light gray and pale brown line sandy loam
5 to 60 inches-pale yellow fine sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Severe

Characteristics of the Quincy Soil

Typical profile:
0 to 5 inches-brown sandy loam
5 to 25 inches-pale brown loamy sand
25 to 60 inches-pale brown sand
Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Available water capacity: 3 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Severe

Contrasting Inclusions

• Soils that are similar to Declo silt loam in slightly convex areas
• Soils that have bedrock at a depth of 40 to 60 inches in eroded areas
• Soils in and near drainageways and in eroded areas that have more than 35 percent rock fragments

Use and Management

Major use: Rangeland
Major management factors: Turbyfill soil-low precipitation, hazards of water erosion and wind erosion; Quincy soil-low available water capacity, low precipitation, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Juniper, bluebunch wheatgrass, scattered Wyoming big sagebrush
General management considerations:
• Forage production is limited mainly by a dense stand of juniper, the low precipitation during the growing season, and the low available water capacity in the Quincy soil.
• Range seeding of adapted species is limited by the dense stand of trees, the low precipitation during the growing season, the low available water capacity in some areas, water erosion, and wind erosion.

Capability Classification

Vle, nonirrigated

151-Ushar silt loam, 1 to 3 percent slopes

Composition

Ushar soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Flood plains, low terraces
Elevation: 4,400 to 5,200 feet
Average annual precipitation: About 13 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 105 days

Characteristics of the Ushar Soil

Typical profile:
0 to 12 inches-brown silt loam
12 to 45 inches-pale brown silt loam

45 to 60 inches-pale brown very gravelly sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 8 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that are similar to the Ushar soil and that have very gravelly loam at a depth of 20 to 40 inches
- Strevell silt loam, nonsaline, on high terraces

Use and Management

Major use: Irrigated cropland
Major management factors: Hazard of wind erosion

Irrigated cropland

Suitable crops: Wheat, barley, alfalfa hay
General management considerations:

- Suitable irrigation methods are sprinkler, furrow, border, and corrugation systems.
- A tillage pan forms if the soil is excessively cultivated.
- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

IIIe irrigated; IVe, nonirrigated

152-Vining fine sandy loam, 1 to 3 percent slopes

Composition

Vining soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Basalt plains
Elevation: 4,200 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Vining Soil

Typical profile:
0 to 3 inches-brown fine sandy loam
3 to 11 inches-pale brown fine sandy loam
11 to 26 inches-pale brown sandy loam
26 inches-bedrock that has thin coatings of lime

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 2 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

- Trevino soils that have a surface layer of cobbly or stony fine sandy loam on ridges
- Rock outcrop on ridgetops and as random protrusions

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Hazard of wind erosion, low precipitation, low available water capacity

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:

- Forage production is limited mainly by the low precipitation during the growing season and the low available water capacity.
- Range seeding of adapted species is limited by the low precipitation during the growing season, the low available water capacity, and wind erosion.

Irrigated cropland

Suitable crops: Wheat, barley, potatoes, alfalfa hay
General management considerations:

- The hazard of wind erosion is increased if the surface is left bare after tillage.

Capability Classification

VIe, nonirrigated; IIIe, irrigated

153-Vipont-Rexburg association, 30 to 60 percent slopes

Composition

Vipont soil and similar soils-50 percent
Rexburg soil and similar soils-25 percent
Contrasting inclusions-25 percent

Setting

Elevation: 5,000 to 5,500 feet
Average annual precipitation: About 15 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 85 days

Characteristics of the Vipont Soil

Position on landscape: East- and south-facing mountainsides

Typical profile:
0 to *8* inches-dark brown very stony loam
8 to 17 inches-brown very cobbly clay loam
17 to 26 inches-brown extremely cobbly clay loam
26 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Rexburg Soil

Position on landscape: North-facing mountainsides
Typical profile:
0 to 14 inches-brown silt loam
14 to 60 inches-pale brown and very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Jimsage gravelly loam at the upper end of canyons
- Nearly vertical rock outcrop along canyon rims
- Rubble land at the base of the rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Vipont soil-slope, low available water capacity, rock fragments on and below the surface, hazard of water erosion; Rexburg soil-slope, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low available water capacity in the Vipont soil and the short growing season.
- Range seeding of adapted species is limited by the slope, poor access, rock fragments on and below the surface in some areas, the low available water capacity, water erosion, and wind erosion.

Capability Classification

Vipont soil-VIIs, nonirrigated; Rexburg soil-VIIe

154-Vitale-Jimsage association, 40 to 60 percent slopes

Composition

Vitale soil and similar soils-50 percent
Jimsage soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Elevation: 5,800 to 7,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 42 degrees F
Frost-free period: About 80 days

Characteristics of the Vitale Soil

Position on landscape: South-facing sides of canyons
Typical profile:
0 to 5 inches-brown stony loam
5 to 10 inches-brown gravelly loam
10 to 30 inches-yellowish brown very cobbly clay loam
30 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Jimsage Soil

Position on landscape: North-facing sides of canyons
Typical profile:
0 to 5 inches-dark brown gravelly loam
5 to 26 inches-dark brown very gravelly and extremely gravelly loam
26 to 60 inches-pale brown and very pale brown very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4 to 5 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- Hutchley gravelly silt loam on ridgetops and near rock outcrop
- Vipont very stony loam on west- and south-facing slopes in slightly concave areas
- Rock outcrop and rubble land below the rock outcrop
- Doodlelink gravelly loam in drainageways

• Springs and intermittent streams on narrow canyon bottoms that are suitable for development

Use and Management

Major use: Rangeland
Major management factors: Vitale soil-slope, hazard of water erosion, rock fragments on and below the surface, low available water capacity; Jimsage soil-slope, hazard of water erosion, rock fragments on and below the surface

Rangeland

Dominant vegetation in potential natural plant community: Vitale soil-mountain big sagebrush, bluebunch wheatgrass; Jimsage soil-low sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low available water capacity in the Vitale soil.
• Range seeding of adapted species is limited Cy the slope, rock fragments on and below the surface, the low available water capacity, poor access, and water erosion.

Capability Classification

VIIe, nonirrigated

155-Watercanyon silt loam, 4 to 12 percent slopes

Composition

Watercanyon soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Hillsides, fan terraces
Elevation: 5,000 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Watercanyon ;soil

Typical profile:
0 to 2 inches-pale brown silt loam
2 to 16 inches-yellowish brown and pale brown silt loam
16 to 22 inches-very pale brown silt loam
22 to 60 inches-very pale brown very fine sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Rexburg silt loam in concave areas, in drainageways, and on north-facing slopes
• Harroun very stony silt loam in the area where the Watercanyon unit joins the Harroun unit
• Calcixerollic Xerochrepts on eroded south-facing slopes

Use and Management

Major use: Rangeland
Major management factors: Hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Range seeding of adapted species is limited by water erosion and wind erosion.

Capability Classification

IIIe, nonirrigated

156-Watercanyon silt loam, 20 to 40 percent slopes

Composition

Watercanyon soil and similar soils-85 percent
Contrasting inclusions-15 percent

Setting

Position on landscape: Hillsides, mountainsides
Elevation: 4,600 to 6,000 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 44 degrees F
Frost-free period: About 95 days

Characteristics of the Watercanyon Soil

Typical profile:
0 to 11 inches-pale brown silt loam
11 to 60 inches-very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Nearly vertical rock outcrop at the higher elevations
• Jimsage gravelly loam below the rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Slope, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Range seeding of adapted species is limited by the slope, water erosion, and wind erosion.

Capability Classification

VIIe, nonirrigated

157-Watercanyon-Vitale-Rexburg association, 30 to 50 percent slopes

Composition

Watercanyon soil and similar soils-35 percent
Vitale soil and similar soils-25 percent
Rexburg soil and similar soils-20 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Mountainsides
Elevation: 5,000 to 6,600 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 90 days

Characteristics of the Watercanyon Soil

Position on landscape: Toe slopes, convex areas, south-facing slopes at the higher elevations
Typical profile:
0 to 60 inches-pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Characteristics of the Vitale Soil

Position on landscape: Generally the higher east- and north-facing slopes near rock outcrop
Typical profile:
0 to 5 inches-brown stony loam
5 to 10 inches-brown gravelly loam
10 to 30 inches-yellowish brown very cobbly clay loam
30 inches-bedrock
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 3 inches
Restriction affecting rooting depth: Bedrock at a depth of 20 to 40 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Rexburg Soil

Position on landscape: Generally east- and north-facing slopes between the Vitale and Watercanyon soils
Typical profile:
0 to 12 inches-brown silt loam
12 to 60 inches-pale brown and very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Jimsage very gravelly loam below rock outcrop
• Hutchley gravelly silt loam on ridges
• Nearly vertical rock outcrop at the higher elevations
• Kucera silt loam in concave areas on north-facing slopes
• Soils that are similar to Kucera and Hades soils, that have slopes of 5 to 15 percent, and that have been covered by silty alluvium and loess; on wide ledges in areas that are up to 2 acres in size, that may have seeps or intermittent springs, and that are suitable for development

Use and Management

Major use: Rangeland
Major management factors: Watercanyon and Rexburg soils-slope, hazards of water erosion and wind erosion; Vitale soil-slope, hazard of water erosion, low available water capacity, rock fragments on and below the surface

Rangeland

Dominant vegetation in potential natural plant community: Mountain big sagebrush, bluebunch wheatgrass
General management considerations:
• Forage production is limited mainly by the low available water capacity in the Vitale soil.
• Range seeding of adapted species is limited by the slope, water erosion, wind erosion, the low available water capacity, and rock fragments on and below the surface.

Capability Classification

VIIe, nonirrigated

158-Weeks loam, 4 to 12 percent slopes

Composition

Weeks soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Coalesced fan terraces, hillsides
Elevation: 4,300 to 4,500 feet
Average annual precipitation: About 12 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 125 days

Characteristics of the Weeks Soil

Typical profile:
0 to 12 inches-brown loam
12 to 28 inches-pale brown and very pale brown loam
28 to 55 inches-white and very pale brown cemented hardpan
55 to 60 inches-light yellowish brown loam
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 8 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Medium or rapid
Hazard of water erosion: Moderate or severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Soils that have bedrock at a depth of less than 40 inches
- Small drainageways that have steep sides and some rock outcrop
- Soils that have slopes of less than 4 percent of more than 12 percent
- Weeks loam that has 10 to 20 percent rock fragments on and below the surface

Use and Management

Major use: Nonirrigated cropland
Major management factors: Slope, low precipitation, low available water capacity, hazards of water erosion and wind erosion

Nonirrigated cropland

Suitable crops: Wheat, barley
General management considerations:

- Production is limited mainly by the low precipitation and the low available water capacity.
- Continuous cropping is not suitable because of the low precipitation.
- A tillage pan forms if the soil is excessively cultivated.
- The hazards of water erosion and wind erosion are increased if the surface is left bare after tillage.

Capability Classification

VIe, nonirrigated

159-Wheeler silt loam, 25 to 45 percent slopes

Composition

Wheeler soil and similar soils-95 percent
Contrasting inclusions-5 percent

Setting

Position on landscape: Side slopes of dissected terraces
Elevation: 4,200 to 4,400 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 48 degrees F
Frost-free period: About 130 days

Characteristics of the Wheeler Soil

Typical profile:
0 to 60 inches-pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11 to 13 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Severe

Contrasting Inclusions

- Soils in and near drainageways that have pebbles and sand
- Soils that have an accumulation of lime in the subsoil and are more than 18 percent clay on slopes of 4 to 12 percent near the bottom of drainageways
- Soils that are similar to Kucera silt loam on steep, concave, north-facing slopes
- Pocatello silt loam in the less sloping areas
- Bahem silt loam on north-facing toe slopes
- Wheeler silt loam that has slopes of more than 45 percent

Use and Management

Major use: Rangeland
Major management factors: Low precipitation, slope, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plan F community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass

General management considerations:

• Forage production is limited mainly by the low precipitation during the growing season.

• Range seeding of adapted species is limited by the slope, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

Vlle, nonirrigated

160-Wilsonguich very stony loam, 40 to 60 percent slopes

Composition

Wilsongulch soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: South-facing hillsides and mesa sides
Elevation: 5,100 to 5,900 feet
Average annual precipitation: About 14 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 95 days

Characteristics of the Wilsongulch Soil

Typical profile:
0 to 7 inches-brown *very* stony loam
7 to 14 inches-brown very gravelly loam
14 to 60 inches-white very gravelly sandy loam
Depth class: Deep or very deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 5 to 7 inches
Restriction affecting rooting depth: Weakly consolidated volcanic ash at a depth of 40 to more than 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

• Soils that are similar to Cottonthomas fine sandy loam on toe slopes

• Rock outcrop consisting of quartz latite and weakly consolidated volcanic ash

• Bluehill fine sandy loam near ash outcrop

Use and Management

Major use: Rangeland
Major management factors: Slope, rock fragments on and below the surface, hazard of water erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass

General management considerations:

• Range seeding of adapted species is limited by the slope, rock fragments on and below the surface, and water erosion.

Capability Classification

Vlls, nonirrigated

161-Womack gravelly silt loam, 4 to 8 percent slopes

Composition

Womack soil and similar soils-90 percent
Contrasting inclusions-10 percent

Setting

Position on landscape: Fan terraces
Elevation: 4,700 to 5,700 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Womack Soil

Typical profile:
0 to 5 inches-pale brown gravelly silt loam
5 to 11 inches-pale brown gravelly clay loam
11 to 13 inches-very pale brown very gravelly loam
13 to 17 inches-very pale brown very gravelly sandy loam
17 to 24 inches-very pale brown extremely gravelly loamy coarse sand
24 to 31 inches-multicolored, stratified extremely gravelly loamy coarse sand
31 inches-lime-silica cemented hardpan
Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: A hardpan at a depth of 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that do not have a hardpan and that have more than 35 percent rock fragments; in drainageways, on the upper end of fans, and in slightly concave areas

• Soils that have a hardpan at a depth of less than 20 inches

• Soils that have slopes of less than 4 percent or more than 8 percent

Use and Management

Major use: Rangeland
Major management factors: Hazards of water erosion and wind erosion, low available water capacity, rock fragments on and below the surface, low precipitation

Rangeland

Dominant vegetation in potential natural plant community: Low sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
• Forage production is limited mainly by the low available water capacity and the low precipitation during the growing season.
• Range seeding of adapted species is limited by rock fragments on and below the surface, the low available water capacity, the low precipitation during the growing season, water erosion, and wind erosion.

Capability Classification

VIe, nonirrigated

162-Xerollic Calciorthids, 25 to 55 percent slopes

Composition

Xerollic Calciorthids and similar soils-75 percent
Contrasting inclusions-25 percent

Setting

Position on landscape: Moderately steep and steep fan terrace breaks and hillsides
Elevation: 4,250 to 5,600 feet
Average annual precipitation: About 10 inches
Average annual air temperature: About 46 degrees F
Frost-free period: About 110 days

Characteristics of the Xerollic Calciorthids

Representative profile:
0 to 6 inches-pale brown gravelly loam
6 to 60 inches-stratified light yellowish brown very gravelly loam and very pale brown and light yellowish brown extremely gravelly loam and gravelly loam
Depth class: Very deep
Drainage class: Well drained to somewhat excessively drained
Permeability: Moderate or moderately rapid
Available water capacity: 2 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

• Soils that have more than 35 percent rock fragments throughout in drainageways and eroded areas
• Soils that have slopes of less than 25 percent or more than 55 percent
• Soils that have a dark surface layer on steep north-facing slopes in slightly concave areas at the higher elevations

Use and Management

Major use: Rangeland
Major management factors: Slope, rock fragments on and below the surface, low precipitation, low available water capacity in some areas, hazards of water erosion and wind erosion

Rangeland

Dominant vegetation in potential natural plant community: Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass
General management considerations:
• Slopes generally are 150 to 400 feet long and have been dissected by water erosion.
• The unit includes soils that are weakly developed and that are generally dry for long periods of time during the summer.
• The extent of erosion and the slope make the map unit difficult or nearly impossible to cross with conventional equipment.
• The slope and the numerous erosion channels make improving the range by seeding difficult.
• Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
• Range seeding of adapted species is limited by the slope, the numerous dissections, water erosion, wind erosion, and the low precipitation during the growing season.

Capability Classification

VIIe, nonirrigated

163-Yeates Hollow-Chen-Povey complex, 25 to 55 percent slopes

Composition

Yeates Hollow soil and similar soils-40 percent
Chen soil and similar soils-20 percent
Povey soil and similar soils-20 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Mountainsides
Elevation: 6,100 to 7,000 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 41 degrees F
Frost-free period: About 80 days

Characteristics of the Yeates Hollow Soil

Position on landscape: Smooth to slightly concave south-facing slopes, smooth to slightly convex north-facing slopes
Slope: 30 to 55 percent
Typical profile:
0 to 11 inches-grayish brown extremely stony loam and extremely gravelly silt loam
11 to 18 inches-brown extremely stony silty clay loam
18 to 43 inches-pale brown and light yellowish brown very gravelly and extremely stony clay
43 inches-bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 4 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Characteristics of the Chen Soil

Position on landscape: Convex and smooth south- and west-facing slopes and ridgetops
Slope: 25 to 50 percent
Typical profile:
0 to 3 inches-brown very stony silt loan
3 to 7 inches-brown very gravelly clay
7 to 11 inches-brown very cobbly clay
11 to 16 inches-yellowish brown extremely cobbly clay
16 inches-bedrock
Depth class: Shallow
Drainage class: Well drained
Permeability: Slow
Available water capacity: Less than 1 inch
Restriction affecting rooting depth: Bedrock at a depth of 10 to 20 inches
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe

Characteristics of the Povey Soil

Position on landscape: Slightly concave north-facing slopes
Slope: 30 to 55 percent
Typical profile:
0 to 10 inches-very dark grayish brown stony loam
10 to 16 inches-dark grayish brown very stony loam
16 to 35 inches-brown very stony loam
35 to 45 inches-pale brown very stony loam
45 inches-bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 7 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Contrasting Inclusions

- Vipont very stony loam on steep north-facing slopes
- A soil that is similar to the Povey soil and in similar landscape positions and that has less than 35 percent rock fragments
- Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Yeates Hollow soil-slope, stones on and below the surface, low available water capacity, hazard of water erosion; Chen soil-slope, stones on and below the surface, shallow depth to bedrock, hazard of water erosion, low available water capacity; Povey soil-slope, stones on and below the surface, hazard of water erosion, low available water capacity

Rangeland

Dominant vegetation in potential natural plant community:
Yeates Hollow and Povey soils-mountain big sagebrush, Idaho fescue, bluebunch wheatgrass; Chen soil-low sagebrush, Idaho fescue, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the shallow depth to bedrock of the Chen soil and the low available water capacity in some areas.
- Uniform distribution of grazing is difficult because of the slope and the lack of permanent water developments.
- Range seeding of adapted species is limited by the low available water capacity, stones on and below the surface, and water erosion.

Capability Classification

Yeates Hollow and Povey soils-VIIe, nonirrigated; Chen soil-VIIs, nonirrigated

164-Yeates Hollow-Hades complex, 10 to 40 percent slopes

Composition

Yeates Hollow soil and similar soils-50 percent
Hades soil and similar soils-30 percent
Contrasting inclusions-20 percent

Setting

Position on landscape: Mountainsides, foothills
Elevation: 5,500 to.7,000 feet
Average annual precipitation: About 16 inches
Average annual air temperature: About 43 degrees F
Frost-free period: About 75 days

Characteristics of the Yeates Hollow Soil

Position on landscape: South-facing slopes, slightly convex north-facing slopes
Slope: 25 to 40 percent
Typical profile:
0 to 3 inches-dark grayish brown very stony loam
3 to 8 inches-brown very cobbly loam
8 to 15 inches-brown very cobbly clay
15 to 49 inches-brown extremely cobbly clay
49 inches-bedrock
Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 1 to 5 inches
Restriction affecting rooting depth: Bedrock at a depth of 40 to 60 inches
Runoff: Very rapid
Hazard of water erosion: Very severe

Characteristics of the Hades Soil

Position on landscape: Concave areas, north-facing slopes, toe slopes
Slope: 10 to 40 percent
Typical profile:
0 to 7 inches-brown and dark brown loam
7 to 19 inches-dark grayish brown and dark brown clay loam
19 to 41 inches-brown, light brown, and pink cobbly clay loam
41 to 60 inches-light brown cobbly clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid or very rapid
Hazard of water erosion: Severe or very severe
Hazard of wind erosion: Moderate

Contrasting Inclusions

- Manila loam in concave areas
- Chen very stony loam on ridgetops and near rock outcrop
- Soils that have a surface layer of very stony loam, have bedrock at a depth of 20 to 40 inches, have more than 35 percent coarse fragments, and are less than 35 percent clay; on north- and south-facing shoulder slopes and near rock outcrop
- Rock outcrop
- Very deep soils that generally are more than 35 percent clay in small, nearly level, slightly concave areas of seeps

Use and Management

Major use: Rangeland
Major management factors: Yeates Hollow soil-stones on and below the surface, low available water capacity, hazard of water erosion, slope; Hades soil-hazards of water erosion and wind erosion, slope

Rangeland

Dominant vegetation in potential natural plant community: Yeates Hollow soil-mountain big sagebrush, Idaho fescue, bluebunch wheatgrass; Hades soil mountain big sagebrush, bluebunch wheatgrass
General management considerations:
- Forage production is limited mainly by the low available water capacity.
- The use of forage by livestock is limited by surface stones in some areas and the slope.
- Seeding the more favorable areas of this map unit is difficult because of the pattern in which they occur with the less favorable areas.
- Range seeding of adapted species is limited by surface stones in some areas, the low available water capacity, water erosion, and wind erosion

Capability Classification

Yeates Hollow soil-Vls, nonirrigated; Hades soil-VIIe, nonirrigated

Prime Farmland

In this section, prime farmland is defined and the soils in the survey area that are considered prime farmland are listed.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, seed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. An adequate moisture supply and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils commonly receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and length of growing season are favorable, and the level of acidity or alkalinity is acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

Soils that are droughty qualify as prime farmland only in areas where this limitation has been overcome by irrigation. The need for irrigation is indicated after the map unit name. Onsite evaluation is needed to determine whether or not a specific area is irrigated.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

About 307,072 acres, or nearly 35 percent of the survey area, meets the requirements for prime farmland.

The following map units meet the requirements for prime farmland. On some soils included in the list, measures that overcome droughtiness are needed. The location of each map unit is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

9	Bahem silt loam, 1 to 3 percent slopes
12	Bahem-Portneuf complex, 0 to 1 percent slopes (where irrigated)
14	Bancroft silt loam, 1 to 3 percent slopes
25	Chatburn silt loam, 1 to 4 percent slopes
26	Chayson gravelly silt loam, 2 to 10 percent slopes (where irrigated)
37	Darkbull loam, 0 to 1 percent slopes (where irrigated)
38	Darkbull loam, 1 to 4 percent slopes (where irrigated)
39	Darkbull loam, saline, 1 to 3 percent slopes (where irrigated)
41	Darkbull gravelly loam, cool, 4 to 8 percent slopes (where irrigated)
44	Davey sandy loam, 0 to 2 percent slopes (where irrigated)
45	Davey fine sandy loam, 0 to 2 percent slopes (where irrigated)
46	Declo silt loam, 0 to 1 percent slopes (where irrigated)

47 Declo silt loam, 1 to 3 percent slopes (where irrigated)
49 Declo silt loam, saline, 0 to 1 percent slopes (where irrigated)
50 Declo silt loam, saline, 1 to 3 percent slopes (where irrigated)
55 Donnardo gravelly loam, 2 to 4 percent slopes (where irrigated)
57 Escalante sandy loam, 4 to 8 percent slopes (where irrigated)
58 Escalante fine sandy loam, 1 to 3 percent slopes (where irrigated)
59 Farmell silty clay loam, 0 to 1 percent slopes (where irrigated)
61 Genola silt loam, 0 to 1 percent slopes (where irrigated)
62 Genola silt loam, saline, 0 to 1 percent slopes (where irrigated)
69 Heglar silt loam, 1 to 3 percent slopes
79 Idahome silt loam, 1 to 3 percent slopes (where irrigated)
85 Jeff silt loam, 0 to 1 percent slopes (where irrigated)
88 Kancan gravelly silt loam, 2 to 8 percent slopes
91 Koosharem silt loam, 1 to 3 percent slopes
97 McClenden silt loam, 1 to 3 percent slopes (where irrigated)
100 Nibbs gravelly silt loam, 2 to 8 percent slopes (where irrigated)
104 Pocatello silt loam, 0 to 1 percent slopes (where irrigated)
112 Rexburg silt loam, 1 to 3 percent slopes
119 Ririe silt loam, 1 to 3 percent slopes
134 Somsen fine sandy loam, 1 to 3 percent slopes (where irrigated)
136 Stake silty clay loam, 0 to 1 percent slopes (where irrigated)
140 Strevell silt loam, 1 to 3 percent slopes (where irrigated)
141 Strevell silt loam, nonsaline, 1 to 3 percent slopes (where irrigated)
144 Strevell, nonsaline-Darkbull complex, 2 to 4 percent slopes (where irrigated)
146 Taunton-Somsen complex, 2 to 4 percent slopes (where irrigated)
151 Ushar silt loam, 1 to 3 percent slopes (where irrigated)
152 Vining fine sandy loam, 1 to 3 percent slopes (where irrigated)

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to p an the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or veny firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

By Kent Foster, district conservationist, Soil Conservation Service, Burley, Idaho.

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil. The information in this section is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, community planners, conservationists, and others.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1987, about 220,000 acres of the survey area was used for crops and pasture. Of this, about 107,000 acres was irrigated cropland, 97,000 acres was nonirrigated cropland, and 16,000 acres was pasture and hayland. These lands are largely farmed in conjunction with livestock enterprises; therefore, much of the acreage is used for improved pasture, hay, or grain for livestock feed.

Commonly grown field crops that are suited to the survey area are potatoes, sugar beets, alfalfa, and pasture plants. Close-growing crops, such as wheat and barley, are commonly grown on both irrigated and nonirrigated soils.

Approximately half of the total acreage used for crops and pasture requires some irrigation. Nonirrigated wheat and barley are produced on cropland at elevations above 5,000 feet.

Sprinkler irrigation systems are used on most of the irrigated cropland in the Raft River valley. A large portion of this cropland is irrigated by center-pivot sprinklers. Some type of sprinkler system is also used on most of the acreage used for potatoes and sugar beets. Newly developed irrigated cropland is almost totally irrigated by sprinklers. Gravity surface irrigation systems, such as corrugation or border, are predominantly used for crops such as alfalfa and grain rather than for row crops. Many surface irrigation systems are being converted to sprinkler systems.

Sprinkler irrigation systems are more efficient than other systems and require less extensive land

smoothing. This fact is important for the survey area because of the effects of topographic changes within a field. Sprinkler systems also allow more flexibility in tillage operations, improve control of water for crop emergence, and ease the application of certain chemicals and fertilizers. These advantages can result in a general fuel saving by reducing the number of needed tillage operations.

High winds occur within the survey area in the spring and frequently during the fall. Soils that have little or no plant cover or crop residue on or near the surface are subject to moderate or severe erosion.

The hazard of wind erosion can be minimized by applying a suitable conservation cropping system. Good management practices include leaving enough crop residue on the surface to protect it from wind erosion, leaving the soil rough and cloddy when not cropped, using reduced tillage, using conservation cropping sequences, and planting a close-growing cover crop.

A serious water erosion problem exists in the northeastern part of the survey area, where steep cropland is being irrigated with center-pivot sprinkler systems. Managing irrigation water, applying a good conservation cropping system, managing crop residue, and farming across the slope where feasible can help to reduce or eliminate this hazard. The cropland in other areas needs both management measures and structural measures to overcome the hazard of erosion.

Nonirrigated cropland in the Sublett, Juniper, and Heglar areas on the east side of the Raft River valley also has the potential for severe erosion where it is not adequately protected. In many cases, management practices, such as conservation tillage, farming across the slope, and using crop residue, can reduce this hazard to acceptable levels. In other cases, structural measures, such as diversions, terraces, and grassed waterways, may also be needed to reduce erosion to acceptable levels.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yield: may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils generally are grouped at three levels-capability class, subclass, and unit (13). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w*, *s*, or *c*, to the class numeral, for example, I e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows; that the soil is limited mainly because it is shallow, droughty, or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

Class V contains only the subclasses indicated by w, s, or c because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland

By Dennis Froeming, area range conservationist, Soil Conservation Service, Boise, Idaho.

About 74 percent, or 648,685 acres, of the survey area is used as rangeland. About 437,215 acres of this rangeland is administered by the Bureau of Lend Management and the Forest Service. About 211,470 acres is privately owned. The rangeland is used for livestock and wildlife grazing, as recreation sites, and as valuable watershed for the Raft River, Goose Creek, and the Marsh Creek drainageway of the Snake River. Sheep and cattle operations contribute significantly to the economy of the survey area. Because of relief and inclement winter temperatures, the rangeland is best suited to grazing in spring, summer, and fall (18).

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 6 shows, for many soils, the name of the range site; the potential annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the expected percentage of the major species in the composition of the potential natural plant community. Only the soils that are suited to rangeland are listed. An explanation of the column headings in table 6 follows.

A range site is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was ascertained during this survey; thus range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important (9).

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruit of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed as pounds per acre of air-dry weight for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average because of low available soil moisture, abnormal temperatures or winds, or a combination of unfavorable conditions.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation-the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil-is listed by common name. Under *composition,* the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be

used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective of range management is to control grazing so that the plants growing are about the same in kind and amount as the potential natural plant community for the site. Such management generally results in the optimal production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

The primary management practice needed on rangeland in this survey area is a planned grazing system that allows plants to achieve adequate growth in spring to withstand grazing pressure, allows the soils to dry out in spring to avoid damage from trampling, allows for periodic rest or deferment of grazing, and allows for removal of livestock when the desired amount of forage has been grazed (18).

Practices such as constructing water developments and fences, managing brush, range seeding, End properly distributing livestock facilitate the grazing system and help to bring about needed changing in the plant community. The suitability of specific practices is determined by the various characteristics of individual soils.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland End crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise, The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival; a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 7 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 7 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Only the soils that can support windbreaks and environmental plantings are listed in table 7. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Wildlife Habitat

By Mike Anderson, state biologist, Soil Conservation Service, Boise, Idaho, and Willis Byrd, wildlife biologist, Bureau of Land Management, Burley, Idaho.

The survey area provides favorable habitat for many kinds of wildlife. The diverse areas of woodland, rangeland, cropland, and water provide food and cover for many mammals, birds, and fish.

Wildlife populations are largely determined by the supply of food, cover, and water. Habitats differ in their capacity to provide these essential needs. Some of the differences result from the various characteristics of the soils, and others result from the various kinds of management used. Good management is needed to improve habitat for wildlife and includes the integration of wildlife conservation with other uses of the soils.

Mule deer are the most abundant of the big game animals, but small populations of pronghorns also inhabit the survey area. Beaver, mink, muskrat, and other small furbearers live along the streams.

A good variety of upland game species use almost all of the habitat types in the survey area. Some species, such as pheasant, mourning dove, and quail, are closely associated with the private farmland, while others, such as sage grouse, Hungarian partridge, chukar partridge, and rabbits, are more dependent on the rangeland.

Waterfowl are found throughout the survey area even though habitat is limited. Major areas of wetland habitat include Goose Creek Reservoir, Sublett Reservoir, Marsh Creek, Warm Creek, Raft River, and the Minidoka Wildlife Refuge. Principal waterfowl species include Canada geese, mallards, and teal.

Most of the mule deer in Cassia County inhabit land

in the Sawtooth National Forest. They mainly use the survey area as winter range. Crucial winter range for deer amounts to about 73,000 acres of State, private, and Bureau of Land Management land. These important areas support about 6,000 deer during winter.

Pronghorns are limited to specific areas within the survey area. They inhabit areas on a yearly basis, shifting from one area to another, according to availability of food and water. The Idaho Department of Fish and Game indicates a population of about 130 antelope within the survey area in 1982.

The soils of the survey area are assigned to general soil groups (see the section "General Soil Map Units"). The wildlife populations correlate with these general soil map units. The following paragraphs describe the habitat available in various units and the major wildlife species that can be supported.

General soil map units 6, 7, 8, 9, 11, 12, 13, and 16 provide winter range for mule deer, and units 6, 9, 13, and 16 offer crucial winter range. Pronghorns inhabit areas in general soil map units 1, 2, 3, 4, and 5.

Pheasants are found in general soil map units 1, 2, 3, 4, 6, and 15.

Areas of water and wetland habitat are available for waterfowl in general soil map units 1, 6, and 15. Aquatic mammals, such as beaver, mink, and muskrat, also use these areas.

California quail are found in general soil map units 11, 12, 14, and 16; sage grouse, units 4 through 14 and unit 16; chukar partridge, units 6, 9, 14, and 16; and mourning dove, units 2, 3, 4, 6, and 7. The mourning dove prefer agricultural areas but are common throughout the survey area. Sharptail grouse inhabit areas in general soil map units 7 and 8 only in the eastern part of Cassia County.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas *of different soils may be included within the mapped areas of a specific soil.*

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 8 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The

limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements; graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 9 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 9 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties require special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less

than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many, local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 9 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill-trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated) at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of groundwater pollution. Ease of excavation and revegetation should be considered.

The ratings in table 9 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as *a probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration.

The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the taxonomic unit descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 11 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against

overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils (15). Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 12 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each taxonomic unit under "Taxonomic Units and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials (1) and the Unified soil classification system (2).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection (7).

Rock fragments 3 to 10 inches in diameter or greater than 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on

laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 13 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each taxonomic unit under "Taxonomic Units and Their Morphology."

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at '/s-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure (4).

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind

and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low,* a change of less than 3 percent; *moderate,* 3 to 6 percent; and *high,* more than 6 percent. *Very high,* more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Erosion factor T is an estimate of the maximum average rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measure to control wind erosion are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control wind erosion are used.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 13, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Tables 14 and 15 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or

soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered to be flooding. Standing water in swamps and marshes or in closed depressional areas is considered to be ponding.

Table 14 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable, *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding in any year is nearly 0 percent to 5 percent), *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding in any year is 5 to 50 percent), and *frequent* that it occurs often under normal weather conditions (the chance of flooding in any year is more than 50 percent). *Common* is used when the occasional and frequent classes are grouped for certain purposes.

Duration is expressed as *very brief* (less than 2 days), *brief (2* to 7 days), *long (7* days to 1 month), and *very long* (more than 1 month). The time of year that flooding is most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 14 are the depth to the seasonal high water table, the kind of water table, and the months of the year that the water table usually is highest. A water table that is seasonally high for less than 1 month is not indicated in table 14. An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given in table 15 if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A cemented pan is a cemented or indurated subsurface layer within a depth of 5 feet. Such a pan causes difficulty in excavation. Pans are classified as thin or thick. *A thin* pan is one that is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. *A thick* pan is one that is more than 3 inches thick if continuously indurated or more than 18 inches thick if it is discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced

electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on-the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (14). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in sol. An example is Aridisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Orthid (Orth, meaning most common, plus id, from Aridisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Calciorthids (Calci, meaning lime, plus orthid, the suborder of the Aridisols that is the most common).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. An example is Xerollic Calciorthids.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particlesize class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is loamy-skeletal, mixed, mesic Xerollic Calciorthids.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Taxonomic Units and Their Morphology

In this section, each taxonomic unit recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each unit. A pedon, a small three-dimensional area of soil, that is typical of the unit in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (16). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (14). Unless otherwise stated, matrix colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the unit.

The map units of each taxonomic unit are described in the section "Detailed Soil Map Units."

Acord Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow

Position on landscape: Fan terraces, mountainsides
Parent material: Kind-alluvium that has some loess; source-mica schist and quartzite
Slope: 4 to 30 percent
Elevation: 4,700 to 6,400 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 70 to 95 days
Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Calcic Argixerolls

Typical Pedon

A-0 to 4 inches; brown (10YR 5/3) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common medium roots; many very fine irregular pores; about 2 percent stories on the surface and 5 percent stones, 5 percent cobbles, and 15 percent gravel below; mildly alkaline (pH 7.5); abrupt smooth boundary.

BA-4 to 10 inches; brown (10YR 5/3) cobbly clay loam, dark brown (10YR 3/3) moist; moderate coarse platy structure parting to moderate medium subangular blocky; slightly hard, very friable, sticky and plastic; common very fine and medium roots; many very fine tubular pores; 5 percent stones, 10 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.4); clear wavy boundary.

Bt1-10 to 13 inches; yellowish brown (10YR 5/4) very cobbly clay, brown (10YR 4/3) moist; moderate coarse prismatic structure parting to strong fine subangular blocky; slightly hard, very friable, sticky and very plastic; common very fine and medium roots; many very fine and few fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 5 percent stones, 25 percent cobbles, and 10 percent gravel; mildly alkaline (pH 7.4); abrupt smooth boundary.

Bt2-13 to 30 inches; light yellowish brown (10YR 6/4) very stony clay, brown (10YR 4/3) moist; strong medium prismatic structure parting to strong medium angular blocky; hard, firm, very sticky and very plastic; few very fine, fine, and medium roots; many very fine and few fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; 20 percent stones, 15 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.4); clear smooth boundary.

Btk1-30 to 36 inches; light yellowish brown (10YR 6/4) cobbly clay, yellowish brown (10YR 5/4) moist; strong medium prismatic structure parting to strong medium angular blocky; hard, firm, very sticky and very plastic; few very fine roots; many very fine and few fine tubular pores; many moderately thick clay films on faces of peds and lining pores; violently effervescent; lime segregated into many fine and medium irregularly shaped filaments and seams; 5 percent stones, 10 percent cobbles, and 5 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

Btk2-36 to 41 inches; very pale brown (10YR 7/3) very cobbly clay loam, light yellowish brown (10YR 6/4) moist; moderate medium prismatic structure parting to strong medium subangular blocky; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; violently effervescent; lime segregated into many medium and large irregularly shaped seams, masses, and concretions; 5 percent stones, 20 percent cobbles, and 15 percent gravel; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk-41 to 60 inches; yellowish brown (10YR 5/6) very cobbly coarse sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; common thin clay films on faces of peds and bridging sand grains; violently effervescent; lime segregated into many fine and medium irregularly shaped filaments and seams; 10 percent stones, 25 percent cobbles, and 20 percent gravel; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Acord very stony loam, 4 to 12 percent slopes
Location in survey area: About 2,200 feet west and 2,500 feet north of the southeast corner of sec. 31, T. 14 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 19 inches
Depth to argillic horizon: 3 to 13 inches
Depth to secondary lime: 24 to 36 inches

Particle-size control section:
Content of clay-35 to 50 percent
Content of rock fragments-35 to 60 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 to 3
Content of clay-15 to 25 percent.
Reaction-neutral or mildly alkaline

BA horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 to 3
Texture-cobbly clay loam, very cobbly clay loam, very stony loam, or gravelly loam

Content of clay-22 to 35 percent
Content of rock fragments-20 to 50 percent
Reaction-neutral or mildly alkaline

Bt horizon:
Hue-7.5YR or 10YR
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 to 4
Texture-gravelly clay loam, very cobbly clay, very stony clay, extremely stony clay, or extremely cobbly clay
Content of clay-35 to 50 percent
Content of rock fragments-average of 35 to 60 percent
Reaction-neutral or mildly alkaline

Btk horizon:
Hue-7.5YR or 10YR
Value-5 to 8 dry, 4 to 6 moist
Chroma-3 to 6
Texture-cobbly clay, very cobbly clay loam, very cobbly coarse sandy clay loam, extremely gravelly clay, very cobbly loam, or extremely stony clay
Content of clay-25 to 50 percent
Content of rock fragments-25 to 70 percent

Aninto Series

Depth class: Very deep

Drainage class: Well drained
Permeability: Very slow
Position on landscape: Fan terraces, toe slopes
Parent material: Kind-alluvium; source-mica schist and quartzite
Slope: 4 to 20 percent
Elevation: 5,500 to 6,500 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 43 degrees F
Frost-free period: 70 to 90 days
Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Typic Palexerolls

Typical Pedon

A1-0 to 4 inches; brown (10YR 5/3) stony loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine vesicular pores; 2 percent stones on the surface and 10 percent gravel below; neutral (pH 7.2); clear wavy boundary.

A2-4 to 8 inches; brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine and medium roots; many very fine tubular pores; 20 percent gravel; mildly alkaline (pH 7.4); abrupt wavy boundary.

Bt1-8 to 14 inches; brown (10YR 5/3) very flaggy clay, dark yellowish brown (10YR 3/4) moist; strong fine and medium angular blocky structure; very hard, friable, sticky and very plastic; common very fine and few fine roots; common very fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; 20 percent flags, 5 percent stones, 5 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

Bt2-14 to 28 inches; light yellowish brown (10YR 6/4) very flaggy clay, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; *very* hard, firm, sticky and very plastic; common very fine roots; few very fine tubular pores; continuous thick clay films on faces of peds and lining pores; 15 percent flags, 10 percent stones, 5 percent cobbles, and 20 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

Bt3-28 to 39 inches; light yellowish brown (10YR 6/4) cobbly clay, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure parting to strong medium and coarse angular blocky; very hard, friable, sticky and very plastic; common very fine roots; few very fine tubular pores; continuous thick clay films on faces of peds and lining pores; 15 percent cobbles and 5 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

2BK1-39 to 46 inches; very pale brown (10YR 7/4) loam, yellowish brown (10YR 5/6) moist; massive; slightly hard and very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; less than 5 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

2Bk2-46 to 60 inches; very pale brown (10YR 8/4) loam, very pale brown (10YR 7/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine tubular pores; less than 5 percent gravel; moderately alkaline (pH 8.1).

Typical Pedon Location

Map unit in which located: Aninto stony loam, 4 to 12 percent slopes
Location in survey area: About 2,000 feet east and 1,000 feet south of the northwest corner of sec. 16, T. 16 S., R. 23 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 15 inches
Depth to argillic horizon: 3 to 9 inches
Other characteristics. No Bk horizon in some pedons; a calcareous C horizon in some pedons

Particle-size control section:
Content of clay-average of 45 to 55 percent
Content of rock fragments-35 to 50 percent

A horizon:
Hue-10YR or 7.5YR
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Content of clay-15 to 30 percent
Reaction-slightly acid or neutral

Bt horizon:
Hue-7.5YR or 10YR
Value-5 or 6 dry, 3 to 5 moist
Chroma-3 or 4
Texture-very gravelly clay, very flaggy clay, cobbly clay, or extremely stony sandy clay loam
Content of clay-30 to 55 percent
Reaction-neutral to moderately alkaline

Bk horizon:
Value-7 or 8 dry, 5 to 7 moist
Chroma-3 to 6
Texture-loam, clay loam, or gravelly loam
Reaction-mildly alkaline or moderately alkaline

Arbone Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces, hillsides, mountainsides, toe slopes
Parent material: Mixed alluvium that has some loess
Slope: 4 to 20 percent
Elevation: 5,200 to 6,300 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 75 to 90 days
Taxonomic class: Coarse-loamy, mixed, frigid Calcic Haploxerolls

Typical Pedon

A-0 to 6 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine irregular pores; neutral (pH 7.3); clear smooth boundary.

Bw-6 to 13 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; many very fine and common fine roots; many very fine and common fine tubular pores; mildly alkaline (pH 7.5); clear smooth boundary.

Bk1-13 to 30 inches; white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; violently effervescent; moderately alkaline (pH 8.4); clear *wavy* boundary.

Bk2-30 to 60 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) moist; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; violently effervescent; about 25 percent gravel; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Arbone silt loam, 12 to 20 percent slopes
Location in survey area: About 100 feet east and 1,200 feet north of the southwest corner of sec. 15, T. 14 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 18 inches
Depth to calcic horizon: 13 to 18 inches

Particle-size control section:
Content of clay-13 to 18 percent
Content of rock fragments-5 to 30 percent

A horizon:
Value-4 or 5 dry
Chroma-2 or 3
Reaction-neutral or mildly alkaline

Bw horizon:
Value-5 or 6 dry
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 or 3
Content of rock fragments-15 to 35 percent
Reaction-mildly alkaline or moderately alkaline

Bahem Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Basalt plains, fan terraces
Parent material: Loess and silty alluvium
Slope: 0 to 20 percent
Elevation: 4,200 to 5,000 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 46 to 50 degrees F
Frost-free period: 115 to 135 days
Taxonomic class: Coarse-silty, mixed, mesic Xerollic Calciorthids

Typical Pedon

Ap1-0 to 3 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; strongly effervescent; moderately alkaline (pH 8.3); abrupt smooth boundary.

Ap2-3 to 10 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate thin and medium platy structure; hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.5); abrupt smooth boundary.

Bk1-10 to 16 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 3 percent nodules that are firm or very firm when moist; strongly effervescent (20 percent calcium carbonate equivalent); strongly alkaline (pH 8.5); gradual wavy boundary.

Bk2-16 to 35 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 10 percent nodules that are firm or very firm when moist; strongly effervescent (18 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); clear wavy boundary.

Bk3-35 to 55 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 3 percent nodules that are firm or very firm when moist; strongly effervescent (15 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); clear wavy boundary.

C-55 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; 3 percent nodules that are firm or very firm when moist; slightly effervescent; strongly alkaline (pH 8.5).

Typical Pedon Location

Map unit in which located: Bahem-Portneuf complex, 0 to 1 percent slopes

Location in survey area: About 1,580 feet west and 50 feet north of the southeast corner of sec. 10, T. 11 S., R. 26 E.

Range in Characteristics

Depth to calcic horizon: 7 to 20 inches

Content of lime throughout the profile: 15 to 30 percent

A horizon:

Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Calcium carbonate equivalent-5 to 12 percent

Bk horizon:

Value-6 to 8 dry, 4 to 6 moist
Chroma-2 or 3
Calcium carbonate equivalent-15 to 30 percent
Reaction-moderately alkaline to very strongly alkaline

C horizon:

Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Reaction-moderately alkaline or strongly alkaline

Bancroft Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Coalesced fan terraces
Parent material: Loess and silty alluvium
Slope: 1 to 12 percent
Elevation: 4,800 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 80 to 100 days
Taxonomic class: Fine-silty, mixed, frigid Calcic Argixerolls

Typical Pedon

Ap-0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine irregular pores; neutral (pH 7.3); clear smooth boundary.

AB-5 to 14 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; neutral (pH 7.3); clear smooth boundary.

Bt-14 to 25 inches; pale brown (10YR 6/3) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; very hard, friable, sticky and plastic; few fine roots; many very fine tubular pores; common thin clay films on
faces of peds and lining pores; mildly alkaline (pH 7.5); clear smooth boundary.

Bk1-25 to 31 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

Bk2-31 to 46 inches; very pale brown (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

C-46 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Bancroft silt loam, 3 to 12 percent slopes

Location in survey area: About 3,170 feet south and 1,580 feet east of the northwest corner of sec. 23, T. 14 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 11 to 19 inches

Depth to calcic horizon: 19 to 29 inches

A horizon:

Value-4 or 5 dry
Chroma-2 or 3
Reaction-neutral or mildly alkaline

Bt horizon:

Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Texture-silt loam or silty clay loam
Content of clay-18 to 30 percent
Reaction-mildly alkaline or moderately alkaline

Bk horizon:

Value-6 to 8 dry, 5 to 7 moist
Chroma-2 to 4
Calcium carbonate equivalent-15 to 30 percent
Reaction-moderately alkaline or strongly alkaline

C horizon:

Value-6 or 7 dry, 4 to 6 moist
Chroma-2 to 4
Reaction-moderately alkaline or strongly alkaline

Taxadjunct Features

The Bancroft soil in the map unit Bancroft-Bezzant complex, 4 to 12 percent slopes, has a fine-loamy control section and contains 15 to 40 percent rock fragments below a depth of about 40 inches. 'These features are outside the range for the series. These differences, however, do not significantly affect use and management.

Bezzant Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Hillsides, fan terraces
Parent material: Mixed alluvium
Slope: 2 to 20 percent
Elevation: 5,000 to 6,400 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Loamy-skeletal, mixed, frigid Typic Calcixerolls

Typical Pedon

A-0 to 10 inches; brown (10YR 5/3) cobbly loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and common fine irregular pores; strongly effervescent; 15 percent cobbles and 10 percent gravel; moderately alkaline (pH 8.4); gradual smooth boundary.

Bk1-10 to 15 inches; white (10YR 8/2) cobbly loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; violently effervescent; 15 percent cobbles and 10 percent gravel; moderately alkaline (pH 8.4); clear wavy boundary.

Bk2-15 to 23 inches; very pale brown (10YR 8/3) very cobbly loam, very pale brown (10YR 7/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; violently effervescent; 35 percent cobbles and 20 percent gravel; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3-23 to 31 inches; very pale brown (10YR 8/3) very cobbly clay loam, very pale brown (10YR 7/4) moist; massive; hard, friable, sticky and plastic; few fine roots; many very fine tubular pores; violently effervescent; 35 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.4); clear wavy boundary.

2C-31 to 60 inches; reddish yellow (7.5YR 6/6) very cobbly loam, strong brown (7.5YR 5/6) moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine tubular pores; slightly

effervescent; 35 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Bancroft-Bezzant complex, 4 to 12 percent slopes

Location in survey area: About 530 feet west and 20 feet north of the southeast corner of sec. 27, T. 14 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 18 inches

Content of rock fragments throughout the profile: 35 to 60 percent

A horizon:
- Value-4 or 5 dry
- Chroma-2 or 3
- Reaction-mildly alkaline or moderately alkaline

Bk horizon:
- Value-7 or 8 dry, 6 or 7 moist
- Chroma-2 to 4
- Texture-cobbly loam, very cobbly loam, cobbly clay loam, or very cobbly clay loam
- Content of lime-15 to 30 percent

C horizon:
- Hue-7.5YR or 10YR
- Value-6 to 8 dry, 5 to 7 moist
- Chroma-3 to 6
- Texture-very cobbly loam, cobbly sandy clay loam, or very cobbly sandy clay loam

Birchcreek Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Slow

Position on landscape: Mountainsides

Parent material: Alluvium and residuum of mica schist and quartzite

Slope: 20 to 55 percent

Elevation: 5,600 to 7,000 feet

Average annual precipitation: 12 to 16 inches

Average annual air temperature: 41 to 44 degrees F

Frost-free period: 75 to 95 days

Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Typic Argixerolls

Typical Pedon

A-0 to 3 inches; dark grayish brown (10YR 4/2) very stony loam, black (10YR 2/1) moist; weak coarse platy structure parting to moderate fine and medium granular; soft, very friable, slightly sticky and plastic; many very fine roots; many very fine irregular pores; 55 percent stones on the surface and 20 percent stones, 20 percent cobbles, and 15 percent gravel below; neutral (pH 6.8); clear smooth boundary.

Bt1-3 to 7 inches; dark grayish brown (10YR 4/2) very cobbly clay loam, black (10YR 2/1) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine roots; many very fine and few fine tubular pores; few thin clay films on faces of peds and lining pores; 30 percent cobbles and 20 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

Bt2-7 to 13 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; common very fine and few medium roots; many very fine and few fine tubular pores; few thin clay films on faces of peds and lining pores; 35 percent cobbles and 20 percent gravel; neutral (pH 6.8); clear irregular boundary.

Bt3-13 to 23 inches; yellowish brown (10YR 5/6) very cobbly clay, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; hard, very friable, sticky and very plastic; few very fine and medium roots; many very fine and few fine tubular pores; common thin clay bridges; 20 percent stones, 20 percent cobbles, and 10 percent gravel; neutral (pH 7.3); abrupt wavy boundary.

R-23 inches; unweathered quartzite.

Typical Pedon Location

Map unit in which located: Birchcreek-Hades complex, 15 to 50 percent slopes

Location in survey area: About 1,100 feet west and 400 feet north of the southeast corner of sec. 21, T. 15 S., R. 22 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 18 inches

Depth to bedrock: 20 to 40 inches

Reaction throughout the profile: Neutral or mildly alkaline

Particle-size control section:
- Content of clay-average of 40 to 50 percent
- Content of rock fragments-average of 45 to 60 percent

A horizon:
- Value-4 or 5 dry, 2 or 3 moist
- Chroma-2 or 3
- Content of clay-15 to 25 percent
- Reaction-neutral or mildly alkaline

Bt horizon:
- Value-2 or 3 moist
- Chroma-2 or 3
- Texture-very gravelly clay loam, extremely gravelly

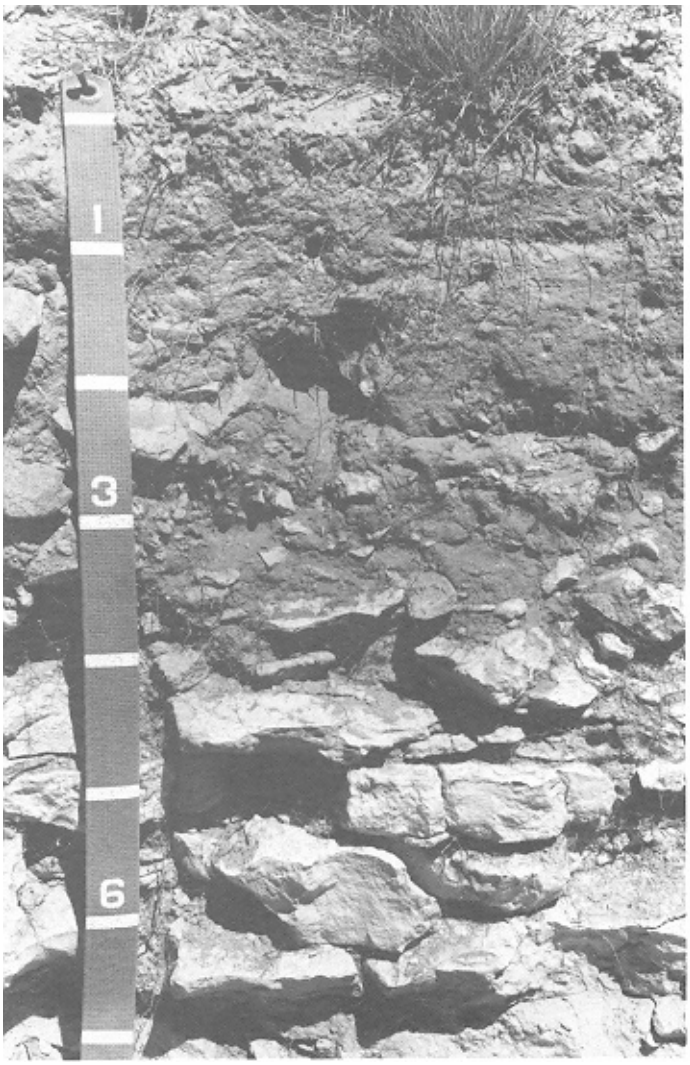

Figure 7.-Profile of Bluehill fine sandy loam. Weakly consolidated volcanic ash is at a depth of about 7 decimeters (28 inches). Depth Is marked in decimeters.

clay, very cobbly clay loam, very cobbly clay, extremely cobbly clay, very stony clay loam, very stony clay, or extremely stony clay
Content of rock fragments greater than 3 inches 25 to 40 percent
Content of gravel-15 to 35 percent
Content of clay-35 to 50 percent
Reaction-neutral or mildly alkaline

Bluehill Series

Depth class: Moderately deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Position on landscape: South-facing slopes of mesas, fan terraces
Parent material: Kind-alluvium and residuum of volcanic ash (fig. 7); source-lacustrine-laid, weakly consolidated volcanic ash
Slope: 20 to 60 percent
Elevation: 4,600 to 5,900 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 85 to 120 days
Taxonomic class: Ashy, mesic Typic Vitrandepts

Typical Pedon

A-0 to 3 inches; light brownish gray (10YR 6/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; 5 percent gravel on the surface; mildly alkaline (pH 7.7); clear smooth boundary.
BA-3 to 9 inches; pale brown (10YR 6/3) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and very fine subangular blocky structure; soft and very friable; common very fine and few fine roots; common very fine irregular pores; 10 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.
Bw-9 to 13 inches; pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots between ash plates that have been fractured; 55 percent platy ash fragments 1/2 inch to 6 inches across that are coated with lime on all sides in a noncalcareous matrix; 10 percent gravel; strongly alkaline (pH 8.5); clear wavy boundary.
Bk-13 to 30 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots between ash plates that have been fractured; 90 percent weakly consolidated ash plates 1 to 4 inches thick that are coated with lime on all sides; strongly effervescent; strongly alkaline (pH 8.9); abrupt wavy boundary.
Cr-30 inches; weakly consolidated volcanic ash.

Typical Pedon Location

Map unit in which located: Coalbank-Bluehill association, 40 to 60 percent slopes
Location in survey area: About 1,200 feet west and 1,500 feet south of the northeast corner of sec. 10, T. 16 S., R. 21 E.

Range in Characteristics

Depth to paralithic contact: 20 to 40 inches

Content of rock fragments throughout the profile: 0 to 15 percent
Content of ash throughout the profile: More than 60 percent
Content of ash fragments throughout the profile: 30 to 90 percent

A horizon:
Value-5 to 7 dry, 3 to 5 moist
Chroma-2 or 3
Bulk density-0.95 gram to 1.05 grams per cubic centimeter
Reaction-neutral or mildly alkaline

Bw horizon:
Value-5 to 7 dry, 3 to 5 moist
Chroma-2 or 3
Calcium carbonate equivalent-0 to 5 percent
Bulk density-1.00 to 1.05 grams per cubic centimeter
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Hue-neutral, 2.5Y, or 10YR
Value-7 or 8 dry, 4 to 6 moist
Chroma-0 to 4
Texture-loamy sand, sandy loam, or loam
Calcium carbonate equivalent-5 to 15 percent
Reaction-moderately alkaline to very strongly alkaline

Calcixerollic Xerochrepts

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terrace breaks, hillsides
Parent material: Mixed alluvium that has some loess
Slope: 20 to 50 percent
Elevation: 4,800 to 5,600 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 95 to 115 days

Representative Pedon

A-0 to 5 inches; pale brown (10YR 6/3) stony silt loam, dark brown (10YR 3/3) moist; moderate very coarse granular structure parting to strong very fine and fine granular; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine irregular pores; strongly effervescent; 10 percent stones, 5 percent cobbles, and 20 percent gravel; moderately alkaline (pH 8.1); clear smooth boundary.

Bw-5 to 12 inches; pale brown (10YR 6/3) very gravelly silt loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine and medium tubular pores; strongly effervescent; 10 percent cobbles and 40 percent gravel; moderately alkaline (pH 8.2); clear *wavy* boundary.

Bk-12 to 33 inches; pale brown (10YR 6/3) very gravelly silt loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and few fine tubular pores; violently effervescent; 10 percent cobbles and 30 percent gravel; moderately alkaline (pH 8.2); gradual wavy boundary.

Ck-33 to 60 inches; very pale brown (10YR 7/3) gravelly silt loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; strongly effervescent; 5 percent cobbles and 15 percent gravel; strongly alkaline (pH 8.6).

Representative Pedon Location

Map unit in which located: Calcixerollic Xerochrepts, 20 to 50 percent slopes
Location in survey area: About 2,550 feet east and 550 feet north of the southwest corner of sec. 6, T. 11 S., R. 29 E.

Range in Characteristics

Depth to calcic horizon: 6 to 15 inches

Particle-size control section:
Content of rock fragments-20 to 50 percent
Content of clay-12 to 20 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3

Bw horizon:
Value-3 or 4 moist
Chroma-2 to 4
Texture-very gravelly silt loam, gravelly silt loam, or gravelly loam
Content of rock fragments-20 to 50 percent
Reaction-moderately alkaline or strongly alkaline

Bk horizon:
Value-6 or 7 dry, 3 to 5 moist
Chroma-3 or 4
Texture-very cobbly silt loam, very cobbly loam, cobbly silt loam, cobbly loam, very gravelly silt loam, very gravelly loam, gravelly silt loam, or gravelly loam
Content of rock fragments-20 to 50 percent
Reaction-moderately alkaline or strongly alkaline

C horizon:
Texture-very cobbly silt loam, very cobbly loam, cobbly silt loam, cobbly loam, very gravelly silt loam, very gravelly loam, gravelly silt loam, or gravelly loam
Content of rock fragments-20 to 50 percent
Reaction-moderately alkaline or strongly alkaline

Chatburn Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Coalesced fan terraces, valley floors
Parent material: Silty alluvium that has some loess
Slope: 1 to 4 percent
Elevation: 4,600 to 4,900 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 43 to 44 degrees F
Frost-free period: 85 to 100 days
Taxonomic class: Fine-silty, mixed, frigid Calcic Argixerolls

Typical Pedon

Ap1-0 to 5 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak very coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and common fine tubular pores; mildly alkaline (pH 7.7); clear smooth boundary.

Ap2-5 to 11 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; hard, very friable, sticky and plastic; common very fine roots; many very fine and common fine tubular pores; moderately alkaline (pH 8.2); abrupt smooth boundary.

Bt-11 to 14 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; moderate fine and medium angular blocky structure; hard, very friable, sticky and plastic; common very fine roots; many very fine and common fine tubular pores; common thin clay films on faces of peds and lining pores; moderately alkaline (pH 8.4); abrupt smooth boundary.

Btz-14 to 19 inches; very pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; electrical conductivity 3 mmhos; SAR 18; strongly alkaline (pH 8.6); abrupt smooth boundary.

Bkz1-19 to 22 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; about 50 percent of plate surfaces have dark brown (7.5YR 4/4 moist) staining; moderate very thick and thick platy structure; very hard, friable, slightly sticky and slightly plastic; common very fine roots; few very fine and fine tubular pores; violently effervescent (24 percent calcium carbonate equivalent); disseminated lime; electrical conductivity 8 mmhos; SAR 25; strongly alkaline (pH 8.7); abrupt smooth boundary.

Bkz2-22 to 31 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and few fine tubular pores; about 10 percent hard and friable nodules; violently effervescent (24 percent calcium carbonate equivalent); lime segregated into many fine irregularly shaped seams and filaments; electrical conductivity 11 mmhos; SAR 22; moderately alkaline (pH 8.4); clear smooth boundary.

Bkz3-31 to 50 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; massive; hard, friable; few very fine roots; many very fine and few fine tubular pores; about 5 percent hard and friable nodules; strongly effervescent (21 percent calcium carbonate equivalent); lime segregated into common fine irregularly shaped seams and filaments; electrical conductivity 9 mmhos; SAR 21; moderately alkaline (pH 8.3); clear smooth boundary.

Cz-50 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; many very fine and few fine tubular pores; strongly effervescent (19 percent calcium carbonate equivalent); disseminated lime; electrical conductivity 8 mmhos; SAR 16; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Chatburn silt loam, 1 to 4 percent slopes
Location in survey area: About 100 feet east and 200 feet north of the southwest corner of sec. 33, T. 11 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 11 to 17 inches
Depth to secondary lime: 13 to 17 inches
Depth to platy layer: 16 to 19 inches
Calcium carbonate equivalent in the calcic horizon: 20 to 35 percent
Particle-size control section:
Content of clay-22 to 32 percent

A horizon:
Chroma-2 or 3
Content of clay-10 to 18 percent
Reaction-mildly alkaline or moderately alkaline

Bt horizon:
Value-5 to 7 dry
Chroma-2 to 4
Texture-silt loam or silty clay loam
Content of clay-22 to 32 percent
Reaction-moderately alkaline or strongly alkaline

Bkz horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 or 3
Content of clay-5 to 15 percent
Calcium carbonate equivalent-20 to 35 percent
Conductivity of saturation extract-8 to 16 millimhos
Sodium adsorption ratio-15 to 25
Reaction-moderately alkaline or strongly alkaline

Cz horizon:
Value-6 or 7 dry, 4 or 5 moist
Content of clay-5 to 10 percent
Calcium carbonate equivalent-10 to 20 percent
Conductivity of saturation extract-8 to 16 millimhos
Reaction-moderately alkaline or strongly alkaline

Chayson Series

Depth class: Moderately deep (to a duripan)
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Coalesced fan terraces
Parent material: Mixed alluvium that has some loess
Slope: 2 to 10 percent
Elevation: 5,000 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Fine-loamy, mixed, frigid Typic Durixerolls

Typical Pedon

A-0 to 3 inches; grayish brown (10YR 5/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; strong very coarse platy structure parting to strong medium and coarse platy; soft, very friable, sticky and plastic; common very fine and few fine roots; many very fine irregular pores; 15 percent gravel on the surface and 25 percent gravel below; mildly alkaline (pH 7.4); abrupt smooth boundary.

AB-3 to 8 inches; brown (10YR 5/3) gravelly silty clay loam, very dark grayish brown (10YR 3/2) moist; strong very coarse platy structure parting to moderate coarse subangular blocky; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; many very fine and few fine tubular pores; slightly effervescent; 10 percent cobbles and 20 percent gravel; mildly alkaline (pH 7.7); clear smooth boundary.

Btk1-8 to 12 inches; brown (10YR 5/3) gravelly clay loam, dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, sticky and very plastic; common very fine roots; many very fine and few fine tubular pores; common thin clay films on faces of peds and lining pores; strongly effervescent; 5 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.2); clear smooth boundary.

Btk2-12 to 18 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; few thin clay films on faces of peds and lining pores; strongly effervescent matrix; violently effervescent lime segregated into many irregularly shaped, fine and medium seams, soft masses, and concretions; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk-18 to 28 inches; very pale brown (10YR 8/3) gravelly loam, very pale brown (10YR 7/3) moist; massive; hard, very friable, nonsticky and slightly plastic; few very fine roots; many very fine tubular pores; 15 percent gravel-sized duripan fragments; violently effervescent; 5 percent cobbles and 15 percent gravel; moderately alkaline (pH 8.4); abrupt wavy boundary.

2Bqkm-28 inches; pink (7.5YR 7/4) and brown (7.5YR 5/4) moist, silica indurated hardpan; strong very coarse platy structure; extremely hard, extremely firm; violently effervescent; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Chayson gravelly silt loam, 2 to 10 percent slopes
Location in survey area: About 1,000 feet east and 800 feet south of the northwest corner of sec. 20, T. 14 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 17 inches
Depth to hardpan: 21 to 38 inches
Depth to secondary lime: 6 to 12 inches
Other characteristics: Loamy or sandy soil material below the hardpan in some pedons
Particle-size control section:
Content of clay-25 to 34 percent

A horizon:
Chroma-2 or 3
Content of clay-15 to 25 percent
Content of rock fragments-15 to 25 percent

Btk horizon:
Value-5 to 8 dry, 3 to 5 moist
Chroma-2 to 4
Texture-gravelly clay loam, clay loam, silty clay loam, or silt loam
Content of clay-25 to 34 percent
Content of rock fragments-5 to 25 percent
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 to 8 dry, 5 to 7 moist
Chroma-2 to 4
Texture-gravelly loam or very gravelly loam
Content of clay-15 to 25 percent
Content of rock fragments-15 to 40 percent

2Bqkm horizon:
Hue-10YR or 7.5YR
Value-7 or 8 dry, 5 to 7 moist
Chroma-3 or 4

Chen Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Mesa tops, mountainsides
Parent material: Residuum of rhyolite or mica schist
Slope: 2 to 50 percent
Elevation: 5,200 to 7,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Lithic Argixerolls

Typical Pedon

A-0 to 3 inches; grayish brown (10YR 5/2) very cobbly loam, dark brown (7.5YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; neutral (pH 7.2); clear smooth boundary.

AB-3 to 6 inches; grayish brown (10YR 5/2) very cobbly clay, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak medium granular; hard, very friable, sticky and plastic; many very fine roots; many very fine tubular pores; neutral (pH 7.2); abrupt smooth boundary.

Bt1-6 to 10 inches; brown (10YR 5/3) very cobbly clay, dark reddish brown (5YR 3/3) moist; moderate fine angular blocky structure; hard, friable, very sticky and very plastic; common *very* fine roots; many very fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; neutral (pH 7.2); abrupt wavy boundary.

Bt2-10 to 13 inches; brown (7.5YR 5/4) extremely cobbly clay, dark brown (7.5YR 3/4) moist; very hard, very firm, very sticky and very plastic; common very fine roots; many very fine tubular pores; continuous thick clay films on faces of peds and lining pores; neutral (pH 7.2); abrupt wavy boundary.

R-13 inches; rhyolite; highly weathered in the upper three-fourths of an inch.

Typical Pedon Location

Map unit in which located: Chen very cobbly loam, 2 to 10 percent slopes
Location in survey area: About 1,750 feet west and 1,900 feet south of the northeast corner of sec. 17, T. 16 S., R. 21 E.

Range in Characteristics

Thickness of mollic epipedon: 7 to 14 inches
Depth to bedrock: 12 to 20 inches
Content of clay throughout the profile: 40 to 50 percent
Content of rock fragments throughout the profile: 35 to 65 percent

A horizon:
Hue-7.5YR or 10YR
Chroma-2 or 3
Content of rock fragments-35 to 55 percent
Reaction-neutral or mildly alkaline

Bt horizon:
Hue-7.5YR or 10YR
Value-5 or 6 dry, 3 or 4 moist
Chroma-3 or 4
Texture-very cobbly clay, very stony clay, extremely stony clay, or very gravelly clay
Reaction-neutral or mildly alkaline

Clavicon Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides
Parent material: Alluvium and residuum of limestone that have some loess
Slope: 30 to 50 percent
Elevation: 5,700 to 7,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 75 to 90 days

Taxonomic class: Loamy-skeletal, mixed, frigid Typic Calcixerolls

Typical Pedon

A1-0 to 4 inches; dark grayish brown (10YR 4/2) stony loam, very dark brown (10YR 2/2) moist; moderate very fine and fine granular structure; soft, very friable; common very fine roots; many very fine irregular pores; strongly effervescent; 5 percent stones, 5 percent cobbles, and 25 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

A2-4 to 11 inches; dark brown (10YR 4/3) very gravelly loam, very dark brown (10YR 2/2) moist; moderate medium and coarse subangular blocky structure parting to moderate fine granular; soft, very friable; common very fine roots; many very fine and fine tubular pores; strongly effervescent; 5 percent cobbles and 40 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

Bk1-11 to 16 inches; dark brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; strongly effervescent; 25 percent cobbles and 35 percent gravel; moderately alkaline (pH 8.2); clear wavy boundary.

Bk2-16 to 28 inches; very pale brown (10YR 7/3) very cobbly loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; violently effervescent; 5 percent stones, 25 percent cobbles, and 20 percent gravel; strongly alkaline (pH 8.6); abrupt wavy boundary.

R-28 inches; slightly fractured limestone.

Typical Pedon Location

Map unit in which located: Clavicon stony loam, 30 to 50 percent slopes

Location in survey area: About 1,200 feet west and 2,000 feet north of the southwest corner of sec. 36, T. 16 S., R. 25 E.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of mollic epipedon: 10 to 16 inches

Particle-size control section:
Content of rock fragments-40 to 60 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3

Bk horizon:
Value-4 to 8 dry, 3 to 6 moist
Chroma-2 to 4
Texture-very gravelly loam or very cobbly loam
Effervescence-strong or violent
Reaction-moderately alkaline or strongly alkaline

Coalbank Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Hillsides, mesa sides
Parent material: Alluvium and residuum of weakly consolidated volcanic ash
Slope: 20 to 65 percent
Elevation: 4,800 to 5,900 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 80 to 100 days
Taxonomic class: Ashy, frigid Mollic Vitrandepts

Typical Pedon

A1-0 to 3 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; mildly alkaline (pH 7.5); abrupt smooth boundary.

A2-3 to 10 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine tubular pores; mildly alkaline (pH 7.5); clear smooth boundary.

Bw1-10 to 14 inches; brown (10YR 5/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse and *very* coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine tubular pores; mildly alkaline (pH 7.5); clear smooth boundary.

Bw2-14 to 21 inches; brown (10YR 5/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak very coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; mildly alkaline (pH 7.6); gradual smooth boundary.

C1-21 to 46 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

C2-46 to 55 inches; light gray (5Y 7/1) fine sand, olive gray (5Y 4/2) moist; massive; soft, very friable,

nonsticky and nonplastic; 25 to 35 percent medium and thick, hard and firm plates of ash; mildly alkaline (pH 7.7); abrupt smooth boundary.

Cr-55 to 60 inches; light gray (N 7/0) weakly cemented volcanic ash, gray (5Y 5/1) moist; massive; very thick plates that are hard and firm and that can be broken in the hand; mildly alkaline (pH 7.8).

Typical Pedon Location

Map unit in which located: Coalbank fine sandy loam, 40 to 65 percent slopes

Location in survey area: About 200 feet east and 500 feet south of the northwest corner of sec. 34, T. 16 S., R. 21 E.

Range in Characteristics

Depth to paralithic contact: 40 to more than 60 inches

Reaction in sodium fluoride: pH 6.8 to 8.0

Content of gravel throughout the profile: Average of 0 to 15 percent

Other characteristics: Thin layers that contain 25 to 35 percent gravel in the lower part of some pedons; a layer of accumulated lime in the lower part of some pedons

A horizon:

Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Bulk density-1.0 to 1.15 grams per cubic centimeter
Reaction-neutral or mildly alkaline

Bw horizon:

Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Bulk density-1.10 to 1.15 grams per cubic centimeter
Reaction-neutral or mildly alkaline

C horizon:

Hue-neutral to 10YR
Value-6 to 8 dry, 3 to 6 moist
Chroma-0 to 3

Conneridge Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides, ridges
Parent material: Mixed alluvium that has some loess
Slope: 20 to 50 percent
Elevation: 5,100 to 7,100 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic class: Loamy-skeletal, mixed, frigid Calcic Haploxerolls

Typical Pedon

A-0 to 3 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; strong *very* fine and fine granular structure; soft, very friable, slightly sticky and plastic; many very fine roots; many very fine irregular pores; 15 percent stones, 10 percent cobbles, and 35 percent gravel; neutral (pH 7.0); abrupt smooth boundary.

Bw1-3 to 7 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; strong fine and medium subangular blocky structure; soft, very friable, slightly sticky and plastic; common very fine and few fine roots; many very fine and few fine tubular pores; 10 percent cobbles and 30 percent gravel; neutral (pH 7.2); clear wavy boundary.

Bw2-7 to 13 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and plastic; common very fine and few fine roots; 30 percent stones, 10 percent cobbles, and 20 percent gravel; neutral (pH 7.2); clear wavy boundary.

Bk1-13 to 17 inches; yellowish brown (10YR 5/4) very . gravelly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; strongly effervescent; 10 percent cobbles and 45 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

Bk2-17 to 23 inches; pale brown (10YR 6/3) extremely gravelly loam, brown (10YR 4/3) moist; massive; *soft,* very friable, slightly sticky and slightly plastic; strongly effervescent; 20 percent cobbles and 60 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

2R-23 inches; unweathered quartzite that has continuous thin coatings of lime.

Typical Pedon Location

Map unit in which located: Conneridge very stony loam, 20 to 50 percent slopes

Location in survey area: About 800 feet west and 1,100 feet south of the northeast corner of sec. 2, T. 14 S., R. 24 E.

Range in Characteristics

Depth to bedrock: 20 to 40 inches

Thickness of mollic epipedon: 10 to 17 inches

Depth to calcic horizon: 13 to 17 inches

Particle-size control section:

Content of rock fragments-45 to 80 percent
Content of clay-14 to 22 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-neutral or mildly alkaline

Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Texture-gravelly loam, very gravelly loam, or very stony loam
Content of clay-14 to 25 percent
Effervescence-none to slight
Reaction-neutral or mildly alkaline

Bk horizon:
Value-5 to 8 dry, 3 to 7 moist
Chroma-2 to 4
Texture-very gravelly loam, extremely gravelly loam, very cobbly loam, or extremely flaggy loam
Content of clay-12 to 20 percent
Effervescence-strong to violent
Calcium carbonate equivalent-15 to 40 percent

Cottonthomas Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces, hillsides
Parent material: Alluvium and residuum of weakly consolidated volcanic ash
Slope: 0 to 20 percent
Elevation: 5,000 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 100 days
Taxonomic class: Ashy, frigid Mollic Vitrandepts

Typical Pedon

A1-0 to 3 inches; brown (10YR 5/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; many fine and common medium roots; many very fine tubular pores; neutral (pH 7.3); abrupt wavy boundary.

A2-3 to 11 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; many very fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

Bw1-11 to 22 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 15 percent nodules that are hard when dry and firm when moist; mildly alkaline (pH 7.6); clear smooth boundary.

Bw2-22 to 35 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and nonplastic; many very fine roots on faces of nodules; few very fine tubular pores; 40 percent nodules; 10 percent durinodes below a depth of 26 inches; mildly alkaline (pH 7.7); gradual smooth boundary.

Bk1-35 to 45 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; hard, firm, nonsticky and nonplastic; common very fine roots; few very fine tubular pores; slightly effervescent matrix; strongly effervescent lime in common fine irregularly shaped seams; mildly alkaline (pH 7.8); gradual smooth boundary.

Bk2-45 to 60 inches; very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist; hard, firm, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; 10 percent durinodes coated with strongly effervescent lime; slightly effervescent matrix; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Cottonthomas-Tomsherry complex, 0 to 12 percent slopes
Location in survey area: About 1,850 feet west and 200 feet south of the northeast corner of sec. 30, T. 16 S., R. 21 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 16 inches
Content of rock fragments throughout the profile: 0 to 15 percent
Reaction in sodium fluoride: Less than 9.5

A horizon:
Chroma-2 or 3
Reaction-neutral or mildly alkaline

Bw horizon:
Hue-2.5Y or 10YR
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-fine sandy loam, sandy loam, or loam
Content of nodules-0 to 50 percent
Content of durinodes-0 to 10 percent

Bk horizon:
Hue-2.5Y or 10YR
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 or 3
Texture-fine sandy loam, sandy loam, or loam

Content of nodules-0 to 50 percent
Content of durinodes-0 to 10 percent
Reaction-mildly alkaline or moderately alkaline

Cumulic Haplaquolls

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Position on landscape: Dissected alluvial fans, flood plains, stream terraces
Parent material: Mixed alluvium
Slope: 0 to 4 percent
Elevation: 4,800 to 6,300 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 80 to 95 days

Representative Pedon

A1-0 to 4 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; strong very fine and fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; many very fine roots; many fine and very fine irregular pores; slightly effervescent (5 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear smooth boundary.

A2-4 to 8 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; weak coarse subangular blocky structure parting to strong medium and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; many wormcasts; slightly effervescent (3 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear smooth boundary.

A3-8 to 12 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine and common medium tubular pores; many wormcasts; mildly alkaline (pH 7.6); clear wavy boundary.

Bw-12 to 28 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine and common fine tubular pores; mildly alkaline (pH 7.6); clear wavy boundary.

Bg-28 to 40 inches; dark gray (10YR 4/1) sandy clay loam, very dark grayish brown (10YR 3/2) moist; many medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure parting to moderate medium and fine subangular blocky; slightly hard, very friable, slightly sticky and plastic; common very fine roots; many very fine irregular pores; mildly alkaline (pH 7.4); gradual smooth boundary.

Cg1-40 to 46 inches; grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; massive; hard, very friable, slightly sticky and plastic; few *very* fine roots; many very fine tubular pores; mildly alkaline (pH 7.4); abrupt smooth boundary.

Cg2-46 to 55 inches; pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; mildly alkaline (pH 7.4); gradual smooth boundary.

Cg3-55 to 60 inches; pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; mildly alkaline (pH 7.4).

Representative Pedon Location

Map unit in which located: Cumulic Haplaquolls, 0 to 4 percent slopes
Location in survey area: About 1,190 feet west and 920 feet north of the southeast corner of sec. 33, T. 15 S., R. 23 E.

Range in Characteristics

Thickness of mollic epipedon: 30 to 50 inches
Depth to seasonal high water table: 18 to 30 inches
Particle-size control section:
Content of clay-15 to 45 percent
A horizon:
Value-2 or 3 moist, 3 or 4 dry
Chroma-1 or 2
Content of gravel-0 to 10 percent
Reaction-neutral or mildly alkaline
Bg horizon:
Value-3 or 4 dry, 2 or 3 moist
Chroma-1 or 2
Texture-stratified sandy loam, loam, silt loam, sandy clay loam, clay loam, silty clay loam, or silty clay
Content of gravel-0 to 5 percent
Reaction-neutral or mildly alkaline
Cg horizon:
Hue-2.5Y or 10YR
Value-5 to 7 dry, 3 to 5 moist
Chroma-2 to 4
Texture-stratified sandy loam, loam, silt loam, sandy clay loam, clay loam, silty clay loam, or silty clay
Reaction-neutral or mildly alkaline

Darkbull Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces
Parent material: Mixed alluvium
Slope: 0 to 20 percent
Elevation: 4,400 to 6,000 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 95 to 130 days
Taxonomic class: Loamy-skeletal, mixed, mesic Xerollic Calciorthids

Typical Pedon

A1-0 to 3 inches; pale brown (10YR 6/3) loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure parting to weak fine and very fine granular; soft, very friable, slightly sticky and nonplastic; many fine and *very* fine roots; many very fine tubular pores; slightly effervescent (1 percent calcium carbonate equivalent); 10 percent gravel; moderately alkaline (pH 8.2); abrupt smooth boundary.

A2-3 to 4 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; weak very thick platy structure parting to weak fine subangular blocky; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many fine tubular pores; slightly effervescent (3 percent calcium carbonate equivalent); 5 percent gravel; strongly alkaline (pH 8.6); abrupt smooth boundary.

Bw-4 to 7 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate coarse and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); 5 percent gravel; strongly alkaline (pH 9.0); clear wavy boundary.

Bk1-7 to 13 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; weak coarse and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; violently effervescent (20 percent calcium carbonate equivalent); 5 percent gravel; strongly alkaline (pH 9.0); clear smooth boundary.

Bk2-13 to 20 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; violently effervescent (16 percent calcium carbonate equivalent); 5 percent gravel; strongly alkaline (pH 8.6); abrupt wavy boundary.

2Bk3-20 to 22 inches; white (10YR 8/2) very gravelly sandy loam, light brown (7.5YR 6/4) moist; very hard, firm, nonsticky and nonplastic; few very fine roots; violently effervescent (16 percent calcium carbonate equivalent); 55 percent gravel that has silica pendants on the underside; strongly alkaline (pH 8.6); abrupt discontinuous boundary.

2C1-22 to 28 inches; very pale brown (10YR 7/3) very gravelly loamy sand, brown (10YR 5/3) moist; single grained; loose; strongly effervescent (13 percent calcium carbonate equivalent); 60 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.

2C2-28 to 60 inches; very pale brown (10YR 7/3) very gravelly sand, brown (10YR 5/3) moist; single grained; loose; strongly effervescent (8 percent calcium carbonate equivalent); 60 percent gravel; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Darkbull loam, 0 to 1 percent slopes
Location in survey area: About 375 feet east and 925 feet north of the southwest corner of sec. 1, T. 13 S., R. 27 E.

Range in Characteristics

Depth to calcic horizon: 6 to 10 inches

Particle-size control section:
- Content of rock fragments-35 to 70 percent
- Content of clay-6 to 15 percent

A horizon:
- Value-6 or 7 dry, 3 or 4 moist
- Chroma-2 or 3
- Calcium carbonate equivalent-0 to 5 percent

Bw horizon:
- Value-6 or 7 dry, 4 or 5 moist
- Chroma-2 to 4
- Texture-silt loam, gravelly silt loam, loam, or gravelly loam
- Content of rock fragments-0 to 30 percent
- Calcium carbonate equivalent-5 to 13 percent

Bk horizon:
- Value-6 to 8 dry, 5 to 7 moist
- Chroma-2 to 4
- Texture-loam, gravelly loam, very gravelly loam, sandy loam, gravelly sandy loam, or very gravelly sandy loam
- Content of rock fragments-5 to 50 percent
- Calcium carbonate equivalent-13 to 29 percent
- Reaction-moderately alkaline or strongly alkaline

2C horizon:
Texture-very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand, extremely cobbly loamy sand, or very cobbly sand
Content of rock fragments-35 to 65 percent
Reaction-moderately alkaline or strongly alkaline

Taxadjunct Features

The Darkbull soil in the map unit Darkbull gravelly loam, 4 to 20 percent slopes, is 30 to 60 percent volcanic ash throughout. This feature is outside the range for the series. This difference, however, does not significantly affect use and management.

Davey Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Position on landscape: River terraces, basalt plains
Parent material: Sandy alluvium
Slope: 0 to 2 percent
Elevation: 4,200 to 4,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free period: 125 to 135 days
Taxonomic class: Sandy, mixed, mesic Xerollic Camborthids

Typical Pedon

A1-0 to 3 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak thin and medium platy structure; soft, very friable, nonsticky and slightly plastic; mildly alkaline (pH 7.8); abrupt smooth boundary.
A2-3 to 7 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; mildly alkaline (pH 7.8); abrupt smooth boundary.
Bw-7 to 19 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak medium prismatic structure; hard, friable, nonsticky and slightly plastic; mildly alkaline (pH 7.8); clear smooth boundary.
Bk1-19 to 25 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; strongly effervescent; mildly alkaline (pH 7.8); clear smooth boundary.
2Bk2-25 to 60 inches; multicolored gravelly sand; single grained; loose; strongly effervescent; 20 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Davey sandy loam, 0 to 2 percent slopes
Location in survey area: About 2,500 feet north and 900 feet east of the southwest corner of sec. 11, T. 9 S., R. 26 E.

Range in Characteristics

Depth to secondary lime: 19 to 24 inches
Other characteristics: As much as 55 percent rock fragments below a depth of 40 inches in some pedons

Particle-size control section:
Content of sand of mixed mineralogy-80 to 90 percent
Content of gravel-0 to 25 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Texture-sandy loam or fine sandy loam
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Texture-gravelly loamy sand, loamy sand, or fine sand
Effervescence-strong to violent

2Bk horizon:
Value-no specific color other than that of the individual sand grains and gravel
Content of gravel-10 to 25 percent
Effervescence-slight to violent

Declo Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces, valley floors
*Parent m*aterial: Mixed alluvium
Slope: 0 to 8 percent
Elevation: 4,200 to 5,600 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 46 to 49 degrees F
Frost-free period: 95 to 135 days
Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Calciorthids

Typical Pedon

A-0 to 3 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak thick platy structure parting to moderate very thin platy; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine irregular pores; slightly effervescent; moderately alkaline (pH 8.6); abrupt wavy boundary.

Bw-3 to 8 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and common fine tubular pores; slightly effervescent; strongly alkaline (pH 8.8); clear wavy boundary.

Bk1-8 to 16 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.8); clear wavy boundary.

Bk2-16 to 26 inches; white (10YR 8/2) silt loam, very pale brown (10YR 7/3) moist; massive; hard, friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; 15 percent cicada krotovinas that are hard when dry and friable when moist; violently effervescent; strongly alkaline (pH 8.8); gradual smooth boundary.

Bkz1-26 to 37 inches; very pale brown (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; strongly effervescent; few fine soft irregularly shaped masses of salt; strongly alkaline (pH 8.6); clear wavy boundary.

Bkz2-37 to 46 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; strongly effervescent; common fine soft irregularly shaped masses of salt; moderately alkaline (pH 8.4); clear wavy boundary.

Bkz3-46 to 54 inches; very pale brown (10YR 7/3) loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; strongly effervescent; common fine soft irregularly shaped masses of salt; moderately alkaline (pH 8.4); clear wavy boundary.

Bkz4-54 to 60 inches; very pale brown (10YR 8/3) loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable; few very fine roots; common very fine tubular pores; violently effervescent; common fine soft irregularly shaped masses of salt; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Declo silt loam, saline, 1 to 3 percent slopes

Location in survey area: About 100 feet east and 700 feet north of the southwest corner of sec. 14, T. 16 S., R. 25 E.

Range in Characteristics

Depth to calcic horizon: 5 to 20 inches

Other characteristics: No Bw horizon in some pedons

Particle-size control section:
- Content of gravel-0 to 10 percent
- Content of clay-10 to 18 percent

A horizon:
- Value-5 to 7 dry, 3 to 5 moist
- Chroma-2 or 3
- Content of gravel-0 to 10 percent

Bw horizon:
- Value-6 or 7 dry, 4 or 5 moist
- Chroma-2 or 3
- Texture-silt loam or loam
- Content of gravel-0 to 10 percent
- Content of clay-5 to 18 percent

Bk and Bkz horizons:
- Value-7 or 8 dry, 5 or 6 moist
- Chroma-2 or 3
- Texture-silt loam, loam, or fine sandy loam
- Content of gravel-0 to 15 percent
- Calcium carbonate equivalent-15 to 30 percent
- Conductivity of saturation extract-4 to 35 millimhos
- Reaction-moderately alkaline or strongly alkaline

Donnardo Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Position on landscape: Fan terraces

Parent material: Mixed alluvium

Slope: 2 to 4 percent

Elevation: 5,400 to 5,600 feet

Average annual precipitation: 10 to 14 inches

Average annual air temperature: 45 to 46 degrees F

Frost-free period: 100 to 105 days

Taxonomic class: Loamy-skeletal, mixed, mesic Aridic Calcixerolls

Typical Pedon

A1-0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist;

weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; common very fine tubular pores; slightly effervescent; 20 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

A2-3 to 11 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; common very fine tubular pores; slightly effervescent; 15 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

Bk1-11 to 15 inches; light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and fine tubular pores; strongly effervescent; 15 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.

2Bk2-15 to 27 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few medium and coarse roots; common very fine and fine tubular pores; strongly effervescent; 40 percent cobbles and 20 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.

2Ck-27 to 60 inches; light gray (10YR 7/2) very cobbly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable; few very fine and fine roots; few very fine tubular pores; strongly effervescent; 5 percent stones, 30 percent cobbles, and 25 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Donnardo gravelly loam, 2 to 4 percent slopes

Location in survey area: About 1,300 feet west and 50 feet north of the southeast corner of sec. 27, T. 16 S., R. 27 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 15 inches

Depth to calcic horizon: 11 to 15 inches

Particle-size control section:
- Content of clay-15 to 25 percent
- Content of rock fragments-35 to 60 percent

A horizon:
- Chroma-2 or 3
- Content of clay-15 to 20 percent
- Content of rock fragments-15 to 25 percent
- Effervescence-slight or strong
- Reaction-mildly alkaline or moderately alkaline

Bk horizon:
- Value-6 to 8 dry, 4 to 6 moist
- Chroma-2 to 4
- Content of clay-15 to 25 percent
- Content of rock fragments-35 to 60 percent
- Texture-very gravelly loam, very cobbly loam, very cobbly sandy loam, or very gravelly sandy loam
- Effervescence-strong or violent

Doodlelink Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderately slow

Position on landscape: Mountainsides

Parent material: Alluvium and residuum of quartz latite that have some loess

Slope: 30 to 60 percent

Elevation: 4,800 to 7,000 feet

Average annual precipitation: 14 to 18 inches

Average annual air temperature: 41 to 44 degrees F

Frost-free period: 75 to 95 days

Taxonomic class: Loamy-skeletal, mixed, frigid Pachic Ultic Haploxerolls

Typical Pedon

A-0 to 6 inches; dark brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine irregular pores; 2 percent stones and 20 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

AB-6 to 10 inches; dark brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine and fine and common medium tubular pores; 25 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

Bw1-10 to 15 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; 25 percent cobbles and 15 percent gravel; neutral (pH 6.6); gradual wavy boundary.

Bw2-15 to 22 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure;

slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and common fine tubular pores; 30 percent cobbles and 20 percent gravel; neutral (pH 6.6); gradual wavy boundary.

Bw3-22 to 60 inches; light yellowish brown (10YR 6/4) very cobbly loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and common fine tubular pores; 20 percent cobbles and 20 percent gravel; neutral (pH 6.8).

Typical Pedon Location

Map unit in which located: Jimsage-Doodlelink complex, 40 to 60 percent slopes

Location in survey area: About 800 feet west and 2,100 feet north of the southeast corner of sec. 30, T. 12 S., R. 26 E.

Range in Characteristics

Thickness of mollic epipedon: 21 to 30 inches

Particle-size control section:
Content of clay-20 to 25 percent
Content of gravel-15 to 35 percent
Content of cobbles-20 to 40 percent
Content of stones-0 to 10 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3

Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 to 4
Texture-very gravelly loam, very cobbly loam, or extremely cobbly loam
Content of clay-18 to 25 percent
Reaction-slightly acid or neutral

Taxadjunct Features

The Doodlelink soils in this survey area have a base saturation of more than 75 percent, which is outside the range for the series. This difference, however, does not significantly affect use and management.

Downata Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow
Position on landscape: Flood plains, low stream terraces
Parent material: Mixed silty alluvium
Slope: 0 to 2 percent
Elevation: 4,400 to 5,100 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 43 to 44 degrees F
Frost-free period: 85 to 95 days

Taxonomic class: Fine-silty, mixed (calcareous), frigid Cumulic Haplaquolls

Typical Pedon

Ap-0 to 10 inches; dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; strong fine granular structure; slightly hard, very friable, sticky and plastic; many very fine roots; many very fine and few fine irregular and tubular pores; strongly effervescent; moderately alkaline (pH 8.4); abrupt smooth boundary.

ABg-10 to 17 inches; dark gray (10YR 4/1) silty clay loam, black (2.5Y 2/0) moist; few fine distinct brown (10YR 5/3) mottles; moderate very fine angular blocky structure parting to moderate fine granular; slightly hard, very friable, sticky and plastic; many very fine and few fine roots; many very fine and few fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

Bg-17 to 32 inches; dark gray (10YR 4/1) silty clay loam, black (10YR 2/1) moist; few fine distinct brown (10YR 5/3) mottles; weak fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; many very fine and common fine tubular pores; strongly effervescent; mildly alkaline (pH 7.8); clear wavy boundary.

Cg1-32 to 46 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark gray (10YR 3/1) moist; common medium faint dark grayish brown (10YR 4/2) mottles, very dark grayish brown (10YR 3/2) moist; massive; hard, firm, sticky and plastic; mildly alkaline (pH 7.8); clear wavy boundary.

Cg2-46 to 60 inches; gray (2.5Y 5/0) silty clay loam, dark gray (10YR 4/1) moist; massive; hard, firm, sticky and plastic; mildly alkaline (pH 7.8).

Typical Pedon Location

Map unit in which located: Downata silt loam, 0 to 2 percent slopes

Location in survey area: About 400 feet west and 1,320 feet south of the northeast corner of sec. 6, T. 12 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 24 to 60 inches
Depth to mottles: 10 to 25 inches
Depth to water table: 0 to 30 inches

Particle-size control section:
Content of rock fragments-0 to 5 percent
Content of clay-28 to 34 percent

A horizon:
Hue-10YR, 2.5Y, or 2Y
Value-3 to 5 dry, 2 or 3 moist
Chroma-0 to 2
Content of clay-13 to 26 percent
Reaction-mildly alkaline or moderately alkaline

Bg horizon:
Hue-10YR, 2.5Y, or 2Y
Value-3 to 5 dry, 2 or 3 moist
Chroma-0 to 2
Content of clay-28 to 34 percent
Reaction-mildly alkaline or moderately alkaline

Cg horizon:
Hue-10YR, 2.5Y, or 2Y
Value-3 to 7 dry, 2 to 3 moist
Chroma-0 to 2
Content of clay-18 to 34 percent
Reaction-mildly alkaline or moderately alkaline

The Downata soils in this survey area are slightly outside the range for the series because they have a mollic epipedon that commonly is more than 36 inches thick, have mottles at a slightly greater depth, and have darker chromas. These differences, however, do not significantly affect use and management.

Escalante Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Fan terraces
Parent material: Mixed alluvium
Slope: 1 to 8 percent
Elevation: 4,400 to 5,400 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 120 days
Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Calciorthids

Typical Pedon

A-0 to 3 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; strong very thick platy structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine roots; many very fine irregular pores; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary.

BA-3 to 7 inches; pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure parting to strong coarse subangular blocky; hard, very friable, nonsticky and nonplastic; common *very* fine roots; many very fine, few fine, and common medium tubular pores; slightly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

Bk1-7 to 12 inches; pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure parting to strong very fine granular; slightly hard, very friable, nonsticky and slightly plastic; common very fine roots; many very fine and few fine tubular pores; strongly effervescent; lime segregated in many soft masses; strongly alkaline (pH 8.6); clear smooth boundary.

Bk2-12 to 28 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine and common fine tubular pores; violently effervescent; 5 percent gravel; strongly alkaline (pH 9.0); clear wavy boundary.

Bkz1-28 to 50 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine tubular pores; strongly effervescent; common fine and medium masses of salt occurring in irregularly shaped filaments and seams; moderately alkaline (pH 8.4); gradual wavy boundary.

Bkz2-50 to 60 inches; light yellowish brown (10YR 6/4) fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine tubular pores; strongly effervescent; common fine and medium masses of salt occurring in irregularly shaped filaments and seams; moderately alkaline (pH 8.0).

Typical Pedon Location

Map unit in which located: Escalante fine sandy loam, 1 to 3 percent slopes
Location in survey area: About 100 feet south and 1,100 feet east of the northwest corner of sec. 29, T. 12 S., R. 27 E.

Range in Characteristics

Depth to calcic horizon: 12 to 19 inches

Particle-size control section:
Content of gravel-0 to 10 percent
Content of clay-10 to 18 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Content of gravel-0 to 10 percent

BA horizon:
Value-3 or 4 moist
Chroma-2 or 3

Texture-very fine sandy loam, fine sandy loam, or sandy loam
Content of gravel-0 to 10 percent
Content of clay-10 to 18 percent Reaction-moderately alkaline or strongly alkaline

Bk horizon:
Value-6 or 7 dry, 4 to 6 moist
Chroma-3 or 4
Texture-very fine sandy loam, sandy loam, or fine sandy loam
Content of gravel-0 to 15 percent
Calcium carbonate equivalent-15 to 30 percent
Reaction-moderately alkaline to very strongly alkaline

Taxadjunct Features

The Escalante soil in the map unit Escalante sandy loam, 4 to 8 percent slopes, is generally leached of calcium carbonate to a depth of 10 to 12 inches. This feature is outside the range for the series. This difference, however, does not significantly affect use and management.

Farmell Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Playas, depressional areas on basalt plains
Parent material: Mixed silty alluvium
Slope: 0 to 1 percent
Elevation: 4,250 to 4,400 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 47 to 48 degrees F
Frost-free period: 125 to 135 days
Taxonomic class: Fine, montmorillonitic, mesic Xerollic Haplargids

Typical Pedon

Ap1-0 to 4 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; moderate very fine granular structure; slightly hard, very friable, very sticky and very plastic; common very fine and few fine roots; many very fine irregular pores; many colloid stained mineral grains; mildly alkaline (pH 7.8); gradual smooth boundary.

Ap2-4 to 10 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; weak very fine granular structure; slightly hard, very friable, very sticky and very plastic; common very fine and few fine roots; common very fine irregular and few very fine tubular pores; many colloid stained mineral grains; mildly alkaline (pH 7.5); clear smooth boundary.

Bt1-10 to 33 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; moderate very fine angular blocky structure; hard, very friable, very sticky and *very* plastic; few very fine roots; common very fine irregular and few very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; mildly alkaline (pH 7.5); distinct smooth boundary.

Bt2-33 to 60 inches; very pale brown (10YR 7/3) silty clay, brown (10YR 5/3) moist; moderate very fine subangular blocky structure; hard, very friable, very sticky and very plastic; few very fine roots; common very fine tubular pores; many thin clay films on faces of peds and lining pores; mildly alkaline (pH 7.5).

Typical Pedon Location

Map unit in which located: Farmell silty clay loam, 0 to 1 percent slopes
Location in survey area: About 950 feet east and 1,450 feet south of the northwest corner of sec. 2, T. 10 S., R. 27 E.

Range in Characteristics

Depth to argillic horizon: 9 to 10 inches
Depth to secondary lime: 20 to 56 inches

Particle-size control section:
Content of clay-35 to 45 percent

A horizon:
Chroma-2 or 3
Content of clay-30 to 35 percent
Reaction-mildly alkaline or moderately alkaline

Bt horizon:
Value-6 or 7 dry, 4 or 5 moist
Content of clay-35 to 45 percent
Reaction-mildly alkaline or moderately alkaline

Bk horizon (if it occurs):
Value-6 or 7 dry, 3 or 4 moist
Chroma-3 or 4
Texture-sandy loam or loam

Taxadjunct Features

The Farmell soils in this survey area commonly have lime at a depth that is outside the range for the series, and they have a thin layer of sand or sandy loam below a depth of 50 inches in some pedons. These differences, however, do not significantly affect use and management.

Freedom Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow

Position on landscape: Stream terraces
Parent material: Mixed silty alluvium
Slope: 0 to 1 percent
Elevation: 4,300 to 4,900 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 115 to 130 days
Taxonomic class: Fine-silty, mixed, mesic Xerollic Calciorthids

Typical Pedon

A-0 to 4 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate thick platy structure parting to moderate fine granular; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine and medium tubular pores; strongly effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary.

AB-4 to 7 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; firm, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine and medium tubular pores; strongly effervescent; strongly alkaline (pH 9.0); clear smooth boundary.

Bkz1-7 to 26 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine subangular blocky structure; firm, friable, slightly sticky and slightly plastic; common very fine and fine roots; few fine and medium tubular pores; violently effervescent; very strongly alkaline (pH 9.4); gradual wavy boundary.

Bkz2-26 to 44 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong very fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine roots; many fine, medium, and coarse tubular pores; strongly effervescent; very strongly alkaline (pH 9.6); abrupt smooth boundary.

Cz-44 to 60 inches; light brownish gray (10YR 6/2) silt loam, grayish brown (10YR 5/2) moist; massive; firm, very friable, sticky and plastic; few very fine and fine roots; few very fine tubular pores; strongly effervescent; very strongly alkaline (pH 9.2).

Typical Pedon Location

Map unit in which located: Freedom silt loam, 0 to 1 percent slopes
Location in survey area: About 2,100 feet west and 1,050 feet south of the northeast corner of sec. 23, T. 15 S., R. 26 E.

Range in Characteristics

Depth to secondary lime: 7 to 11 inches
Thickness of calcic horizon: 15 to 24 inches

Particle-size control section:
Content of clay-20 to 35 percent
Conductivity of saturation extract-greater than 8 millimhos

A horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Conductivity of saturation extract-4 to 8 millimhos

Bk horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 to 4
Texture-silt loam or silty clay loam
Calcium carbonate equivalent-15 to 40 percent
Reaction-strongly alkaline or very strongly alkaline

C horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-silt loam or silty clay loam
Calcium carbonate equivalent-4 to 15 percent
Reaction-strongly alkaline or very strongly alkaline

Genola Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Flood plains, stream terraces, alluvial fans
Parent material: Mixed silty alluvium
Slope: 0 to 1 percent
Elevation: 4,200 to 5,200 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 135 days
Taxonomic class: Fine-silty, mixed (calcareous), mesic Xeric Torrifluvents

Typical Pedon

Ap1-0 to 7 inches; light brownish gray (10YR 6/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure parting to moderate very fine and fine granular; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few fine and medium tubular and many very fine interstitial pores; strongly effervescent (12 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); clear *wavy* boundary.

Ap2-7 to 12 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure parting to moderate very fine and fine granular; hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; common fine tubular and many very fine interstitial pores; strongly effervescent (10 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); clear wavy boundary.

C1-12 to 22 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; moderate very fine and fine subangular blocky structure; hard, friable, slightly sticky and plastic; many very fine roots; few fine and medium and many very fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); strongly alkaline (pH 8.7); clear smooth boundary.

C2-22 to 27 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; moderate coarse subangular blocky structure parting to moderate very fine and fine subangular blocky; hard, friable, slightly sticky and plastic; many very fine roots; common fine and many very fine and medium tubular pores; violently effervescent (16 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); abrupt smooth boundary.

C3-27 to 37 inches; light brownish gray (10YR 6/2) silt loam, dark brown (10YR 4/3) moist; moderate very fine and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine and common very fine roots; many very fine and fine tubular pores; strongly effervescent (8 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); abrupt wavy boundary.

C4-37 to 60 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate very fine and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; strongly effervescent (12 percent calcium carbonate equivalent); strongly alkaline (pH 8.5).

Typical Pedon Location

Map unit in which located: Genola silt loam, 0 to 1 percent slopes

Location in survey area: About 2,200 feet west and 1,340 feet north of the southeast corner of sec. 31, T. 13 S., R. 27 E.

Range in Characteristics

Other characteristics: A buried A horizon in some pedons that has values of 5 dry and 3 moist and textures of clay loam, silty clay loam, or loam

Particle-size control section:
Content of clay-18 to 27 percent

A horizon:
Value-5 or 6 dry, 3 to 5 moist
Chroma-2 or 3
Calcium carbonate equivalent-2 to 15 percent
Reaction-moderately alkaline or strongly alkaline

C horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-stratified fine sandy loam, sandy loam, loam, silt loam, sandy clay loam, clay loam, or silty clay loam
Calcium carbonate equivalent-0 to 25 percent
Reaction-moderately alkaline to very strongly alkaline

Gunnel Series

Depth class: Shallow (to a duripan)
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces
Parent material: Mixed alluvium
Slope: 4 to 12 percent
Elevation: 4,800 to 6,000 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 85 to 110 days
Taxonomic class: Loamy-skeletal, mixed, mesic, shallow Xerollic Durorthids

Typical Pedon

A-0 to 2 inches; pale brown (10YR 6/3) gravelly silt loam, dark brown (10YR 3/3) moist; moderate thick platy structure parting to weak very fine and fine granular; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and few fine interstitial pores; mildly alkaline (pH 7.5); abrupt smooth boundary.

Bw-2 to 4 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; mildly alkaline (pH 7.7); clear smooth boundary.

Bk-4 to 9 inches; very pale brown (10YR 7/3) gravelly silt loam, brown (10YR 5/3) moist; weak very fine roots; many very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.5); clear smooth boundary.

Bkq-9 to 18 inches; very pale brown (10YR 7/3) very

gravelly sandy loam, pale brown (10YR 6/3) moist; massive; hard, firm, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; lime coatings and silica pendants on all coarse fragments; violently effervescent; strongly alkaline (pH 8.8); abrupt smooth boundary.

Bkqm-18 to 37 inches; indurated lime-silica cemented hardpan.

C-37 to 60 inches; very pale brown (10YR 7/3) extremely cobbly loamy sand, pale brown (10YR 6/3) moist; layers of weakly cemented hardpan material in the upper 10 inches.

Typical Pedon Location

Map unit in which located: Gunnel gravelly silt loam, 4 to 12 percent slopes

Location in survey area: About 2,300 feet west and 2,300 feet south of the northeast corner of sec. 17, T. 15 S., R. 25 E.

Range in Characteristics

Depth to the hardpan: 10 to 20 inches

Other characteristics: No Bw horizon in some pedons

Particle-size control section:
Content of rock fragments-35 to 50 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Effervescence-none to strong
Reaction-mildly alkaline to strongly alkaline

Bw horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-3 or 4
Texture of the fraction less than 2 mm-loam or silt loam
Content of rock fragments-10 to 35 percent
Effervescence-none to strong
Reaction-mildly alkaline to strongly alkaline

Bk horizon:
Value-6 to 8 dry, 5 to 7 moist
Chroma-2 to 4
Texture of the fraction less than 2 mm-silt loam, loam, fine sandy loam, very fine sandy loam, or sandy loam
Content of rock fragments-25 to 60 percent
Effervescence-strong to violent
Reaction-moderately alkaline or strongly alkaline

Bkqm horizon:
Thickness-6 to 20 inches

2C horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 to 4
Texture-stratified *very* gravelly fine sandy loam, very gravelly sandy loam, very stony sandy loam, very gravelly loamy sand, very gravelly loamy coarse sand, or extremely stony loamy coarse sand

Hades Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Fan terraces, hillsides, mountainsides
Parent material: Mixed alluvium
Slope: 5 to 50 percent
Elevation: 5,200 to 7,000 feet
Average annual precipitation: 16 to 18 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 75 to 90 days
Taxonomic class: Fine-loamy, mixed, frigid Pachic Argixerolls

Typical Pedon

A-0 to 2 inches; brown (10YR 5/3) loam, very dark brown (10YR 2/2) moist; weak to moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine irregular pores; 1 percent stones on the surface and 10 percent gravel below; mildly alkaline (pH 7.4); abrupt smooth boundary.

AB-2 to 7 inches; dark brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and common fine tubular pores; 10 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

Bt1-7 to 13 inches; dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; moderate medium prismatic structure parting to moderate medium and fine angular blocky; slightly hard, very friable, sticky and plastic; many very fine roots; many very fine tubular pores; common thin clay films on faces of peds and lining pores; 10 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

Bt2-13 to 19 inches; dark brown (10YR 4/3) clay loam, very dark brown (10YR 2/2) moist; moderate medium angular blocky structure; hard, friable, sticky and plastic; many very fine roots; many very fine tubular pores; many thin clay films on faces of peds and lining pores; 10 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

Bt3-19 to 25 inches; brown (10YR 5/3) cobbly clay

loam, very dark grayish brown (10YR 3/2) moist; strong medium and fine angular blocky structure; hard, friable, sticky and plastic; common fine roots; many very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 25 percent cobbles; mildly alkaline (pH 7.6); clear wavy boundary.

Bt4-25 to 33 inches; light brown (7.5YR 6/4) cobbly clay loam, dark brown (7.5YR 3/4) moist; strong medium and fine angular blocky structure; hard, friable, sticky and very plastic; common very fine roots; many very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 25 percent cobbles; mildly alkaline (pH 7.8); abrupt wavy boundary.

Bt5-33 to 41 inches; pink (7.5YR 7/4) cobbly clay loam, brown (7.5YR 5/4) moist; strong medium and fine angular blocky structure; hard, friable, sticky and very plastic; common very fine roots; many very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 20 percent cobbles; mildly alkaline (pH 7.8); clear wavy boundary.

Bt6-41 to 60 inches; light brown (7.5YR 6/4) cobbly clay loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; common thin clay films on faces of peds and lining pores; 20 percent cobbles and 5 percent gravel; mildly alkaline (pH 7.8).

Typical Pedon Location

Map unit in which located: Yeates Hollow-Hades complex, 10 to 40 percent slopes

Location in survey area: About 2,150 feet south and 50 feet east of the northwest corner of sec. 28, T. 16 S., R. 22 E.

Range in Characteristics

Thickness of mollic epipedon: 25 to 50 inches

Particle-size control section:
- Content of clay-25 to 35 percent
- Content of rock fragments-5 to 30 percent

A horizon:
- Value-4 or 5 dry, 2 or 3 moist
- Chroma-1 to 3, moist or dry
- Content of rock fragments-5 to 15 percent
- Reaction-neutral or mildly alkaline

Bt horizon:
- Hue-7.5YR or 10YR
- Value-4 to 7 dry, 2 to 5 moist
- Chroma-2 to 4
- Texture-cobbly clay loam, gravelly clay loam, clay loam, or loam
- Content of rock fragments-5 to 30 percent
- Reaction-neutral to moderately alkaline

Hardister Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Valley floors, stream terraces
Parent material: Kind-ashy alluvium; source-weakly consolidated volcanic ash
Slope: 0 to 8 percent
Elevation: 4,900 to 5,600 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 45 to 46 degrees F
Frost-free period: 95 to 115 days

Taxonomic class: Ashy, mesic Mollic Vitrandepts

Typical Pedon

A1-0 to 4 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; mildly alkaline (pH 7.4); abrupt smooth boundary.

A2-4 to 11 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; mildly alkaline (pH 7.4); clear smooth boundary.

AC1-11 to 23 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine and few fine tubular pores; mildly alkaline (pH 7.4); clear smooth boundary.

AC2-23 to 33 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

C1-33 to 45 inches; light brownish gray (10YR 6/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and common medium roots; few very fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

C2-45 to 60 inches; light brownish gray (10YR 6/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine

tubular pores; few fine filaments of lime; mildly alkaline (pH 7.8).

Typical Pedon Location

Map unit in which located: Hardister fine sandy loam, 0 to 8 percent slopes

Location in survey area: About 1,000 feet east and 2,000 feet north of the southwest corner of sec. 10, T. 16 S., R. 21 E.

Range in Characteristics

Reaction in sodium fluoride: Less than 9.5

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

AC horizon:
Value-5 or 6 dry, 2 or 3 moist
Chroma-2 or 3
Texture-fine sandy loam, sandy loam, or loam
Reaction-mildly alkaline or moderately alkaline

C horizon:
Hue-10YR or 2.5Y
Value-6 or 7 dry, 3 or 4 moist
Chroma-2 or 3
Texture-fine sandy loam, sandy loam, or loam
Content of gravel-0 to 10 percent
Content of lime-0 to 10 percent
Reaction-mildly alkaline or moderately alkaline

Harroun Series

Depth class: Shallow (to a duripan)
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Cuestas, hillsides
Parent material: Mixed alluvium
Slope: 4 to 20 percent
Elevation: 5,000 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free period: 85 to 110 days
Taxonomic class: Loamy-skeletal, mixed, frigid, shallow Typic Durochrepts

Typical Pedon

A-0 to 4 inches; light brownish gray (10YR 6/2) stony silt loam, dark brown (10YR 3/3) moist; weak very thick platy structure parting to weak fine and very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine interstitial pores; slightly effervescent; 2 percent stones on and below the surface; moderately alkaline (pH 8.0); clear smooth boundary.

Bw-4 to 11 inches; pale brown (10YR 6/3) very gravelly silt loam, dark brown (10YR 3/3) moist; weak fine and very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common *very* fine tubular pores; strongly effervescent; 15 percent stones and cobbles and 30 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

Bk-11 to 16 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common gravel-sized pan fragments; violently effervescent; 15 percent cobbles and stones and 20 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

Bkgm-16 to 22 inches; fractured lime-silica cemented hardpan; fractures more than 10 cm apart; abrupt wavy boundary.

C-22 to 60 inches; very pale brown (10YR 7/3) very cobbly loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; violently effervescent; 15 percent cobbles and 20 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Harroun stony silt loam, 4 to 20 percent slopes

Location in survey area: About 1,000 feet west and 2,600 feet south of the northeast corner of sec. 24, T. 11 S., R. 25 E.

Range in Characteristics

Depth to hardpan: 10 to 20 inches
Particle-size control section:
Content of rock fragments-35 to 60 percent
A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Content of clay-5 to 15 percent
Effervescence-none to slight
Reaction-mildly alkaline or moderately alkaline
B horizon:
Value-6 to 8 dry, 3 to 6 moist
Chroma-2 or 3
Texture-very stony silt loam, very cobbly loam, or very gravelly silt loam
Content of stones-5 to 15 percent
Content of cobbles-10 to 20 percent
Content of gravel-10 to 30 percent
Content of clay-5 to 15 percent
Bkqm horizon:
Consistence when wet-very hard or extremely firm
Fractures-generally more than 10 cm apart

Heglar Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces, hillsides
Parent material: Silty alluvium and loess
Slope: 0 to 30 percent
Elevation: 4,400 to 5,600 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 125 days
Taxonomic class: Coarse-silty, mixed, mesic Calcixerollic Xerochrepts

Typical Pedon

A-0 to 5 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and medium and few fine roots; many very fine irregular pores; mildly alkaline (pH 7.8); clear smooth boundary.

Bw1-5 to 10 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak very coarse prismatic structure parting to weak very coarse subangular blocky; hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine tubular pores; moderately alkaline (pH 8.4); clear smooth boundary.

Bw2-10 to 13 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 5 percent nodules that are firm and very firm when moist; strongly effervescent; strongly alkaline (pH 8.8); clear smooth boundary.

Bk1-13 to 17 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; moderate coarse and *very* coarse platy structure; hard, friable, nonsticky and slightly plastic; common very fine roots; common very fine tubular pores; strongly effervescent (29 percent calcium carbonate equivalent); strongly alkaline (pH 9.0); clear smooth boundary.

Bk2-17 to 27 inches; light gray (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; 25 percent nodules that are friable when moist; violently effervescent (30 percent calcium carbonate equivalent); strongly alkaline (pH 9.0); gradual smooth boundary.

Bk3-27 to 36 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 20 percent nodules that are hard or friable when moist; violently effervescent (23 percent calcium carbonate equivalent); strongly alkaline (pH 9.0); gradual smooth boundary.

Bk4-36 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; strongly effervescent matrix (20 percent calcium carbonate equivalent); lime segregated into few fine irregularly shaped seams and filaments that are violently effervescent; strongly alkaline (pH 9.0).

Typical Pedon Location

Map unit in which located: Heglar silt loam, 8 to 12 percent slopes
Location in survey area: About 200 feet east and 450 feet north of the southwest corner of sec. 35, T. 11 S., R. 25 E.

Range in Characteristics

Depth to calcic horizon: 10 to 20 inches
Thickness of calcic horizon: 10 to 22 inches

Particle-size control section:
Content of clay-8 to 15 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-3 or 4 moist
Chroma-2 or 3
Texture-silt loam
Content of rock fragments-0 to 5 percent
Reaction-moderately alkaline or strongly alkaline

Bk horizon:
Value-6 to 8 dry, 4 to 7 moist
Chroma-2 to 4
Texture-silt, silt loam, or very fine sandy loam
Content of rock fragments-0 to 5 percent
Reaction-moderately alkaline or strongly alkaline

Hutchley Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Cuestas, mountainsides, ridges

Parent material: Mixed alluvium and residuum of quartz latite that have some loess
Slope: 4 to 65 percent
Elevation: 5,200 to 7,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 40 to 45 degrees F
Frost-free period: 65 to 85 days
Taxonomic class: Loamy-skeletal, mixed, frigid Lithic Argixerolls

Typical Pedon

A-0 to 4 inches; dark brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; 20 percent gravel; neutral (pH 7.3); clear smooth boundary.

Bw-4 to 9 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common very fine and few fine roots; common very fine tubular pores; 30 percent gravel; mildly alkaline (pH 7.4); clear smooth boundary.

Bt1-9 to 12 inches; brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and few fine roots; common very fine tubular pores; few thin clay films on faces of peds and lining pores; 5 percent cobbles and 35 percent gravel; mildly alkaline (pH 7.4); clear smooth boundary.

Bt2-12 to 15 inches; brown (10YR 4/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; few very fine tubular pores; common thin clay films on faces of peds and lining pores; 45 percent cobbles and 10 percent gravel; mildly alkaline (pH 7.5); abrupt smooth boundary.

R-15 inches; smooth, slightly fractured quartz latite.

Typical Pedon Location

Map unit in which located: Hutchley gravelly loam, 12 to 20 percent slopes
Location in survey area: About 2,500 feet north and 800 feet west of the southeast corner of sec. 24, T. 12 S., R. 25 E.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of mollic epipedon: 10 to 20 inches

Particle-size control section:
Content of clay-24 to 35 percent
Content of rock fragments-45 to 70 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Content of rock fragments-15 to 50 percent
Content of clay-12 to 25 percent
Reaction-neutral or mildly alkaline

Bw horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Texture gravelly silt loam, loam, or very gravelly loam
Content of rock fragments-20 to 50 percent
Content of clay-18 to 25 percent
Reaction-neutral or mildly alkaline

Bt horizon:
Value-4 or 5 dry
Chroma-3 or 4
Texture-very gravelly loam, extremely gravelly loam, very gravelly clay loam, or very cobbly clay loam
Content of rock fragments-45 to 70 percent
Content of clay-24 to 35 percent
Reaction-neutral or mildly alkaline

Hymas Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides, ridgetops
Parent material: Residuum of limestone that has some loess
Slope: 10 to 60 percent
Elevation: 5,000 to 7,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 65 to 85 days
Taxonomic class: Loamy-skeletal, carbonatic, frigid Lithic Haploxerolls

Typical Pedon

A1-0 to 2 inches; brown (10YR 5/3) cobbly silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine irregular pores; strongly effervescent; 15 percent cobbles and 10 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

A2-2 to 7 inches; grayish brown (10YR 5/2) cobbly silt

loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; many very fine irregular pores; strongly effervescent; 20 percent cobbles and 10 percent gravel; moderately alkaline (pH 8.0); clear smooth boundary.

Bw-7 to 11 inches; brown (10YR 5/3) very cobbly silt loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, medium, and coarse roots; many very fine and fine irregular pores; strongly effervescent; 5 percent stones, 35 percent cobbles, and 10 percent gravel; moderately alkaline (pH 8.1); abrupt wavy boundary.

Bk-11 to 16 inches; very pale brown (10YR 7/4) extremely cobbly loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; violently effervescent; 10 percent stones, 40 percent cobbles, and 20 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

R-1 6 inches; fractured limestone bedrock that has Material from the Bk horizon in the cracks.

Typical Pedon Location

Map unit in which located: Ireland-Hymas association, 35 to 55 percent slopes

Location in survey area: About 1,750 feet west and 1,200 feet north of the southeast corner of sec. 21, T. 10 S., R. 29 E.

Range in Characteristics

Depth to bedrock: 10 to 20 inches

Thickness of mollic epipedon: 7 to 14 inches

Particle-size control section:

Content of rock fragments-35 to 70 percent

Content of clay-10 to 18 percent

A horizon: Chroma-2 or 3

Bw horizon:

Value-5 or 6 dry, 3 or 4 moist

Chroma-2 or 3

Texture-very cobbly silt loam, very gravelly loam, or very stony loam

Content of rock fragments-35 to 65 percent

Bk horizon:

Value-6 or 7 dry, 4 or 5 moist

Chroma-3 or 4

Texture-very gravelly loam, extremely gravelly loam, very cobbly loam, or extremely cobbly loam

Content of rock fragments-45 to 70 percent

Reaction-mildly alkaline to strongly alkaline

Idahome Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Position on landscape: Fan terraces, high stream terraces

Parent material: Silty alluvium

Slope: 1 to 3 percent

Elevation: 4,400 to 5,400 feet

Average annual precipitation: 8 to 12 inches

Average annual air temperature: 45 to 47 degrees F

Frost-free period: 100 to 130 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Calciorthids

Typical Pedon

A1-0 to 2 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate very thick platy structure; slightly hard, very friable; few very fine roots; many very fine and common fine and medium vesicular pores; slightly effervescent (4 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); abrupt smooth boundary.

A2-2 to 5 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak very thick platy structure parting to weak fine subangular blocky; slightly hard and very friable; many very fine roots; many very fine vesicular pores; strongly effervescent (8 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); clear smooth boundary.

Bk1-5 to 10 inches; *very* pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium roots; many very fine, fine, and medium tubular pores; strongly effervescent (15 percent calcium carbonate equivalent); strongly alkaline (pH 9.0); clear wavy boundary.

Bk2-10 to 18 inches; very pale brown (10YR 8/3) silt loam, pale brown (10YR 6/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and medium and common fine roots; many very fine, fine, and medium tubular pores; violently effervescent (25 percent calcium carbonate equivalent); very strongly alkaline (pH 9.4); clear smooth boundary.

Bk3-18 to 31 inches; white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many very fine, common fine, and

few medium tubular pores; 15 percent cicada krotovinas that are hard when dry and firm when moist; violently effervescent (18 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); clear wavy boundary.

Cz-31 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many very fine and common fine tubular pores; strongly effervescent (11 percent calcium carbonate equivalent); few fine irregularly shaped soft seams and filaments of salt; strongly alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Idahome silt loam, 1 to 3 percent slopes

Location in survey area: About 2,600 feet east and 1,100 feet north of the southwest corner of sec. 25, T. 15 S., R. 26 E.

Range in Characteristics

Depth to calcic horizon: 5 to 18 inches

Thickness of calcic horizon: 15 to 28 inches

Particle-size control section:
Content of clay-10 to 15 percent

A horizon:
Value-6 or 7 dry, 4 or 5 moist
Calcium carbonate equivalent-8 to 15 percent
Reaction-moderately alkaline or strongly alkaline

Bk horizon:
Value-7 or 8 dry, 5 or 6 moist
Chroma-2 or 3
Calcium carbonate equivalent-15 to 30 percent
Cicada krotovinas-0 to 15 percent
Reaction-strongly alkaline or very strongly alkaline

Cz horizon:
Value-6 or 7 dry, 4 or 5 moist
Calcium carbonate equivalent-8 to 12 percent
Reaction-moderately alkaline to very strongly alkaline
Conductivity of saturation extract-greater than 16 millimhos

Ireland Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides, foothills, ridges
Parent material: Alluvium and residuum of limestone that have some loess
Slope: 25 to 55 percent
Elevation: 5,200 to 7,000 feet
Average annual precipitation: 16 to 20 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 65 to 85 days

Taxonomic class: Loamy-skeletal, mixed, frigid Calcic Haploxerolls

Typical Pedon

A-0 to 6 inches; grayish brown (10YR 5/2) stony silt loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine irregular pores; 3 percent stones on the surface and 10 percent cobbles and 15 percent gravel below; mildly alkaline (pH 7.6); clear smooth boundary.

AB-6 to 15 inches; brown (10YR 5/3) very cobbly silt loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; common very fine and fine tubular pores; 10 percent stones, 30 percent cobbles, and 10 percent gravel; mildly alkaline (pH 7.7); clear wavy boundary.

Bk1-15 to 19 inches; pale brown (10YR 6/3) extremely stony silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; strongly effervescent; 40 percent stones, 30 percent cobbles, and 10 percent gravel; mildly alkaline (pH 7.7); clear wavy boundary.

Bk2-19 to 26 inches; very pale brown (10YR 7/3) extremely stony silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; violently effervescent; 40 percent stones, 40 percent cobbles, and 5 percent gravel; mildly alkaline (pH 7.7); abrupt wavy boundary.

R-26 inches; limestone.

Typical Pedon Location

Map unit in which located: Ireland-Hymas association, 35 to 55 percent slopes

Location in survey area: About 2,100 feet south and 1,400 feet west of the northeast corner of sec. 10, T. 11 S., R. 29 E.

Range in Characteristics

Depth to bedrock: 20 to 40 inches

Thickness of mollic epipedon: 10 to 18 inches

Particle-size control section:
Content of rock fragments: 50 to 80 percent

A horizon:
Value-4 or 5 dry
Chroma-2 or 3

Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 to 4
Texture-very gravelly silt loam, extremely gravelly silt loam, very gravelly loam, extremely gravelly loam, very cobbly loam, extremely cobbly loam, stony loam, *very* stony loam, or extremely stony loam
Effervescence-strong to violent
Reaction-mildly alkaline or moderately alkaline

Itca Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Slow
Position on landscape: Mountainsides
Parent material: Alluvium and residuum of quartzite and mica schist
Slope: 25 to 55 percent
Elevation: 5,400 to 7,200 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 75 to 95 days
Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Lithic Argixerolls

Typical Pedon

A-0 to 3 inches; brown (10YR 5/3) very stony loam, very dark brown (10YR 2/2) moist; weak thick platy structure parting to moderate fine platy; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine vesicular pores; 35 percent stones on the surface; neutral (pH 7.2); abrupt smooth boundary.

Bt1-3 to 8 inches; brown (10YR 5/3) extremely cobbly clay loam, very dark grayish brown (10YR 3/2) moist; strong coarse prismatic structure parting to moderate very fine and fine subangular blocky; slightly hard, very friable, sticky and plastic; many very fine and common fine and medium roots; many very fine and common fine tubular pores; neutral (pH 7.2); clear wavy boundary.

Bt2-8 to 12 inches; yellowish brown (10YR 5/4) extremely cobbly clay, brown (10YR 4/3) moist; strong fine and medium angular blocky structure; *very* hard, friable, very sticky and *very* plastic; common very fine and medium roots; many very fine and few fine tubular pores; many thin clay films on faces of peds and lining pores; neutral (pH 7.2); clear wavy boundary.

Bt3-12 to 17 inches; yellowish brown (10YR 5/4) extremely cobbly clay, brown (10YR 4/3) moist; strong fine and medium subangular blocky structure; very hard, friable, very sticky and very plastic; common very fine and fine roots; many very fine and common fine tubular pores; common thin clay films on faces of peds and lining pores; mildly alkaline (pH 7.4); abrupt wavy boundary.

R-1 7 inches; unweathered bedrock.

Typical Pedon Location

Map unit in which located: Itca-Birchcreek-Rock outcrop complex, 25 to 55 percent slopes
Location in survey area: About 1,300 feet west and 1,050 feet north of the southeast corner of sec. 32, T. 15 S., R. 24 E.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of mollic epipedon: 8 to 18 inches
Particle-size control section:
Content of rock fragments-40 to 50 percent
Content of clay-35 to 45 percent
A horizon:
Value-2 or 3 moist
Chroma-2 or 3
Bt horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 to 4
Texture-very stony clay loam, very gravelly clay loam, very gravelly clay, very stony clay, extremely stony clay, or extremely cobbly clay
Content of rock fragments-35 to 70 percent
Content of clay-35 to 45 percent
Reaction-neutral or mildly alkaline

Jett Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Low stream terraces, flood plains
Parent material: Mixed silty alluvium
Slope: 0 *to* 1 percent
Elevation: 4,300 to 5,100 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 110 to 130 days
Taxonomic class: Fine-silty, mixed, mesic Cumulic Haploxerolls

Typical Pedon

Ap-0 to 8 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; moderate fine granular structure; soft, *very* friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine irregular pores; strongly

effervescent; moderately alkaline (pH 8.4); abrupt smooth boundary.

A-8 to 20 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; common very fine and fine tubular pores; strongly effervescent; moderately alkaline (pH 8.1); clear smooth boundary.

AB-20 to 27 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable, sticky and plastic; common very fine and medium roots; common very fine and fine and few medium tubular pores; strongly effervescent; lime segregated into few fine irregularly shaped filaments and seams; mildly alkaline (pH 7.8); abrupt smooth boundary.

C1-27 to 41 inches; gray (10YR 5/1) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, medium, and coarse roots; many very fine and common fine tubular pores; mildly alkaline (pH 7.8); clear smooth boundary.

C2-41 to 50 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and common fine tubular pores; mildly alkaline (pH 7.8); gradual wavy boundary.

2C3-50 to 65 inches; pale brown (10YR 6/3) silty clay loam, dark grayish brown (10YR 4/2) moist; few fine distinct very dark brown (10YR 2/2 moist) mottles; massive; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; mildly alkaline (pH 7.8).

Typical Pedon Location

Map unit in which located: Jett silt loam, 0 to 1 percent slopes
Location in survey area: About 700 feet west and 800 feet north of the southeast corner of sec. 1, T. 13 S., R. 26 E.

Range in Characteristics

Thickness of mollic epipedon: 22 to 41 inches
Depth to apparent water table: 48 to 60 inches
Other characteristics: Lenses of coarse material in the lower part of the C horizon in some pedons

Particle-size control section:
Content of clay-18 to 27 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 or 2

C horizon:
Value-4 to 6 dry, 3 or 4 moist
Chroma-1 to 3
Texture-silt loam or silty clay loam
Reaction-mildly alkaline or moderately alkaline

Jimsage Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides
Parent material: Alluvium and residuum of quartz latite that have some loess
Slope: 30 to 70 percent
Elevation: 4,800 to 7,200 feet
Average annual precipitation: 12 to 18 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free period: 70 to 95 days
Taxonomic class: Loamy-skeletal, mixed, frigid Calcic Pachic Haploxerolls

Typical Pedon

A-0 to 5 inches; dark brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure parting to weak fine and very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; 2 percent stones on the surface and 25 percent gravel below; mildly alkaline (pH 7.4); clear smooth boundary.

Bw1-5 to 13 inches; dark brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; 5 percent cobbles and 30 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

Bw2-13 to 26 inches; dark brown (10YR 4/3) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 15 percent cobbles and 50 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

Bk1-26 to 43 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 4/3) moist;

massive; soft and very friable; few very fine roots; common very fine tubular pores; strongly effervescent matrix; lime segregated into common fine and medium irregularly shaped masses; that are violently effervescent; 10 percent cobbles and 45 percent gravel; strongly alkaline (pH 8.6); gradual wavy boundary.

Bk2-43 to 60 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft and very friable; few very fine roots in the upper 10 inches; strongly effervescent; 20 percent cobbles and 25 percent gravel; strongly alkaline (pH 8.5).

Typical Pedon Location

Map unit in which located: Vitale-Jimsage association, 40 to 60 percent slopes

Location in survey area: About 1,600 feet east and 700 feet north of the southwest corner of sec. 36, T. 12 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 20 to 32 inches

Depth to secondary lime: 10 to 32 inches

Particle-size control section:

Content of clay-10 to 18 percent
Content of gravel-30 to 65 percent
Content of cobbles-5 to 65 percent
Content of stones-0 to 40 percent

A horizon:

Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Content of rock fragments-15 to 40 percent
Reaction-neutral or mildly alkaline

Bw horizon:

Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Texture-very gravelly loam, extremely gravelly loam, very cobbly loam, or extremely cobbly loam
Content of clay-12 to 18 percent
Effervescence-none to strong Reaction-mildly alkaline or moderately alkaline

Bk horizon:

Value-6 to 8 dry, 3 to 5 moist
Chroma-3 or 4
Texture-very gravelly loam, extremely gravelly loam, very cobbly loam, extremely cobbly loam, very gravelly sandy loam, extremely gravelly sandy loam, very cobbly sandy loam, or extremely cobbly sandy loam
Content of clay-10 to 15 percent
Effervescence-slight to strong
Reaction-moderately alkaline or strongly alkaline

Kancan Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Coalesced fan terraces
Parent material: Mixed alluvium that has some loess over mixed coarse alluvium
Slope: 1 to 12 percent
Elevation: 4,400 to 5,500 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 90 to 120 days
Taxonomic class: Loamy-skeletal, mixed, mesic Aridic Calcic Argixerolls

Typical Pedon

A1-0 to 3 inches; brown (10YR 5/3) gravelly silt loam, very dark grayish brown (10YR 3/3) moist; weak medium subangular blocky structure parting to strong very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine irregular pores; 20 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

A2-3 to 10 inches; brown (10YR 5/3) gravelly loam, very dark grayish brown (10YR 3/3) moist; weak medium subangular blocky structure parting to strong very fine granular; hard, friable, sticky and plastic; common very fine roots; many very fine and few fine irregular pores; 20 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

Bt-10 to 16 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many very fine and few fine irregular pores; 45 percent gravel; moderately alkaline (pH 7.9); clear wavy boundary.

2Bk-16 to 27 inches; yellowish brown (10YR 5/4) very gravelly coarse sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and plastic; few very fine roots; many very fine irregular pores; slightly effervescent; 45 percent gravel; moderately alkaline (pH 7.9); clear wavy boundary.

3Ck1-27 to 33 inches; pale brown (10YR 6/3) *very* cobbly coarse sandy loam, brown (10YR 5/3) moist; massive; slightly hard, *very* friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; rock fragments coated with lime on all sides; strongly effervescent (10 percent calcium carbonate equivalent); common fine and medium irregularly shaped soft seams and masses of lime;

30 percent cobbles and 20 percent gravel; moderately alkaline (pH 8.4); clear wavy boundary.

3Ck2-33 to 60 inches; very pale brown (10YR 7/3) very cobbly coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable; many very fine irregular pores; rock fragments coated with lime on all sides; strongly effervescent (10 percent calcium carbonate equivalent); common fine and medium irregularly shaped soft seams and masses of lime; 35 percent cobbles and 20 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Kancan gravelly silt loam, 2 to 8 percent slopes

Location in survey area: About 2,500 feet south and 200 feet west of the northeast corner of sec. 34, T. 12 S., R. 26 E.

Range in Characteristics

Thickness of mollic epipedon: 7 to 14 inches
Depth to first discontinuity: 9 to 16 inches
Depth to second discontinuity: 16 to 37 inches
Depth to secondary lime: 9 to 27 inches

Particle-size control section:
Content of clay-23 to 32 percent
Content of rock fragments-15 to 30 percent

A horizon:
Value-5 or 6 dry
Chroma-2 or 3
Content of clay-15 to 22 percent
Content of rock fragments-15 to 30 percent
Reaction-neutral or mildly alkaline

Bt horizon:
Value-3 or 4 moist
Chroma-2 or 3
Texture-gravelly silt loam, very gravelly silt loam, gravelly clay loam, or very gravelly clay loam
Content of clay-23 to 35 percent Content of rock fragments-15 to 55 percent, average of 15 to 30 percent

Bk horizon:
Value-5 to 7 dry, 4 to 6 moist
Chroma-3 or 4
Texture-very gravelly loam, extremely gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loamy coarse sand, or extremely gravelly loamy coarse sand
Content of clay-5 to 15 percent
Content of rock fragments-40 to 80 percent
Calcium carbonate equivalent-10 to 25 percent
Reaction-moderately alkaline or strongly alkaline

C horizon.
Texture-very cobbly coarse sandy loam, very gravelly coarse sandy loam, extremely gravelly coarse sandy loam, very gravelly loamy coarse sand, extremely gravelly loamy coarse sand, very gravelly coarse sand, or extremely gravelly coarse sand
Content of rock fragments-45 to 80 percent
Reaction-moderately alkaline or strongly alkaline

Kanlee Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Pediments, mountainsides
Parent material: Residuum of granodiorite
Slope: 3 to 30 percent
Elevation: 5,700 to 7,000 feet
Average annual precipitation: 16 to 20 inches
Average annual air temperature: 40 to 43 degrees F
Frost-free period: 65 to 90 days
Taxonomic class: Fine-loamy, mixed, frigid Typic Argixerolls

Typical Pedon

A-0 to 2 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate coarse platy structure parting to weak very fine granular; slightly hard, very friable, nonsticky and nonplastic; many *very* fine and few fine roots; many very fine and common fine irregular pores; neutral (pH 7.2); abrupt smooth boundary.

Bt1-2 to 11 inches; brown (10YR 5/3) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; many very fine and few fine tubular pores; few thin clay films lining pores and bridging sand grains; mildly alkaline (pH 7.6); clear wavy boundary.

Bt2-11 to 19 inches; yellowish brown (10YR 5/4) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine, common fine, and few medium tubular pores; common thin clay films lining pores and bridging sand grains; mildly alkaline (pH 7.6); gradual wavy boundary.

Bt3-19 to 24 inches; pale brown (10YR 6/3) coarse sandy loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine and coarse and few fine and medium

roots; many very fine, common fine, and few medium tubular pores; common thin clay films lining pores and bridging sand grains; mildly alkaline (pH 7.6); gradual wavy boundary.

Cr-24 to 35 inches; multicolored decomposing granodiorite that can be broken into a coarse sand with the hands; massive; hard, very firm, nonsticky and nonplastic; few very fine roots; mildly alkaline (pH 7.6); gradual wavy boundary.

R-35 inches; granodiorite.

Typical Pedon Location

Map unit in which located: Rock outcrop- Kanlee complex, 3 to 30 percent slopes

Location in survey area: About 1,500 feet north and 420 feet west of the southeast corner of sec. 36, T. 15 S., R. 23 E.

Range in Characteristics

Thickness of mollic epipedon: 11 to 19 inches

Content of pebbles in the lower part of the profile: As much as 35 percent

Depth to paralithic contact: 20 to 35 inches

Depth to lithic contact: 35 to 40 inches

Particle-size control section:
Content of clay-18 to 30 percent
Content of gravel-0 to 10 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-medium acid to mildly alkaline

Bt horizon:
Value-4 to 6 dry, 2 to 4 moist
Chroma-2 or 3
Texture-sandy loam or sandy clay loam in the upper part ranging to coarse sandy loam in the lower part
Content of clay-18 to 30 percent in the upper part, 15 to 30 percent in the lower part
Content of gravel-0 to 10 percent
Reaction-medium acid to mildly alkaline

Cr horizon:
Texture-coarse sand
Consistence when wet-very firm

Kimmerling Series

Depth class: Very deep
Drainage class: Very poorly drained
Permeability: Moderately slow
Position on landscape: Flood plains, low stream terraces
Parent material: Mixed alluvium
Slope: 0 to 1 percent
Elevation: 4,900 to 5,300 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 100 to 115 days
Taxonomic class: Fine-loamy, mixed, mesic Cumulic Haplaquolls

Typical Pedon

A-0 to 3 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (2.5YR 3/2) moist; moderate medium granular structure; hard, friable, sticky and plastic; many very fine and few fine roots; many very fine and few fine irregular pores; strongly effervescent; mildly alkaline (pH 7.8); clear smooth boundary.

Ag-3 to 14 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (2.5YR 3/2) moist; many moderate prominent yellow (5Y 7/8) and light olive brown (2.5Y 5/6) mottles; moderate medium granular structure; hard, friable, sticky and plastic; many very fine and few fine roots; many very fine and few fine irregular pores; strongly effervescent; mildly alkaline (pH 7.8); clear smooth boundary.

Bg-14 to 35 inches; grayish brown (10YR 5/2) silty clay loam, *very* dark gray (5Y 3/1) moist; weak coarse subangular blocky structure; extremely hard, firm, sticky and plastic; few very fine roots; many very fine and common fine tubular pores; strongly effervescent; mildly alkaline (pH 7.8); clear smooth boundary.

Cg1-35 to 47 inches; gray (5Y 5/1) silty clay, very dark gray (5Y 3/1) moist; massive; extremely hard, firm, sticky and plastic; strongly effervescent; mildly alkaline (pH 7.8); gradual smooth boundary.

Cg2-47 to 60 inches; gray (5Y 5/1) silty clay, very dark gray (5Y 3/1) moist; massive; extremely hard, firm, sticky and plastic; strongly effervescent; moderately alkaline (pH 7.9).

Typical Pedon Location

Map unit in which located: Kimmerling silty clay loam, 0 to 1 percent slopes

Location in survey area: About 800 feet west and 200 feet north of the southeast corner of sec. 13, T. 16 S., R. 27 E.

Range in Characteristics

Thickness of mollic epipedon: 34 to 60 inches

Depth to mottles: 3 to 20 inches

Depth to water table: 3 to 20 inches

Particle-size control section:
Content of rock fragments-0 to 5 percent
Content of clay-28 to 45 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 or 2
Reaction-mildly alkaline or moderately alkaline

Bg horizon:
Hue-10YR, 5Y, or neutral
Value-4 or 5 dry, 2 or 3 moist
Chroma-0 to 2
Content of clay-28 to 34 percent
Reaction-mildly alkaline or moderately alkaline

Cg horizon:
Hue-10YR, 5Y, or neutral
Value-4 to 6 dry, 2 to 4 moist
Chroma-0 to 3
Content of clay-40 to 45 percent
Reaction-mildly alkaline or moderately alkaline

Taxadjunct Features

The Kimmerling soils in this survey area are outside the range for the series because they have a. cumulic epipedon that ranges from 6 inches thinner to 10 inches thicker than is typical, have strong effervescence, and have clay textures in the lower part. These differences, however, do not significantly affect use and management.

Koosharem Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Low stream terraces
Parent material: Mixed alluvium
Slope: 1 to 3 percent
Elevation: 5,400 to 6,200 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 80 to 90 days
Taxonomic class: Fine-loamy, mixed, frigid Cumulic Haploxerolls

Typical Pedon

A-0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate coarse and very coarse platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine vesicular and tubular pores; mildly alkaline (pH 7.8); abrupt smooth boundary.

ABk1-4 to 13 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; many very fine tubular pores; strongly effervescent; lime segregated into common fine irregularly shaped filaments and seams; mildly alkaline (pH 7.8); gradual smooth boundary.

ABk2-13 to 24 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, sticky and plastic; common *very* fine and few fine roots; many very fine tubular pores; violently effervescent; lime segregated into common fine and medium irregularly shaped filaments and seams; mildly alkaline (pH 7.8); gradual wavy boundary.

Bk-24 to 51 inches; very dark brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak very coarse prismatic structure parting to moderate coarse subangular blocky; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; many very fine and common fine and medium tubular pores; violently effervescent; lime segregated into common fine and medium irregularly shaped filaments and seams; mildly alkaline (pH 7.7); gradual wavy boundary.

2C-51 to 60 inches; grayish brown (10YR 5/2) loam, *very* dark brown (10YR 2/2) moist; massive; slightly hard, *very* friable, sticky and plastic; many very fine and common fine and medium tubular pores; mildly alkaline (pH 7.7).

Typical Pedon Location

Map unit in which located: Koosharem silt loam, 1 to 3 percent slopes
Location in survey area: About 2,200 feet south and 250 feet east of the northwest corner of sec. 34, T. 16 S., R. 23 E.

Range in Characteristics

Thickness of mollic epipedon: 37 to 60 inches
Depth to secondary lime: 4 to 60 inches
Other characteristics: Lenses of sandy and gravelly material in the lower part of the 2C horizon

Particle-size control section:
Content of clay-18 to 27 percent

A and ABk horizons:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-moderately alkaline or strongly alkaline

Bk horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3 Texture-silt loam or loam

2C horizon:

Value-4 to 6 dry, 2 or 3 moist
Chroma-2 or 3
Texture-silt loam or loam
Content of rock fragments-0 to 15 percent

Kovich Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Moderate
Position on landscape: Alluvial fans, flood plains, low stream terraces
Parent material: Mixed alluvium
Slope: 0 to 3 percent
Elevation: 4,900 to 5,700 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 80 to 90 days
Taxonomic class: Fine-loamy, mixed, frigid Cumulic Haplaquolls

Typical Pedon

A1-0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, *very* dark gray (10YR 3/1) moist; moderate fine, medium, and coarse granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and few fine interstitial pores; neutral (pH 6.8); abrupt smooth boundary.

A2-4 to 9 inches; dark grayish brown (10YR 4/2) silt loam, very dark gray (10YR 3/1) moist; moderate fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial pores; neutral (pH 7.0); clear smooth boundary.

A3-9 to 13 inches; dark grayish brown (10YR 4/2) silt loam, very dark gray (10YR 3/1) moist; weak fine subangular blocky structure parting to weak fine and very fine granular; hard, friable, slightly sticky and slightly plastic; common very fine roots; few fine and very fine interstitial pores; neutral (pH 7.0); clear wavy boundary.

A4-13 to 19 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; many fine and medium distinct yellowish brown (10YR 5/4 dry) mottles; weak fine and medium granular structure; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and few fine interstitial pores; neutral (pH 6.8); clear wavy boundary.

A5-19 to 27 inches; brown (10YR 4/3) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; many fine and medium distinct yellowish brown (10YR 5/6 dry) mottles; massive; hard, friable, sticky and plastic; common very fine and few fine roots; common very fine and few fine pores; neutral (pH 6.8); clear wavy boundary.

2C1-27 to 35 inches; light yellowish brown (10YR 6/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; many medium distinct brownish yellow (10YR 6/6 dry) mottles; massive; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and few fine tubular pores; neutral (pH 6.8); clear wavy boundary.

3C2-35 to 38 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; many medium prominent yellowish red (5YR 5/6 dry) mottles; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine tubular pores; neutral (pH 7.2); gradual wavy boundary.

3C3-38 to 60 inches; stratified light yellowish brown (1YR 6/4) very gravelly loamy sand, very cobbly sand, and extremely cobbly sand, dark yellowish brown (10YR 4/4) moist; single grained; loose; many fine irregular pores; neutral (pH 7.3).

Typical Pedon Location

Map unit in which located: Kovich silt loam, 0 to 3 percent slopes
Location in survey area: About 1,500 feet north and 1,320 feet east of the southwest corner of sec. 16, T. 12 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 22 to 27 inches
Depth to seasonal high water table: 15 to 36 inches
Depth to lithologic discontinuity: 22 to 38 inches
Other characteristics: Thin strata that have more than 35 percent rock fragments in some pedons
Particle-size control section:

Content of clay-18 to 35 percent
Content of rock fragments-average of 15 to 30 percent

A horizon:

Hue-10YR to 2.5Y
Value-3 or 4 dry, 2 or 3 moist
Chroma-1 or 2
Content of clay-15 to 25 percent on the surface, 20 to 35 percent below the surface
Content of gravel-0 to 10 percent on the surface, 5 to 35 percent below the surface

C horizon:
Hue-10YR to 5Y
Value-4 to 6 dry, 3 to 5 moist
Chroma-1 to 4
Texture-gravelly loam or gravelly silt loam in the upper part; stratified very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand, extremely gravelly sand, very cobbly sand, or extremely cobbly sand in the lower part

Kucera Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Hillsides, mountainsides
Parent material: Loess and silty alluvium
Slope: 20 to 55 percent
Elevation: 4,500 to 6,500 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Coarse-silty, mixed, frigid Calcic Pachic Haploxerolls

Typical Pedon

A1-0 to 5 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine, common medium, and few fine roots; common very fine irregular pores; mildly alkaline (pH 7.6); abrupt smooth boundary.
A2-5 to 11 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to weak fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common medium, and few fine roots; common very fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.
Bw1-11 to 21 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.
Bw2-21 to 35 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; about 30 percent friable nodules; slightly effervescent; lime segregated into a few irregularly shaped filaments and seams; mildly alkaline (pH 7.6); gradual wavy boundary.
Bk1-35 to 40 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; weak *very* fine and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; about 20 percent friable nodules; strongly effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.
Bk2-40 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Kucera silt loam, 25 to 55 percent slopes
Location in survey area: About 1,520 feet east and 150 feet south of the northwest corner of sec. 23, T. 12 S., R. 28 E.

Range in Characteristics

Thickness of mollic epipedon: 21 to 45 inches
Depth to secondary lime: 25 to 40 inches
Particle-size control section:
Content of clay-14 to 18 percent
A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-neutral or mildly alkaline
Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Content of nodules-5 to 35 percent
Reaction-neutral or mildly alkaline
Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Content of nodules-10 to 30 percent
Reaction-mildly alkaline to strongly alkaline

Lizzant Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountain foot slopes

Parent material: Alluvium and residuum of limestone
Slope: 5 to 20 percent
Elevation: 5,200 to 5,900 feet
Average annual precipitation: 13 to 16 inches
Average annual air temperature: 43 to 44 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Loamy-skeletal, carbonatic, frigid Typic Calcixerolls

Typical Pedon

A-0 to 7 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and few fine irregular pores; slightly effervescent; 5 percent stones and 40 percent gravel on the surface and about 10 percent gravel below; mildly alkaline (pH 7.8); clear smooth boundary.

Bw-7 to 10 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; strongly effervescent; 25 percent stones, 5 percent cobbles, and 10 percent gravel; moderately alkaline (pH 8.3); abrupt smooth boundary.

Bk1-10 to 18 inches; very pale brown (10YR 8/3) very gravelly loam, very pale brown (10YR 7/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; many very fine tubular pores; strongly effervescent; 5 percent stones, 10 percent cobbles, and 25 percent gravel; moderately alkaline (pH 8.4); gradual smooth boundary.

Bk2-18 to 43 inches; very pale brown (10YR 8/3) *very* gravelly loam, very pale brown (10YR 7/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; violently effervescent; 10 percent cobbles and 45 percent gravel; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3-43 to 60 inches; very pale brown (10YR 8/3) very stony loam, very pale brown (10YR 7/3) moist; massive; slightly hard, very friable; few very fine roots; common very fine tubular pores; violently effervescent; 35 percent stones and 25 percent gravel; strongly alkaline (pH 8.6).

Typical Pedon Location

Map unit in which located: Lizzant very stony loam, 5 to 20 percent slopes
Location in survey area: About 2,650 feet south and 525 feet east of the northwest corner of sec. 36, T. 15 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 16 inches

Particle-size control section:
Content of rock fragments-35 to 70 percent
Content of clay-18 to 25 percent

A horizon:
Chroma-2 or 3
Content of rock fragments-5 to 25 percent
Effervescence-slight to strong
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Content of rock fragments-15 to 40 percent
Effervescence-slight or strong
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 to 8 dry, 4 to 7 moist
Chroma-2 or 3
Content of rock fragments-40 to 70 percent
Calcium carbonate equivalent-25 to 50 percent, average of more than 40 percent in the textural control section
Reaction-moderately alkaline or strongly alkaline

Manassa Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Stream terraces
Parent material: Mixed silty alluvium
Slope: 0 to 1 percent
Elevation: 4,600 to 5,300 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 100 to 120 days
Taxonomic class: Fine-silty, mixed (calcareous), mesic Xeric Torriorthents

Typical Pedon

Ap1-0 to 3 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; strong *very* fine granular structure; soft, very friable, sticky and plastic; many very fine and few fine roots; many very fine irregular pores; slightly effervescent (7 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); abrupt smooth boundary.

Ap2-3 to 8 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist;

moderate very fine subangular blocky structure; hard, friable, sticky and plastic; many very fine and common fine roots; many very fine irregular pores; slightly effervescent (7 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); abrupt wavy boundary.

Bkz1-8 to 23 inches; light gray (10YR 7/2) silty clay loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, sticky and plastic; common very fine and few fine roots; many very fine tubular pores; strongly effervescent (11 percent calcium carbonate equivalent); very strongly alkaline (pH 9.1); gradual smooth boundary.

Bkz2-23 to 32 inches; light gray (10YR 7/2) silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, sticky and plastic; few fine and very fine roots; common very fine tubular pores; strongly effervescent (13 percent calcium carbonate equivalent); very strongly alkaline (pH 9.4); clear wavy boundary.

Cz-32 to 41 inches; light gray (10YR 7/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); very strongly alkaline (pH 9.1); clear smooth boundary.

C1-41 to 50 inches; light gray (10YR 7/2) silt loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, sticky and plastic; few *very* fine roots; many very fine and few fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); very strongly alkaline (pH 9.1); gradual smooth boundary.

2C2-50 to 60 inches; light gray (10YR 7/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; massive; hard, firm, sticky and plastic; common very fine tubular pores; strongly effervescent; very strongly alkaline (pH 9.1).

Typical Pedon Location

Map unit in which located: Manassa silt loam, 0 to 1 percent slopes

Location in survey area: About 3,400 feet south and 1,580 feet west of the northeast corner of sec. 14, T. 16 S., R. 24 E.

Range in Characteristics

Particle-size control section:

Content of clay-27 to 35 percent
Content of exchangeable sodium-more than 40 percent
Conductivity of saturation extract-greater than 16 millimhos

A horizon:

Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-moderately alkaline or strongly alkaline

Bk horizon:

Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-silt loam or silty clay loam
Reaction-strongly alkaline or very strongly alkaline

C horizon:

Value-7 or 8 dry, 3 to 6 moist
Chroma-2 or 3
Texture-silt loam, silty clay loam, or silty clay
Reaction-strongly alkaline or very strongly alkaline

Manila Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Fan terraces
Parent material: Alluvium of mica schist and quartzite that has some loess
Slope: 8 to 20 percent
Elevation: 5,500 to 6,500 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 41 to 43 degrees F
Frost-free period: 80 to 90 days

Taxonomic class: Fine, montmorillonitic, frigid Typic Argixerolls

Typical Pedon

A-0 to 6 inches; dark grayish brown (10YR 5/2) stony loam, very dark brown (10YR 2/2) moist; weak fine platy structure parting to strong very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine, common medium, and few coarse and very coarse roots; many fine tubular pores; 10 percent stones on the surface and 15 percent stones and 5 percent gravel below; slightly acid (pH 6.4); clear smooth boundary.

AB-6 to 9 inches; dark grayish brown (10YR 4/2) cobbly clay loam, very dark brown (10YR 2/2) moist; weak very fine subangular blocky structure parting to moderate fine and very fine granular; hard, friable, sticky and plastic; many fine, common medium, and few coarse roots; many fine tubular pores; 25 percent cobbles and 5 percent gravel; neutral (pH 6.8); clear wavy boundary.

Bt1-9 to 12 inches; dark grayish brown (10YR 4/2) clay, dark brown (10YR 3/3) moist; moderate very fine subangular blocky structure; very hard, friable, sticky and plastic; many fine, common medium, and

few coarse roots; many fine tubular pores; many thin clay films on faces of peds and lining pores; 10 percent cobbles; neutral (pH 7.0); clear *wavy* boundary.

Bt2-12 to 17 inches; brown (7.5YR 5/3) clay, dark brown (7.5YR 4/3) moist; weak medium prismatic structure parting to moderate *very* fine angular blocky; extremely hard, firm, sticky and *very* plastic; common fine and few medium and coarse roots; few fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; 5 percent cobbles; neutral (pH 7.2); clear smooth boundary.

Bt3-17 to 33 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/3) moist; moderate medium prismatic structure parting to strong fine and medium angular blocky; extremely hard, firm, sticky and very plastic; few medium and coarse roots; few fine tubular pores; continuous thick clay films on faces of peds and lining pores; mildly alkaline (pH 7.4); gradual wavy boundary.

Bt4-33 to 44 inches; light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) moist; very coarse prismatic structure parting to weak very coarse angular blocky; very hard, firm, sticky and plastic; few fine and medium roots; common fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 5 percent cobbles; mildly alkaline (pH 7.4); gradual irregular boundary.

Bt5-44 to 52 inches; pale brown (10YR 6/3) clay, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 10 percent cobbles; mildly alkaline (pH 7.4); gradual irregular boundary.

C1-52 to 56 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; neutral (pH 7.0); gradual irregular boundary.

C2-56 to 60 inches; pale brown (10YR 6/3) stony loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 15 percent stones and 10 percent cobbles; neutral (pH 7.0).

Typical Pedon Location

Map unit in which located: Aninto-Manila complex, 8 to 20 percent slopes

Location in survey area: About 2,100 feet east and 2,400 feet north of the southwest corner of sec. 28, T. 15 S., R. 23 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 19 inches

Depth to argillic horizon: 9 to 11 inches

Depth to secondary lime: 48 to more than 60 inches

Other characteristics: No C horizon in some pedons

Particle-size control section:

Content of clay-35 to 50 percent
Content of rock fragments-0 to 20 percent

A horizon:

Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-slightly acid or neutral

Bt horizon:

Hue-7.5YR or 10YR
Value-4 to 6 dry, 3 or 4 moist
Chroma-2 to 4
Texture-clay loam, clay, gravelly clay, cobbly clay loam, or very cobbly clay loam
Content of clay-30 to 55 percent
Content of rock fragments-average of 0 to 20 percent
Reaction-slightly acid to mildly alkaline

C horizon:

Value-5 to 7 dry, 4 to 6 moist
Chroma-3 or 4
Texture-loam, stony loam, very cobbly loam, or very stony loam
Content of rock fragments-5 to 45 percent
Reaction-neutral to moderately alkaline

McClenden Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Basalt plains in depressional areas.and on fan terraces
Parent material: Mixed alluvium and silty alluvium
Slope: 1 to 3 percent
Elevation: 4,250 to 5,400 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 135 days
Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Camborthids

Typical Pedon

Ap1-0 to 3 inches; pale brown (10YR 6/3) silt loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse platy structure parting to strong fine and medium granular; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular pores; mildly alkaline (pH 7.5); abrupt smooth boundary.

Ap2-3 to 9 inches; light yellowish brown (10YR 6/4) silt loam, dark brown (10YR 3/3) moist; strong very coarse prismatic structure parting to moderate medium and coarse subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

Bw-9 to 18 inches; light yellowish brown (10YR 6/4) silt loam, brown (10YR 4/3) moist; strong medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and few fine tubular pores; mildly alkaline (pH 7.7); clear smooth boundary.

Bk1-18 to 35 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; moderate very coarse platy structure; hard, friable; few very fine roots; many very fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); gradual wavy boundary.

Bk2-35 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; strongly effervescent (7 percent calcium carbonate equivalent); strongly alkaline (pH 8.6).

Typical Pedon Location

Map unit in which located: McClenden silt loam, 1 to 3 percent slopes

Location in survey area: About 300 feet west and 2,400 feet south of the northwest corner of sec. 22, T. 10 S., R. 25 E.

Range in Characteristics

Depth to lime: 12 to 24 inches

Depth to bedrock: 45 to more than 60 inches

Other characteristics: As much as 35 percent rock fragments below a depth of 50 inches in some pedons

Particle-size control section:
Content of clay-10 to 18 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-3 or 4 moist
Chroma-2 or 3
Texture-silt loam or loam
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 or 7 dry, 4 to 6 moist
Chroma-2 to 4
Texture-silt loam, loam, very fine sandy loam, or sandy loam
Content of rock fragments-0 to 15 percent pebbles
Reaction-moderately alkaline or strongly alkaline

Mellor Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Coalesced fan terraces, stream terraces
Parent material: Mixed alluvium
Slope: 0 to 6 percent
Elevation: 4,300 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 130 days
Taxonomic class: Fine-silty, mixed, mesic Xerollic Natrargids

Typical Pedon

A-0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate thick platy structure parting to weak fine and very fine granular; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine interstitial pores; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

BA-3 to 6 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine roots; many very fine tubular pores; few thin clay films on faces of peds; slightly effervescent; moderately alkaline (pH 8.4); clear irregular boundary.

Btn1-6 to 9 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure parting to strong medium and fine angular blocky; hard, friable, sticky and plastic; many very fine roots; common very fine tubular pores; many thin clay films on faces of peds and lining pores; slightly effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Btn2-9 to 12 inches; very pale brown (10YR 7/3) silty clay loam, yellowish brown (10YR 5/4) moist; strong medium and fine subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common very fine tubular pores; many thin clay films on faces of peds and lining pores; strongly

effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary.

Btkn-12 to 17 inches; white (10YR 8/2) silty clay loam, pale brown (10YR 6/3) moist; strong fine angular blocky structure; hard, very friable, sticky and plastic; few very fine roots; many very fine tubular pores; common thin clay films on faces of peds and lining pores; violently effervescent; common fine and medium irregularly shaped soft masses of lime; moderately alkaline (pH 8.2); clear wavy boundary.

Bk-17 to 29 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; violently effervescent; few fine irregularly shaped soft masses of lime; moderately alkaline (pH 8.4); clear wavy boundary.

2Bkz1-29 to 42 inches; very pale brown (10YR 7/3) loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; violently effervescent; few fine irregularly shaped *soft* masses of salt; moderately alkaline (pH 8.3); clear wavy boundary.

2Bkz2-42 to 60 inches; white (10YR 8/2) loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable; few very fine roots; many very fine tubular pores; violently effervescent; few fine irregularly shaped soft masses of salt; strongly alkaline (pH 8.8).

Typical Pedon Location

Map unit in which located: Mellor silt loam, 2 to 4 percent slopes

Location in survey area: About 350 feet west and 100 feet north of the southeast corner of sec. 19, T. 16 S., R. 28 E.

Range in Characteristics

Depth to the natric horizon: 3 to 5 inches

Particle-size control section:
Content of clay-27 to 35 percent

A horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Content of gravel-0 to 5 percent
Reaction-moderately alkaline or strongly alkaline

Bt horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 to 4
Texture-silty clay loam
Content of gravel-0 to 5 percent
Sodium absorption ratio-generally 30 to 45, ranges to 65
Reaction-moderately alkaline or very strongly alkaline

Bk horizon:
Value-7 or 8 dry, 5 or 6 moist
Chroma-2 to 4
Texture-silt loam, loam, or sandy loam
Content of gravel-0 to 15 percent
Reaction-moderately alkaline or strongly alkaline

Middlehill Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides
Parent material: Alluvium and residuum of mica schist and quartzite
Slope: 20 to 55 percent
Elevation: 6,700 to 8,400 feet
Average annual precipitation: 14 to 20 inches
Average annual air temperature: 38 to 42 degrees F
Frost-free period: Less than 60 days
Taxonomic class: Loamy-skeletal, mixed Typic Cryoborolls

Typical Pedon

A-0 to 3 inches; brown (10YR 5/3) extremely stony sandy loam, dark brown (10YR 3/3) moist; strong fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 40 percent stones on the surface and 35 percent stones, 15 percent cobbles, and 30 percent gravel below; neutral (pH 7.2); abrupt smooth boundary.

AB-3 to 9 inches; brown (10YR 5/3) extremely stony loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 40 percent stones, 10 percent cobbles, and 30 percent gravel; mildly alkaline (pH 7.4); clear wavy boundary.

Bw-9 to 16 inches; yellowish brown (10YR 5/4) extremely cobbly sandy loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine and few fine roots; many very fine tubular pores; 15 percent stones, 30 percent cobbles, and 25 percent gravel; mildly alkaline (pH 7.6); abrupt wavy boundary.

Ck-16 to 24 inches; yellowish brown (10YR 5/4) extremely stony loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable; few very fine roots; many very fine tubular pores; slightly effervescent; coatings of violently effervescent lime on 50 to 75 percent of the underside of rock fragments; 60 percent stones, 15 percent cobbles, and 10 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.

R-24 inches; unweathered, slightly fractured quartzite that has many strongly effervescent coatings of lime.

Typical Pedon Location

Map unit in which located: Povey-Middlehill complex, 20 to 55 percent slopes

Location in survey area: 2,550 feet north and 1,650 feet west of the southeast corner of sec. 25, T. 15 S., R. 22 E.

Range in Characteristics

Thickness of mollic epipedon: 7 to 15 inches

Depth to bedrock: 20 to 40 inches

Depth to secondary lime: 11 to 36 inches

Average annual soil temperature: 40 to 44 degrees F

A horizon:

Value-4 or 5 dry, 2 or 3 moist

Chroma-2 or 3

Reaction-neutral or mildly alkaline

Bw horizon:

Value-5 or 6 dry, 3 or 4 moist

Chroma-2 to 4

Texture-very cobbly sandy loam, very cobbly coarse sandy loam, extremely cobbly sandy loam, very stony loam, extremely stony sandy loam, extremely gravelly sandy loam, or very gravelly loam

Content of clay-5 to 18 percent

Content of rock fragments greater than 3 inches25 to 45 percent

Content of gravel-25 to 35 percent

Reaction-neutral or mildly alkaline

Ck horizon:

Value-5 to 7 dry, 4 to 6 moist

Chroma-3 or 4

Texture-extremely stony loamy coarse sand, extremely stony sandy loam, very cobbly coarse sandy loam, very cobbly sandy loam, or extremely gravelly sandy loam

Content of rock fragments greater than 3 inches30 to 75 percent

Content of gravel-10 to 35 percent

Nibbs Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Position on landscape: Coalesced fan terraces

Parent material: Mixed alluvium

Slope: 2 to 8 percent

Elevation: 4,800 to 5,500 feet

Average annual precipitation: 8 to 12 inches

Average annual air temperature: 45 to 47 degrees F

Frost-free period: 95 to 115 days

Taxonomic class: Loamy-skeletal, mixed, mesic Xerollic Camborthids

Typical Pedon

A1-0 to 2 inches; pale brown (10YR 6/3) gravelly silt loam, very dark grayish brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; 30 percent gravel; mildly alkaline (pH 7.8); abrupt smooth boundary.

A2-2 to 7 inches; pale brown (10YR 6/3) gravelly silt loam, very dark grayish brown (10YR 3/3) moist; weak very thick platy structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and plastic; many very fine and few fine roots; many very fine tubular pores; 20 percent gravel; mildly alkaline (pH 7.8); abrupt smooth boundary.

Bw1-7 to 12 inches; very pale brown (10YR 7/3) gravelly silt loam, dark brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; hard, very friable, slightly sticky and plastic; few very fine and fine roots; many very fine tubular pores; 5 percent cobbles and 10 percent gravel; mildly alkaline (pH 7.8); abrupt wavy boundary.

Bw2-12 to 18 inches; very pale brown (10YR 7/3) gravelly silt loam, dark brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; few very fine roots; many very fine and few fine tubular pores; slightly effervescent; 20 percent gravel; moderately alkaline (pH 8.4); clear wavy boundary.

2Bk1-18 to 31 inches; very pale brown (10YR 8/3) very gravelly loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; hard, very friable, sticky and plastic; few very fine roots; many very fine and few fine tubular pores; strongly effervescent; many fine and medium irregularly shaped soft seams and masses of lime; 5 percent cobbles and 45 percent gravel; rock fragments

coated with lime on all sides; strongly alkaline (pH 9.0); clear wavy boundary.

2Bk2-31 to 41 inches; very pale brown (10YR 8/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable; few very fine roots; many very fine and few fine tubular pores; strongly effervescent; common fine and medium irregularly shaped soft seams and masses of lime; 10 percent cobbles and 60 percent gravel; rock fragments coated with lime on all sides; strongly alkaline (pH 9.0); clear wavy boundary.

3C-41 to 60 inches; multicolored, stratified very gravelly sandy loam and extremely gravelly coarse sand; single grained; loose; few very fine roots; many very fine irregular pores; 5 percent stones, 15 percent cobbles, and 60 percent gravel; rock fragments coated with lime on the underside; strongly alkaline (pH 8.6).

Typical Pedon Location

Map unit in which located: Nibbs gravelly silt loam, 2 to 8 percent slopes

Location in survey area: About 1,650 feet west and 100 feet north of the southeast corner of sec. 5, T. 14 S., R. 26 E.

Range in Characteristics

Depth to first discontinuity: 10 to 21 inches
Depth to stratified sand and gravel: 21 to 41 inches
Depth to secondary lime: 10 to 15 inches

Particle-size control section:
Content of rock fragments-40 to 75 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-6 or 7 dry, 3 or 4 moist
Texture-gravelly silt loam, gravelly loam, or loam
Content of clay-15 to 25 percent
Reaction-mildly alkaline to strongly alkaline

2Bk horizon:
Value-7 or 8 dry, 4 to 7 moist
Chroma-3 or 4
Texture-very gravelly loam, very gravelly sandy loam, or extremely gravelly sandy loam
Content of rock fragments-40 to 75 percent
Reaction-moderately alkaline or strongly alkaline

3C horizon:
Texture-stratified very gravelly sandy loam, extremely gravelly sandy loam, extremely cobbly sandy loam, extremely gravelly loamy sand, extremely cobbly loamy sand, or extremely gravelly coarse sand
Content of rock fragments-45 to 75 percent
Reaction-moderately alkaline or strongly alkaline

Ola Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Pediments, hillsides, mountainsides
Parent material: Alluvium and residuum of granodiorite
Slope: 6 to 55 percent
Elevation: 6,200 to 6,700 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 42 to 43 degrees F
Frost-free period: 70 to 85 days
Taxonomic class: Coarse-loamy, mixed, frigid Pachic Haploxerolls

Typical Pedon

A-0 to 6 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark gray (10YR 3/1) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine irregular pores; 5 percent gravel; slightly acid (pH 6.4); clear smooth boundary.

AB-6 to 16 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and few fine tubular pores; slightly acid (pH 6.4); distinct smooth boundary.

Bw-16 to 22 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and few fine tubular pores; 10 percent gravel; slightly acid (pH 6.5); distinct smooth boundary.

C-22 to 30 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 20 percent gravel; neutral (pH 6.8); clear *wavy* boundary.

Cr-30 inches; decomposing granodiorite.

Typical Pedon Location

Map unit in which located: Rock outcrop-Ola complex, 35 to 55 percent slopes

Location in survey area: About 3,460 feet north and 2,500 feet east of the southwest corner of sec. 18, T. 15 S., R. 24 E.

Range in Characteristics

Thickness of mollic epipedon: 22 to 35 inches

Particle-size control section:
Content of gravel-0 to 25 percent
Content of clay-10 to 15 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 to 3
Reaction-slightly acid or neutral

Bw horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Texture-sandy loam, coarse sandy loam, or gravelly coarse sandy loam
Content of gravel-0 to 25 percent

C horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Texture-sandy loam, coarse sandy loam, or gravelly coarse sandy loam
Content of gravel-5 to 25 percent

Pachic Cryoborolls

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate or moderately slow
Position on landscape: Mountainsides
Parent material: Mixed alluvium
Slope: 15 to 45 percent
Elevation: 7,000 to 8,100 feet
Average annual precipitation: 16 to 20 inches
Average annual air temperature: 36 to 39 degrees F
Frost-free period: Less than 60 days

Representative Pedon

A-0 to 3 inches; dark brown (10YR 3/3) stony loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, slightly sticky and plastic; many very fine and few fine roots; many very fine irregular and few fine tubular pores; 15 percent stones, 5 percent cobbles, and 10 percent gravel; neutral (pH 7.3); abrupt smooth boundary.

AB-3 to 13 inches; dark brown (10YR 4/3) gravelly loam, very dark brown (10YR 2/2) moist; moderate coarse subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky and plastic; common very fine and few fine roots; many very fine, few fine, and few medium tubular pores; 5 percent cobbles and 10 percent gravel; neutral (pH 6.8); gradual smooth boundary.

BA-13 to 24 inches; dark brown (10YR 4/3) very gravelly clay loam, very dark brown (10YR 2/2) moist; strong medium and coarse subangular blocky structure; soft, very friable, sticky and plastic; many large and medium and common very fine and fine tubular pores; 5 percent cobbles and 30 percent gravel; neutral (pH 7.3); clear wavy boundary.

Bw1-24 to 31 inches; pale brown (10YR 6/3) extremely cobbly loam, dark brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; many large and common very fine and fine roots; many very fine and large and few fine and medium tubular pores; 25 percent stones, 35 percent cobbles, and 25 percent gravel; neutral (pH 7.0); gradual wavy boundary.

Bw2-31 to 45 inches; light yellowish brown (10YR 6/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure parting to moderate coarse subangular blocky; hard, friable, slightly sticky and plastic; many medium and few fine and very fine roots; many very fine and large and few fine and medium tubular pores; 20 percent stones, 35 percent cobbles, and 15 percent gravel; neutral (pH 7.2); gradual wavy boundary.

Bw3-45 to 60 inches; light yellowish brown (10YR 6/4) extremely stony clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse prismatic structure parting to moderate coarse subangular blocky; hard, friable, sticky and plastic; common very fine roots; many very fine and common fine tubular pores; 25 percent stones, 15 percent cobbles, and 25 percent gravel; neutral (pH 7.3).

Representative Pedon Location

Map unit in which located: Pachic Cryoborolls, 15 to 45 percent slopes

Location in survey area: About 1,700 feet east and 1,350 feet south of the northwest corner of sec. 2, T. 16 S., R. 22 E.

Range in Characteristics

Thickness of mollic epipedon: 24 to 30 inches

Particle-size control section:
Content of clay-l0 to 35 percent
Content of rock fragments-45 to 75 percent

A horizon:
Value-3 or 4 dry, 2 or 3 moist
Chroma-1 to 3

B horizon:
Value-4 to 6 dry, 3 or 4 moist
Chroma-2 to 4

Content of clay-10 to 35 percent
Content of rock fragments-45 to 75 percent

Paulville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Depressional areas on basalt plains
Parent material: Mixed alluvium that has some loess
Slope: 0 to 4 percent
Elevation: 4,200 to 4,400 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 48 to 49 degrees F
Frost-free period: 130 to 135 days
Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

A1-0 to 2 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine irregular pores; mildly alkaline (pH 7.7); clear smooth boundary.

A2-2 to 6 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; mildly alkaline (pH 7.7); clear smooth boundary.

AB-6 to 12 inches; light yellowish brown (10YR 6/4) silt loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine and few fine tubular pores; mildly alkaline (pH 7.7); clear smooth boundary.

Bt-12 to 26 inches; light yellowish brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common very fine tubular pores; common thin clay films on faces of peds and lining pores; mildly alkaline (pH 7.8); clear smooth boundary.

Bk1-26 to 36 inches; light yellowish brown (10YR 6/4) silt loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; strongly effervescent; mildly alkaline (pH 7.8); gradual smooth boundary.

Bk2-36 to 44 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.1); clear wavy boundary.

Bk3-44 to 60 inches; very pale brown (10YR 7/4) silt loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.1).

Typical Pedon Location

Map unit in which located: Trevino-Paulville complex, 0 to 8 percent slopes
Location in survey area: About 1,600 feet west and 100 feet south of the northeast corner of sec. 14, T. 10 S., R. 26 E.

Range in Characteristics

Depth to secondary lime: 15 to 26 inches
Depth to argillic horizon: 6 to 12 inches
Particle-size control section:
Texture-silt loam, silty clay loam, or clay loam
Content of clay-25 to 30 percent
A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-3 or 4
Bt horizon:
Value-3 or 4 moist
Texture-silt loam, silty clay loam, or clay loam
Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-3 or 4
Texture-silt loam or loam
Calcium carbonate equivalent-15 to 25 percent

Pavohroo Series

Depth class: Deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Mountainsides
Parent material: Silty alluvium over residuum of limestone and shale
Slope: 35 to 50 percent
Elevation: 5,500 to 7,000 feet
Average annual precipitation: 20 to 24 inches
Average annual air temperature: 39 to 42 degrees F
Frost-free period: 50 to 65 days
Taxonomic class: Fine-loamy, mixed Pachic Cryoborolls

Typical Pedon

Oa-2 inches to 0; partially decomposed conifer needles, leaves, and grass.

A1-0 to 10 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; common fine tubular pores; one very coarse root channel filled with partially decomposed conifer needles, leaves, and grass; neutral (pH 6.8); clear smooth boundary.

A2-10 to 14 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and common fine roots; common fine tubular pores; very few very coarse root channels filled with partially decomposed conifer needles, leaves, and grass; neutral (pH 7.0); clear wavy boundary.

AB-14 to 24 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common fine tubular pores; neutral (pH 7.2); gradual smooth boundary.

Bw1-24 to 33 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common fine tubular pores; 15 percent cobbles and 15 percent gravel; neutral (pH 7.2); gradual smooth boundary.

Bw2-33 to 42 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong fine and medium subangular blocky structure; hard, friable, very sticky and very plastic; few fine roots; common very fine and fine tubular pores; 15 percent gravel; neutral (pH 7.2); gradual smooth boundary.

C-42 to 52 inches; light yellowish brown (10YR 6/4) gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; slightly effervescent; 30 percent gravel; neutral (pH 7.2); abrupt wavy boundary.

R-52 inches; highly fractured limestone.

Typical Pedon Location

Map unit in which located: Ireland-Pavohroo association, 35 to 50 percent slopes

Location in survey area: About 2,550 feet east and 350 feet north of the southwest corner of sec. 1, T. 11 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 20 to 30 inches

Depth to bedrock: 40 to 60 inches

Depth to secondary lime: 40 to 60 inches

Other characteristics: No C horizon in some pedons

Particle-size control section:

Content of clay-18 to 30 percent

Content of rock fragments-5 to 35 percent

A horizon:

Value-4 or 5 dry, 2 or 3 moist

Chroma-1 to 3

Bw horizon:

Value-5 or 6 dry, 3 or 4 moist

Chroma-2 to 4

Texture-silt loam, gravelly silt loam, loam, gravelly loam, clay loam, or gravelly clay loam

C horizon:

Effervescence-slight to violent

Pocatello Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Position on landscape: Basalt plains, fan terraces, south-facing hillsides and sides of drainageways

Parent material: Loess and silty alluvium

Slope: 0 to 45 percent

Elevation: 4,200 to 5,000 feet

Average annual precipitation: 8 to 12 inches

Average annual air temperature: 46 to 48 degrees F

Frost-free period: 120 to 135 days

Taxonomic class: Coarse-silty, mixed (calcareous), mesic Xeric Torriorthents

Typical Pedon

Ap-0 to 5 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate very fine platy structure parting to weak *very* fine granular; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many *very* fine irregular pores; strongly effervescent; moderately alkaline (pH 8.3); abrupt smooth boundary.

Bk1-5 to 10 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure; hard, friable, nonsticky and nonplastic; common very fine and fine roots; many very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.5); gradual smooth boundary.

Bk2-10 to 27 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very

friable, nonsticky and nonplastic; common very fine, fine, and medium roots; many very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.5); clear smooth boundary.

Bk3-27 to 50 inches; light brownish gray (10YR 6/2) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

C-50 to 60 inches; light brownish gray (10YR 6/2) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; strongly effervescent; mildly alkaline (pH 7.8).

Typical Pedon Location

Map unit in which located: Pocatello silt loam, 0 to 1 percent slopes

Location in survey area: About 1,550 feet north and 1,450 feet west of the southeast corner of sec. 26, T. 10 S., R. 27 E.

Range in Characteristics

Depth to secondary lime: 5 to 9 inches

Calcium carbonate equivalent: 8 to 15 percent

Particle-size control section:
Content of clay-8 to 15 percent

Ap horizon:
Value-6 or 7 dry, 3 to 5 moist
Chroma-2 or 3
Effervescence-slight or moderate
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-1 to 3
Reaction-moderately alkaline to very strongly alkaline

C horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 to 4
Texture-silt or silt loam
Reaction-moderately alkaline to very strongly alkaline

Poisonhol Series

Depth class: Moderately deep (to a duripan)

Drainage class: Well drained

Permeability: Moderate

Position on landscape: Coalesced fan terraces, hillsides

Parent material: Mixed alluvium

Slope: 1 to 15 percent

Elevation: 5,300 to 5,800 feet

Average annual precipitation: 12 to 16 inches

Average annual air temperature: 43 to 45 degrees F

Frost-free period: 80 to 95 days

Taxonomic class: Loamy-skeletal, mixed, frigid Haplic Durixerolls

Typical Pedon

A-0 to 2 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak very coarse platy structure parting to moderate very fine and fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; 50 percent stones on the surface and 10 percent gravel below; moderately alkaline (pH 8.0); abrupt smooth boundary.

AB-2 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse platy structure parting to moderate very fine and fine subangular blocky; slightly hard, very friable, slightly sticky and plastic; common very fine and few fine roots; many very fine tubular pores; moderately alkaline (pH 8.0); clear smooth boundary.

Bw-5 to 12 inches; grayish brown (10YR 5/2) very cobbly clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; many very fine tubular pores; 10 percent durinodes; 5 percent stones, 25 percent cobbles, and 20 percent gravel; moderately alkaline (pH 8.0); clear wavy boundary.

Bk1-12 to 21 inches; very pale brown (10YR 7/3) very stony loam, light yellowish brown (10YR 6/4) moist; moderate coarse platy structure parting to strong fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; strongly effervescent; 35 percent stones, 10 percent cobbles, and 15 percent gravel; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2-21 to 31 inches; very pale brown (10YR 8/3) very stony loam, light yellowish brown (10YR 6/4) moist; strong medium and coarse platy structure; slightly hard, friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; violently effervescent; 30 percent stones, 15 percent cobbles, and 15 percent gravel; rock fragments coated with lime on all sides; moderately alkaline (pH 8.3); abrupt wavy boundary.

2Bkqm-31 inches; white (10YR 8/2), silica indurated hardpan, light brown (7.5YR 6/4) moist; strong very coarse and coarse platy structure; extremely hard;

extremely firm; violently effervescent; 30 percent stones, 20 percent cobbles, and 20 percent gravel in the upper 5 inches; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Poisonhol very stony loam, 2 to 8 percent slopes

Location in survey area: About 2,200 feet east and 1,600 feet north of the southwest corner of sec. 12, T. 15 S., R. 24 E.

Range in Characteristics

Thickness of mollic epipedon: 11 to 15 inches

Depth to hardpan: 30 to 39 inches

Depth to secondary lime: 7 to 12 inches

Average soil temperature throughout the profile: 45 to 46 degrees F

Other characteristics: Loamy or sandy soil material below the hardpan in some pedons; generally more than 35 percent coarse fragments in duripan

Particle-size control section:
Content of rock fragments-45 to 80 percent
Content of clay-10 to 25 percent

A horizon:
Value-2 or 3 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Chroma-2 or 3
Texture-very cobbly clay loam, very gravelly clay loam, very cobbly loam, or very gravelly loam
Content of clay-25 to 32 percent
Content of rock fragments-45 to 60 percent
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 to 8 dry, 5 or 6 moist
Chroma-2 to 4
Texture-very stony loam, very cobbly loam, very gravelly loam, very cobbly clay loam, extremely stony loam, or extremely cobbly loam
Content of clay-average of 10 to 18 percent
Content of rock fragments-45 to 80 percent
Reaction-moderately alkaline or strongly alkaline

2Bkqm horizon:
Hue-10YR or 7.5YR
Value-7 or 8 dry, 4 to 6 moist
Chroma-2 to 4
Cementation-continuously indurated

Portneuf Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderately slow

Position on landscape: Fan terraces, basalt plains

Parent material: Loess and silty alluvium (fig. 8)

Slope: 0 to 4 percent

Elevation: 4,300 to 4,800 feet

Average annual precipitation: 8 to 12 inches

Average annual air temperature: 46 to 48 degrees F

Frost-free period: 120 to 135 days

Taxonomic class: Coarse-silty, mixed, mesic Durixerollic Calciorthids

Typical Pedon

A-0 to 2 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; common very fine irregular pores; slightly effervescent; mildly alkaline (pH 7.8); abrupt smooth boundary.

Bw-2 to 10 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; common very fine tubular pores; 2 percent nodules; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

Bkq1-10 to 17 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine tubular pores; 20 percent durinodes; violently effervescent; moderately alkaline (pH 8.4); abrupt smooth boundary.

Bkq2-17 to 24 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; *soft,* very friable, nonsticky and nonplastic; few fine roots; few very fine tubular pores; 10 percent durinodes; violently effervescent; strongly alkaline (pH 9.0); clear smooth boundary.

Bk-24 to 36 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine and very fine roots; few very fine tubular pores; 10 percent nodules; strongly effervescent; strongly alkaline (pH 9.0); clear smooth boundary.

C1-36 to 55 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; 5 percent nodules; strongly effervescent; strongly alkaline (pH 8.8); clear smooth boundary.

C2-55 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; slightly effervescent; moderately alkaline (pH 8.4).

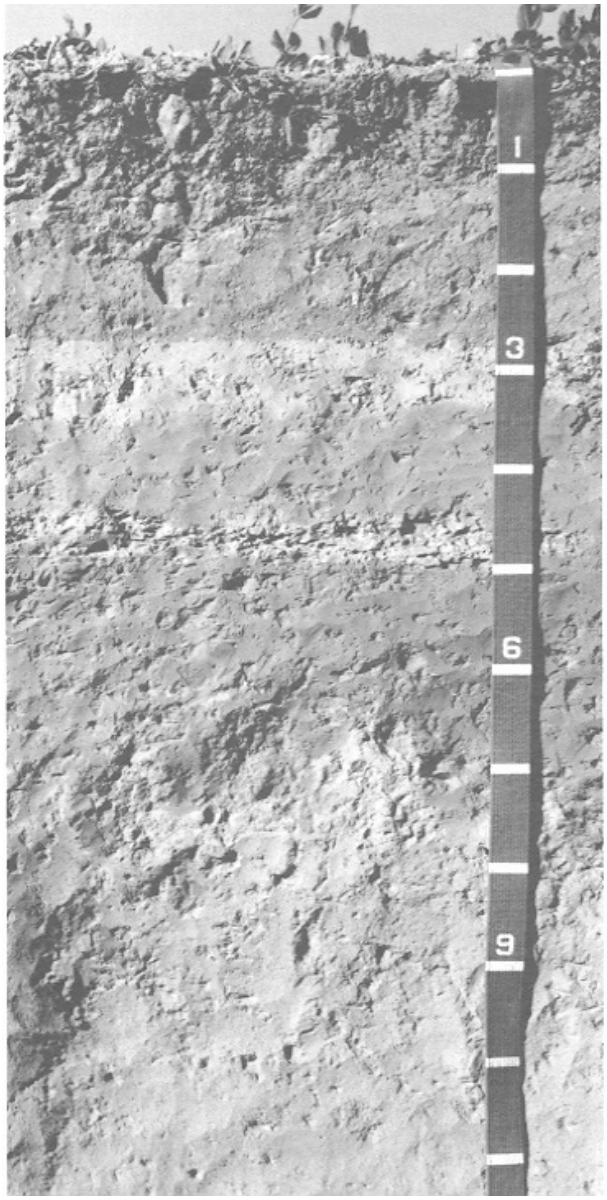

Figure 8.-Profile of Portneuf silt loam, which formed In loess and silty alluvium. The plow layer extends to a depth of about 3 decimeters (12 Inches). A layer having more than 20 percent durinodes is between depths of about 4 decimeters (16 inches) and 7 decimeters (28 Inches). Depth is marked in decimeters.

Typical Pedon Location

Map unit in which located: Bahem-Portneuf complex, 0 to 1 percent slopes
Location in survey area: About 1,550 feet south and 2,750 feet west of the northeast corner of sec. 31, T. 10 S., R. 27 E.

Range in Characteristics

Depth to calcic horizon: 7 to 15 inches
Thickness of calcic horizon: 15 to 30 inches

Particle-size control section:
Content of clay-5 to 15 percent

A horizon:
Value-3 or 4 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-6 or 7 dry, 4 or 5 moist
Effervescence-moderate or strong
Reaction-moderately alkaline or strongly alkaline

Bkq horizon:
Value-6 or 7 dry, 4 to 6 moist
Chroma-2 or 3
Calcium carbonate equivalent-15 to 25 percent
Content of durinodes-10 to 20 percent
Reaction-moderately alkaline or strongly alkaline

C horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Calcium carbonate equivalent-5 to 10 percent
Reaction-moderately alkaline or strongly alkaline

Povey Series

Depth class: Deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides
Parent material: Mixed alluvium
Slope: 15 to 60 percent
Elevation: 6,500 to 8,400 feet
Average annual precipitation: 16 to 18 inches
Average annual air temperature: 38 to 42 degrees F
Frost-free period: Less than 70 days
Taxonomic class: Loamy-skeletal, mixed Pachic Cryoborolls

Typical Pedon

A1-0 to 4 inches; dark brown (10YR 3/3) very gravelly loam, black (10YR 2/1) moist; weak very fine

granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; 5 percent stones, 5 percent cobbles, and 45 percent gravel; neutral (pH 7.0); clear wavy boundary.

A2-4 to 15 inches; dark brown (10YR 4/3) extremely cobbly loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium, and few coarse roots; many very fine and fine and few medium tubular pores; 50 percent cobbles and stones and 20 percent gravel; neutral (pH 7.2); clear *wavy* boundary.

Bw1-15 to 22 inches; dark brown (10YR 4/3) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine tubular pores; 10 percent stones, 10 percent cobbles, and 60 percent gravel; neutral (pH 7.3); clear wavy boundary.

Bw2-22 to 45 inches; yellowish brown (10YR 5/4) extremely gravelly loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine and medium roots; many very fine and common fine tubular pores; 10 percent stones, 10 percent cobbles, and 70 percent gravel; mildly alkaline (pH 7.4); abrupt wavy boundary.

R-45 inches; unweathered quartz latite.

Typical Pedon Location

Map unit in which located: Povey-Povey, dry complex, 35 to 60 percent slopes

Location in survey area: About 100 feet west and 600 feet south of the northeast corner of sec. 14, T. 14 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 20 to 35 inches

Depth to bedrock: 40 to 60 inches

Particle-size control section:

Content of clay-10 to 20 percent
Content of rock fragments-45 to 75 percent

A horizon:

Value-3 or 4 dry, 2 or 3 moist
Chroma-1 to 3
Content of rock fragments-35 to 75 percent
Reaction-slightly acid or neutral

Bw horizon:

Value-4 or 5 dry, 3 or 4 moist
Chroma-2 to 4
Content of rock fragments-55 to 75 percent
Reaction-neutral or mildly alkaline

Quincy Series

Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Position on landscape: Lake terraces, lake terrace breaks
Parent material: Mixed sandy alluvium
Slope: 5 to 15 percent
Elevation: 4,900 to 5,100 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Mixed, mesic Xeric Torripsamments

Typical Pedon

A-0 to 5 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine irregular pores; mildly alkaline (pH 7.4); abrupt smooth boundary.

C1-5 to 25 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

C2-25 to 60 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grained; loose; few very fine roots; many very fine irregular pores; strongly effervescent; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Turbyfill-Quincy complex, 5 to 15 percent slopes

Location in survey area: About 2,110 feet west and 900 feet north of the southeast corner of sec. 27, T. 16 S., R. 29 E.

Range in Characteristics

Particle-size control section:

Content of rock fragments-0 to 15 percent
Content of clay-0 to 10 percent

A horizon:

Value-5 or 6 dry, 3 or 4 moist
Content of clay-8 to 15 percent
Content of rock fragments-0 to 10 percent
Reaction-mildly alkaline or moderately alkaline

C horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-3 or 4
Texture-loamy sand or sand
Content of rock fragments-0 to 15 percent
Reaction-mildly alkaline or moderately alkaline

Taxadjunct Features

The Quincy soils in this survey area are outside the range for the series because they have a surface layer of sandy loam 5 to 10 inches thick, generally have lime above a depth of 15 inches, are at elevations that are about 600 feet higher than typical, have values that range to 7 dry and 5 moist, and have chromas that range to 4, dry or moist. These differences, however, do not significantly affect use and management.

Raftriver Series

Depth class: Moderately deep (to a duripan)
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Coalesced fan terraces
Parent material: Mixed alluvium that has some loess
Slope: 2 to 4 percent
Elevation: 5,800 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 43 degrees F
Frost-free period: 85 to 95 days
Taxonomic class: Coarse-loamy, mixed, frigid Haploxerollic Durorthids

Typical Pedon

A-0 to 4 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; strong very coarse platy structure parting to strong very fine and fine granular; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many *very* fine and few fine vesicular pores; about 2 percent cobbles and 10 percent gravel on the surface and about 10 percent gravel below; mildly alkaline (pH 7.5); . abrupt smooth boundary.

Bw-4 to 8 inches; pale brown (10YR 6/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 10 percent gravel; mildly alkaline (pH 7.7); clear smooth boundary.

Bk1-8 to 13 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and few fine tubular pores; strongly effervescent (about 5 percent calcium carbonate equivalent); 10 percent gravel; moderately alkaline (pH 8.2); gradual smooth boundary.

Bk2-13 to 23 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and few fine tubular pores; violently effervescent (20 percent calcium carbonate equivalent); many fine irregularly shaped soft seams and filaments of lime; moderately alkaline (pH 8.2); clear wavy boundary.

2Bkq-23 to 29 inches; very pale brown (10YR 7/3) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak very coarse platy structure; hard, friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; violently effervescent (27 percent calcium carbonate equivalent); 35 percent gravel and 15 percent gravel-sized duripan fragments; rock fragments coated with lime on all sides; moderately alkaline (pH 8.2); abrupt smooth boundary.

2Bkqm-29 inches; pink (7.5YR 7/4), silica indurated hardpan, brown (7.5YR 5/4) moist; strong very coarse platy structure; extremely hard; extremely firm; few very fine roots between plates; violently effervescent.

Typical Pedon Location

Map unit in which located: Raftriver loam, 2 to 4 percent slopes
Location in survey area: About 530 feet west along the section line of the southeast corner of sec. 32, T. 16 S., R. 23 E.

Range in Characteristics

Depth to hardpan: 21 to 38 inches
Depth to secondary lime: 8 to 12 inches
Other characteristics: Loamy or sandy soil material below the hardpan in some pedons

Particle-size control section:
Calcium carbonate equivalent-20 to 32 percent
Content of clay-12 to 18 percent

A horizon:
Chroma-2 or 3
Content of clay-15 to 20 percent
Content of rock fragments-5 to 15 percent

Bw horizon:
Chroma-2 or 3
Texture-silt loam or loam
Content of clay-12 to 18 percent

Content of rock fragments-5 to 15 percent
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 or 7 dry, 4 to 6 moist
Chroma-2 to 4
Texture-loam or silt loam
Content of clay-12 to 18 percent
Content of rock fragments-5 to 15 percent
Calcium carbonate equivalent (average in calcic horizon)-20 to 33 percent

2Bk horizon:
Value-7 or 8 dry, 5 to 7 moist
Chroma-2 to 4
Texture-very gravelly sandy loam, very gravelly loam, or cobbly loam
Content of rock fragments-30 to 50 percent
Calcium carbonate equivalent-20 to 30 percent
Reaction-moderately alkaline or strongly alkaline

Taxadjunct Features

The Raftriver soils in this survey area have a duripan that is more developed than is typical for the series and generally have a very gravelly layer directly overlying the pan. These differences, however, do not significantly affect use and management.

Rexburg Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces, hillsides, mountainsides
Parent material: Loess and silty alluvium
Slope: 1 to 60 percent
Elevation: 4,600 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Coarse-silty, mixed, frigid Calcic Haploxerolls

Typical Pedon

Ap-0 to 5 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium irregular pores; mildly alkaline (pH 7.5); clear smooth boundary.

AB-5 to 10 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; many very fine and common fine tubular pores; mildly alkaline (pH 7.5); clear wavy boundary.

Bw1-10 to 15 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; many very fine, common fine, and few medium tubular pores; 10 percent nodules that are hard when dry and friable when moist; mildly alkaline (pH 7.5); abrupt smooth boundary.

Bw2-15 to 21 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium tubular pores; 10 percent nodules that are hard when dry and friable when moist; mildly alkaline (pH 7.8); abrupt smooth boundary.

Bk1-21 to 38 inches; white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine and fine and few medium tubular pores; 20 percent hard and friable nodules; violently effervescent (25 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); gradual smooth boundary.

Bk2-38 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky and nonplastic; strongly effervescent; 12 percent calcium carbonate equivalent; moderately alkaline (pH 8.1).

Typical Pedon Location

Map unit in which located: Rexburg silt loam, 1 to 3 percent slopes
Location in survey area: About 150 feet east and 1,500 feet north of the southwest corner of sec. 36, T. 11 S., R. 24 E.

Range in Characteristics

Thickness of mollic epipedon: 12 to 20 inches (fig. 9)
Depth to calcic horizon: 18 to 22 inches

Particle-size control section:
Content of clay-12 to 18 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3

Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-7 or 8 dry, 5 or 6 moist
Chroma-2 or 3
Calcium carbonate equivalent-15 to 30 percent

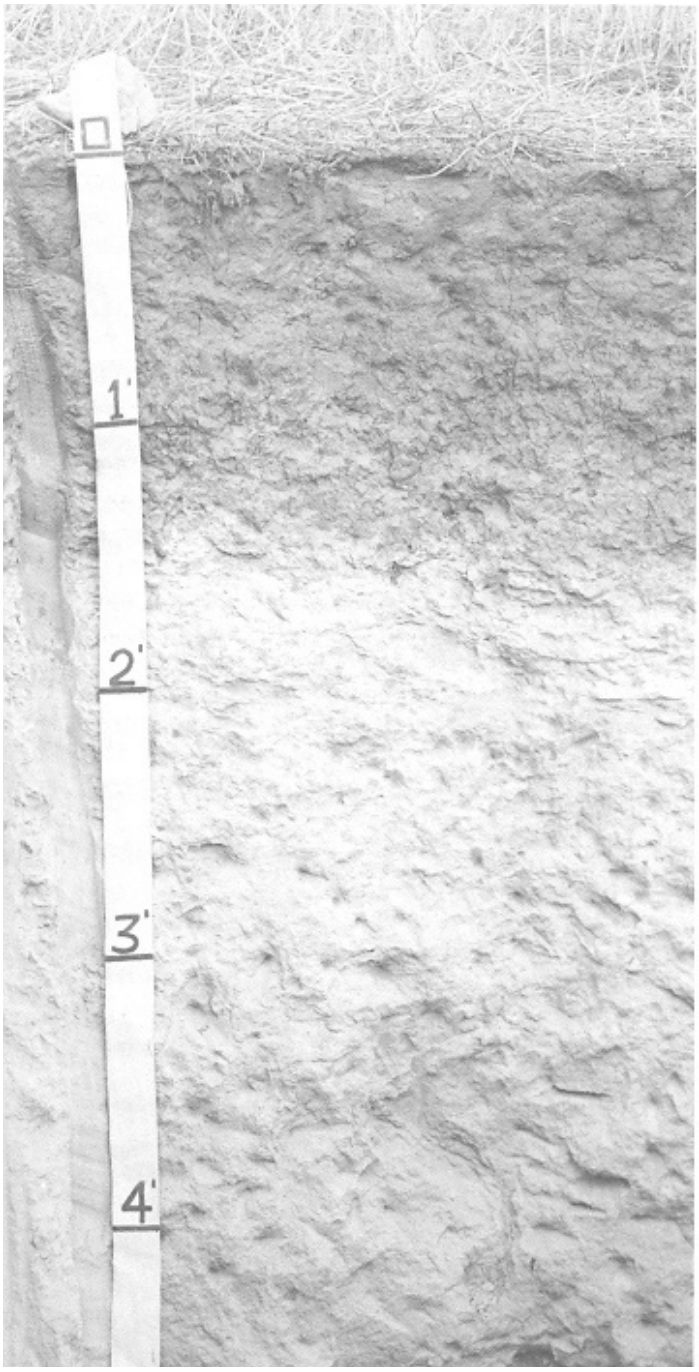

Figure 9.-Profile of Rexburg silt loam. The mollic epipedon extends to a depth of about 16 Inches. Depth is marked in feet.

Position on landscape: Hillsides, valleys
Parent material: Alluvium and residuum of granodiorite
Slope: 4 to 12 percent
Elevation: 6,000 to 6,500 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 41 to 43 degrees F
Frost-free period: 75 to 85 days
Taxonomic class: Coarse-loamy, mixed, frigid Pachic Ultic Haploxerolls

Typical Pedon

A1-0 to 4 inches; grayish brown (10YR 5/2) loamy coarse sand, very dark gray (10YR 3/1) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; slightly acid (pH 6.2); clear smooth boundary.

A2-4 to 7 inches; grayish brown (10YR 5/2) loamy coarse sand, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; neutral (pH 6.6); clear smooth boundary.

Bw1-7 to 14 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; mildly alkaline (pH 7.6); clear *wavy* boundary.

Bw2-14 to 23 inches; brown (10YR 5/3) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; hard, friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine tubular pores; mildly alkaline (pH 7.8); clear wavy boundary.

Bw3-23 to 33 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; 25 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

C-33 to 44 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; 15 percent gravel; mildly alkaline (pH 7.4); abrupt *wavy* boundary.

Ab-44 to 60 inches; brown (10YR 5/3) gravelly loamy coarse sand, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable,

Riceton Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid

nonsticky and nonplastic; few very fine roots; many very fine tubular pores; 15 percent gravel; mildly alkaline (pH 7.4).

Typical Pedon Location

Map unit in which located: Riceton loamy coarse sand, 4 to 12 percent slopes
Location in survey area: About 600 feet west and 2,320 feet south of the northeast corner of sec. 14, T. 16 S., R. 23 E.

Range in Characteristics

Thickness of mollic epipedon: 22 to 35 inches (mollic colors extend deeper but the content of organic carbon is too low to meet mollic requirements)
Base saturation: 75 to 80 percent
Particle-size control section:
Content of gravel-5 to 30 percent
Content of clay-10 to 15 percent
A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 or 2
Reaction-slightly acid or neutral
Bw horizon:
Chroma-2 or 3
Texture-coarse sandy loam or gravelly coarse sandy loam
Content of gravel-0 to 30 percent
C horizon:
Hue-10YR or 7.5YR
Value-5 or 6 dry, 3 or 4 moist
Chroma-3 or 4
Texture-gravelly coarse sandy loam, gravelly loamy coarse sand, or gravelly sandy loam
Content of gravel-15 to 30 percent

Taxadjunct Features

The Riceton soils in this survey area have a measured base saturation of 75 percent or more, which is outside the range for the series. This difference, however, does not significantly affect use and management.

Richmond Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides, ridges
Parent material: Residuum of limestone that has some loess
Slope: 15 to 50 percent
Elevation: 4,800 to 5,600 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 45 to 46 degrees F
Frost-free period: 95 to 105 days
Taxonomic class: Loamy-skeletal, carbonatic, mesic Lithic Xerorthents

Typical Pedon

A-0 to 4 inches; brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine irregular pores; strongly effervescent; about 40 percent limestone gravel on the surface and 20 percent below; moderately alkaline (pH 8.0); clear smooth boundary.
Bk1-4 to 9 inches; pale brown (10YR 6/3) very gravelly silt loam, brown (10YR 4/3) moist; weak medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and medium and few fine roots; many very fine tubular pores; strongly effervescent; 40 percent limestone gravel; moderately alkaline (pH 8.1); clear smooth boundary.
Bk2-9 to 18 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; violently effervescent (45 percent calcium carbonate equivalent); 5 percent limestone cobbles and 40 percent limestone gravel; moderately alkaline (pH 8.3); abrupt wavy boundary.
R-18 inches; slightly fractured limestone that has common thin coatings of lime.

Typical Pedon Location

Map unit in which located: Richmond-Rexburg association, 30 to 50 percent slopes
Location in survey area: About 2,600 feet east and 2,300 feet north of the southwest corner of sec. 3, T. 11 S., R. 28 E.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Depth to secondary lime: 3 to 7 inches
Content of rock fragments throughout the profile: 35 to 55 percent
A horizon:
Value-5 or 6 dry
Content of rock fragments-15 to 30 percent
Content of clay-10 to 15 percent
Reaction-mildly alkaline or moderately alkaline
Bk horizon:
Value-6 or 7 dry, 4 or 5 moist

Texture-very gravelly silt loam or very gravelly loam
Content of rock fragments-35 to 55 percent
Content of clay-10 to 18 percent
Calcium carbonate equivalent-40 to 50 percent
Reaction-mildly alkaline or moderately alkaline

Ricrest Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides, hillsides
Parent material: Mixed alluvium
Slope: 12 to 75 percent
Elevation: 5,200 to 6,100 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Fine-loamy, mixed, frigid Calcic Pachic Haploxerolls

Typical Pedon

A-0 to 11 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine irregular pores; 5 percent cobbles and 5 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.
Bw1-11 to 17 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common fine and very fine tubular pores; 15 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.
Bw2-17 to 26 inches; brown (10YR 5/3) gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; many fine and very fine tubular pores; 15 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.
Bk1-26 to 47 inches; very pale brown (10YR 7/4) gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; strongly effervescent; lime segregated into common fine irregularly shaped filaments and seams; 25 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.
Bk2-47 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; strongly effervescent; 10 percent cobbles and 50 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Searla-Ricrest complex, 30 to 75 percent slopes
Location in survey area: About 1,000 feet north and 1,000 feet west of the southeast corner of sec. 27, T. 14 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 20 to 30 inches

Particle-size control section:
Content of clay-18 to 27 percent

A horizon:
Value-3 or 4 dry, 2 or 3 moist
Chroma-1 or 2

Bw horizon:
Value-4 or 5 dry, 3 or 4 moist
Chroma-2 or 3
Texture-loam, gravelly loam, or gravelly sandy clay loam
Content of rock fragments-5 to 30 percent

Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-3 or 4
Texture-very cobbly loam, very cobbly sandy clay loam, gravelly loam, or very gravelly loam
Content of rock fragments-15 to 60 percent

Ririe Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Fan terraces, hillsides
Parent material: Loess and silty alluvium
Slope: 1 to 25 percent
Elevation: 4,500 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 85 to 95 days
Taxonomic class: Coarse-silty, mixed, frigid Calcic Haploxerolls

Typical Pedon

Ap-0 to 8 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak very thick platy structure parting to moderate medium and coarse subangular blocky; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular pores; neutral (pH 7.3); clear smooth boundary.

AB-8 to 12 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; slightly hard, very friable, slightly sticky and plastic; common very fine roots; many very fine and few fine tubular pores; strongly effervescent; mildly alkaline (pH 7.8); clear smooth boundary.

Bk1-12 to 23 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and few fine tubular pores; strongly effervescent; moderately alkaline (pH 8.1); gradual *wavy* boundary.

Bk2-23 to 32 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine, few fine, and common medium tubular pores; about 7 percent hard and friable nodules; strongly effervescent; moderately alkaline (pH 8.4); clear *wavy* boundary.

Bk3-32 to 45 inches; very pale brown (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; violently effervescent; strongly alkaline (pH 8.6); gradual wavy boundary.

C-45 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; about 5 percent nodules that are hard when dry and friable when moist; strongly effervescent; strongly alkaline (pH 8.9).

Typical Pedon Location

Map unit in which located: Ririe-Heglar association, 5 to 30 percent slopes

Location in survey area: About 600 feet west and 1,400 feet south of the northeast corner of sec. 22, T. 10 S., R. 28 E.

Range in Characteristics

Thickness of mollic epipedon: 7 to 16 inches

Depth to secondary lime: 7 to 16 inches

Particle-size control section:
Content of clay-12 to 18 percent

A horizon:
Value-4 or 5 dry
Chroma-2 or 3
Reaction-neutral or mildly alkaline

AB horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 or 7 dry, 3 to 6 moist
Chroma-2 or 3
Calcium carbonate equivalent-16 to 30 percent
Reaction-moderately alkaline or strongly alkaline

C horizon:
Value-6 or 7 dry, 4 to 6 moist
Chroma-2 or 3
Reaction-moderately alkaline or strongly alkaline .

Sandal! Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Hillsides, mountainsides
Parent material: Alluvium and residuum of limestone
Slope: 35 to 55 percent
Elevation: 4,800 to 6,200 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 90 to 115 days
Taxonomic class: Loamy-skeletal, carbonatic, mesic Xerollic Calciorthids

Typical Pedon

A-0 to 4 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; few very fine and fine interstitial pores; strongly effervescent; 35 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.

Bw-4 to 8 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; few very fine and fine tubular pores; violently effervescent (30 percent calcium carbonate equivalent); 10 percent cobbles and 40 percent gravel; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk1-8 to 16 inches; very pale brown (10YR 7/3)

gravelly loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few fine and very fine tubular pores; violently effervescent (50 percent calcium carbonate equivalent); 30 percent gravel; moderately alkaline (pH 8.4); clear irregular boundary.

Bk2-16 to 37 inches; very pale brown (10YR 7/4) extremely cobbly loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; few very fine and fine tubular pores; violently effervescent (60 percent calcium carbonate equivalent); 10 percent stones, 60 percent cobbles, and 10 percent gravel; strongly alkaline (pH 8.6); abrupt irregular boundary.

R-37 inches; fractured limestone.

Typical Pedon Location

Map unit in which located: Sandall very gravelly loam, 35 to 55 percent slopes

Location in survey area: About 1,700 feet east and 1,150 feet south of the northwest corner of sec. 4, T. 10 S., R. 28 E.

Range in Characteristics

Depth to bedrock: 20 to 40 inches

Particle-size control section:
- Content of clay-20 to 25 percent
- Content of rock fragments-40 to 70 percent
- Calcium carbonate equivalent-more than 40 percent

A horizon:
- Value-5 or 6 dry, 3 or 4 moist
- Chroma-2 or 3
- Content of rock fragments-35 to 50 percent

Bw horizon:
- Chroma-2 or 3
- Texture-cobbly loam, very cobbly loam, or very gravelly loam

Bk horizon:
- Value-6 to 8 dry, 4 to 7 moist
- Chroma-2 to 4
- Texture-very cobbly loam or extremely cobbly loam
- Reaction-moderately alkaline or strongly alkaline

Saxby Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Mountainsides, cuestas
Parent material: Residuum and alluvium of quartz latite that have some loess
Slope: 4 to 50 percent
Elevation: 5,000 to 5,700 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 46 degrees F
Frost-free period: 95 to 115 days
Taxonomic class: Loamy-skeletal, mixed, mesic Lithic Xerollic Calciorthids

Typical Pedon

A-0 to 6 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine irregular pores; strongly effervescent; 45 percent gravel; moderately alkaline (pH 7.9); clear smooth boundary.

Bw-6 to 13 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 4/3) moist; weak fine and very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine irregular pores; strongly effervescent; 45 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.

Bk-13 to 17 inches; very pale brown (10YR 7/3) extremely gravelly loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; violently effervescent; 70 percent gravel; strongly alkaline (pH 8.6); abrupt wavy boundary.

R-17 inches; quartz latite.

Typical Pedon Location

Map unit in which located: Saxby very gravelly loam, 30 to 50 percent slopes

Location in survey area: About 1,500 feet north and 2,350 feet east of the southwest corner of sec. 6, T. 16 S., R. 26 E.

Range in Characteristics

Depth to bedrock: 15 to 20 inches

Particle-size control section:
- Content of clay-10 to 18 percent
- Content of rock fragments-35 to 80 percent
- Calcium carbonate equivalent-15 to 30 percent

A horizon:
- Content of rock fragments-35 to 50 percent
- Reaction-mildly alkaline or moderately alkaline

Bw horizon:
- Value-6 or 7 dry, 4 or 5 moist
- Chroma-3 or 4
- Content of rock fragments-35 to 55 percent

Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Content of rock fragments-35 to 80 percent

Scoon Series

Depth class: Shallow (to a duripan)
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Basalt plains
Parent material: Mixed alluvium and eolian material
Slope: 1 to 4 percent
Elevation: 4,200 to 4,400 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 48 to 49 degrees F
Frost-free period: 130 to 135 days
Taxonomic class: Loamy, mixed, mesic, shallow Xerollic Durorthids

Typical Pedon

Ap-0 to 4 inches; light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium and fine subangular blocky structure parting to weak very fine granular; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial pores; slightly effervescent (1 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); abrupt smooth boundary.

Bw-4 to 14 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; strongly effervescent (8 percent calcium carbonate equivalent); 10 percent hardpan fragments; moderately alkaline (pH 8.0); abrupt wavy boundary.

Bk-14 to 18 inches; very pale brown (10YR 7/3) gravelly very fine sandy loam, brown (1 OYR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; violently effervescent (30 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); abrupt wavy boundary.

Bkgm-18 inches; indurated lime-silica hardpan.

Typical Pedon Location

Map unit in which located: Scoon very fine sandy loam, 1 to 4 percent slopes
Location in survey area: About 1,600 feet east and 1,050 feet south of the northwest corner of sec. 2, T. 10 S., R. 26 E.

Range in Characteristics

Depth to hardpan: 10 to 20 inches
Depth to calcic horizon: 6 to 14 inches
Other characteristics: Loamy or sandy soil material below the hardpan in some pedons

Particle-size control section:
Content of clay-10 to 18 percent
Content of rock fragments-5 to 30 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Content of rock fragments-0 to 10 percent
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-6 or 7 dry, 4 or 5 moist
Texture-loam or very fine sandy loam
Content of rock fragments-0 to 15 percent

Bk horizon:
Value-6 to 8 dry, 4 to 7 moist
Chroma-2 to 4
Texture-loam or gravelly very fine sandy loam
Content of rock fragments-10 to 35 percent
Calcium carbonate equivalent-15 to 40 percent

Bkqm horizon:
Thickness-10 to 37 inches
Fractures-slightly to moderately fractured in the upper part
Plates-1/2 t0 3/4 inch thick and about 4 to 10 inches across; breaks between plates are generally less than '/e inch wide

Searla Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Fan terraces, hillsides
Parent material: Mixed alluvium
Slope: 4 to 60 percent
Elevation: 5,200 to 6,100 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 80 to 95 days
Taxonomic class: Loamy-skeletal, mixed, frigid Calcic Argixerolls

Typical Pedon

A-0 to 5 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 10 percent cobbles and 10 percent gravel; neutral (pH 7.3); clear smooth boundary.

Bt1-5 to 12 inches; dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and common fine tubular pores; common thin clay films on faces of peds; 10 percent cobbles and 10 percent gravel; neutral (pH 7.3); clear smooth boundary.

Bt2-12 to 19 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; common thin clay bridges between sand grains; 5 percent cobbles and 25 percent gravel; neutral (pH 7.3); gradual smooth boundary.

Btk-19 to 32 inches; brown (10YR 5/3) very gravelly sandy clay loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; few fine tubular pores; strongly effervescent; common thin clay bridges between sand grains; 20 percent cobbles and 25 percent gravel; neutral (pH 7.3); clear wavy boundary.

Bk1-32 to 39 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few fine tubular pores; strongly effervescent with lime coatings on the underside of gravel and cobbles; 25 percent cobbles and 20 percent gravel; neutral (pH 7.3); gradual *wavy* boundary.

Bk2-39 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, brown (10YR 4/3) moist; massive; hard, very friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; strongly effervescent; 30 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.0).

Typical Pedon Location

Map unit in which located: Searla-Ricrest complex, 30 to 75 percent slopes

Location in survey area: About 3,170 feet west and 200 feet north of the southeast corner of sec. 25, T. 14 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 16 inches
Depth to secondary lime: 19 to 35 inches

Particle-size control section:
Content of clay-27 to 35 percent
Content of rock fragments-40 to 50 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Content of rock fragments-15 to 30 percent
Reaction-neutral or mildly alkaline

Bt horizon:
Value-4 or 5 dry, 3 or 4 moist
Chroma-2 or 3
Texture-gravelly clay loam, very gravelly clay loam, cobbly clay loam, very cobbly clay loam, gravelly sandy clay loam, very gravelly sandy clay loam, cobbly sandy clay loam, or very cobbly sandy clay loam

Btk horizon:
Value-5 or 6 dry, 3 to 5 moist
Chroma-2 or 3
Texture-very cobbly sandy loam or very cobbly sandy clay loam
Content of rock fragments-35 to 60 percent
Effervescence-strong or violent

Bk horizon:
Value-6 to 8 dry, 4 to 7 moist
Chroma-2 to 4
Texture-cobbly sandy loam, very gravelly sandy loam, very cobbly sandy loam, cobbly sandy clay loam, or very cobbly sandy clay loam
Content of rock fragments-40 to 60 percent
Effervescence-strong or violent

Somsen Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Basalt plains
Parent material: Mixed eolian material
Slope: 1 to 4 percent
Elevation: 4,200 to 4,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 48 to 49 degrees F
Frost-free period: 125 to 135 days
Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Calciorthids

Typical Pedon

A-0 to 5 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; mildly alkaline (pH 7.6); clear smooth boundary.

Bw-5 to 9 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 5/3) moist; weak very fine

subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; slightly effervescent; mildly alkaline (pH 7.6); clear smooth boundary.

Bk1-9 to 20 inches; very pale brown (10YR 7/3) gravelly fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine tubular pores; violently effervescent; 20 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.

Bk2-20 to 29 inches; white (10YR 8/2) gravelly fine sandy loam, light gray (10YR 7/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; violently effervescent; 20 percent gravel; moderately alkaline (pH 8.4); abrupt smooth boundary.

2R-29 inches; basalt.

Typical Pedon Location

Map unit in which located: Somsen fine sandy loam, 1 to 3 percent slopes

Location in survey area: About 20 feet north and 20 feet west of the southeast corner of sec. 20, T. 10 S., R. 27 E.

Range in Characteristics

Depth to bedrock: 20 to 40 inches

Depth to calcic horizon: 7 to 10 inches

Particle-size control section:
Content of clay-8 to 18 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Content of rock fragments-0 to 10 percent
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-4 or 5 moist
Effervescence-slight or strong

Bk horizon:
Value-7 or 8 dry, 5 to 7 moist
Chroma-2 or 3
Texture-fine sandy loam, gravelly fine sandy loam, or cobbly fine sandy loam
Effervescence-strong or violent
Content of rock fragments-10 to 20 percent
Reaction-moderately alkaline or strongly alkaline

Sonlet Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Position on landscape: Hillsides, mountainsides

Parent material: Mixed alluvium that has some loess

Slope: 20 to 50 percent

Elevation: 5,400 to 6,000 feet

Average annual precipitation: 12 to 16 inches

Average annual air temperature: 42 to 44 degrees F

Frost-free period: 85 to 95 days

Taxonomic class: Loamy-skeletal, mixed, frigid Lithic Xerollic Calciorthids

Typical Pedon

A-0 to 4 inches; pale brown (10YR 6/3) stony loam, dark brown (10YR 3/3) moist; strong very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; strongly effervescent; 5 percent stones on the surface and 5 percent stones and 35 percent gravel below; moderately alkaline (pH 8.4); abrupt smooth boundary.

Bk1-4 to 10 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and few fine irregular pores; violently effervescent; 45 percent gravel that has lime coatings on all sides and few thin silica coatings on the underside; strongly alkaline (pH 8.8); clear smooth boundary.

Bk2-10 to 15 inches; very pale brown (10YR 7/3) extremely gravelly loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; violently effervescent; 70 percent gravel that has few thin silica coatings on the underside; strongly alkaline (pH 8.8); abrupt wavy boundary.

2R-15 inches; limestone that has many thin coatings of lime on the surface.

Typical Pedon Location

Map unit in which located: Sonlet stony loam, 20 to 50 percent slopes

Location in survey area: About 2,350 feet south and 50 feet east of the northwest corner of sec. 28, T. 16 S., R. 26 E.

Range in Characteristics

Depth to bedrock: 10 to 20 inches

Depth to secondary lime: 3 to 4 inches

Thickness of calcic horizon: 11 to 16 inches

Particle-size control section:
Content of rock fragments-40 to 65 percent
Content of clay-12 to 18 percent

A horizon:
Value-3 or 4 moist
Chroma-2 or 3

Bk horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-very gravelly loam, extremely gravelly loam, or very stony loam
Content of rock fragments-45 to 70 percent
Reaction-moderately alkaline or strongly alkaline

Stake Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Flood plains, stream terraces
Parent material: Mixed alluvium
Slope: 0 to 1 percent
Elevation: 4,200 to 4,900 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free period: 100 to 135 days
Taxonomic class: Fine, mixed, mesic Cumulic Haploxerolls

Typical Pedon

Ap-0 to 9 inches; grayish brown (10YR 5/2) silty clay loam, very dark gray (10YR 3/1) moist; strong fine subangular blocky structure; hard, friable, sticky and plastic; common medium, fine, and very fine roots; many very fine tubular pores; slightly effervescent (5 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); abrupt smooth boundary.

2Ab1-9 to 13 inches; grayish brown (10YR 5/2) silty clay loam, very dark gray (10YR 3/1) moist; moderate coarse and medium platy structure; hard, very friable, slightly sticky and plastic; common very fine roots; common very fine tubular pores; slightly effervescent (1 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); abrupt discontinuous boundary.

3Ab2-13 to 19 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common medium and fine and many very fine tubular pores; slightly effervescent (4 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); abrupt *wavy* boundary.

4Ab3-19 to 30 inches; dark gray (10YR 4/1) silty clay, black (10YR 2/1) moist; strong medium and fine subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many medium and *very* fine tubular pores; mildly alkaline (pH 7.8); clear wavy boundary.

5Ab4-30 to 40 inches; gray (10YR 5/1) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and very fine subangular blocky structure; hard, very friable, sticky and plastic; common very fine roots; common medium and fine and many very fine tubular pores; mildly alkaline (pH 7.6); abrupt wavy boundary.

5Bk1-40 to 50 inches; gray (10YR 5/1) silty clay loam, very dark grayish brown (10YR 3/2) moist; common medium prominent dark yellowish brown (10YR 4/6 moist) mottles; weak coarse prismatic structure; hard, friable, sticky and very plastic; few medium and fine roots; many very fine tubular pores; slightly effervescent (3 percent calcium carbonate equivalent); common fine irregularly shaped seams of lime; 4 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

5Bk2-50 to 60 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common medium and fine roots; common medium and fine and many very fine tubular pores; strongly effervescent (13 percent calcium carbonate equivalent); moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Stake silty clay loam, 0 to 1 percent slopes
Location in survey area: About 600 feet east and 2,000 feet south of the northwest corner of sec. 8, T. 14 S., R. 27 E.

Range in Characteristics

Thickness of mollic epipedon: 28 to 54 inches

Particle-size control section:
Content of clay-35 to 50 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 or 2
Content of clay-25 to 35 percent

Ab horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 or 2
Texture-silty clay loam, silty clay, or clay
Content of clay-35 to 50 percent
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Hue-10YR or 2.5Y
Value-5 to 7 dry, 3 to 5 moist
Chroma-1 to 3
Texture-silty clay loam or stratified silt loam and sandy loam
Reaction-mildly alkaline or moderately alkaline

C horizon (if it occurs):
Hue-2.5Y to 10YR
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-stratified silt loam and sandy loam
Content of rock fragments-0 to 30 percent

Stanrod Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Coalesced fan terraces
Parent material: Mixed alluvium
Slope: 2 to 8 percent
Elevation: 4,700 to 5,600 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 95 to 120 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Natrargids

Typical Pedon

A-0 to 3 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; weak very thick platy structure parting to moderate thin platy; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine and fine vesicular pores; slightly effervescent; 5 percent gravel; moderately alkaline (pH 8.4); abrupt smooth boundary.

Btn-3 to 6 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 4/3) moist; strong medium prismatic structure parting to strong fine angular blocky; very hard, friable, sticky and very plastic; many very fine and few fine roots; many very fine and common fine tubular pores; many thin and moderately thick clay films on faces of peds and lining pores; slightly effervescent; strongly alkaline (pH 8.6); clear smooth boundary.

Btkn-6 to 8 inches; very pale brown (10YR 7/3) silty clay loam, pale brown (10YR 6/3) moist; moderate medium prismatic structure parting to strong fine and medium angular blocky; hard, friable, sticky and plastic; common very fine roots; many very fine and common fine tubular pores; strongly effervescent; few thin clay films on faces of peds and lining pores; very strongly alkaline (pH 9.2); clear smooth boundary.

Bk1-8 to 11 inches; white (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and common fine tubular pores; strongly effervescent; very strongly alkaline (pH 9.4); clear smooth boundary.

Bk2-11 to 17 inches; white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; violently effervescent; very strongly alkaline (pH 9.2); clear smooth boundary.

Bk3-17 to 30 inches; white (10YR 8/2) silt loam, very pale brown (10YR 7/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; 10 percent cicada krotovinas that are very hard when dry and firm when moist; violently effervescent; lime segregated into a few fine irregularly shaped seams; strongly alkaline (pH 9.0); gradual wavy boundary.

Bkz-30 to 53 inches; very pale brown (10YR 7/2) silt loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; strongly effervescent; common fine irregularly shaped soft masses and filaments of salt; 10 percent gravel; moderately alkaline (pH 8.4); abrupt *wavy* boundary.

2C-53 to 60 inches; very pale brown (10YR 8/3) gravelly silt loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine tubular pores; violently effervescent; 5 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Declo-Stanrod association, 4 to 8 percent slopes

Location in survey area: About 150 feet east and 1,100 feet north of the southwest corner of sec. 20, T. 16 S., R. 27 E.

Range in Characteristics

Depth to natric horizon: 2 to 5 inches
Depth to secondary lime: 4 to 9 inches
Other characteristics: No 2C horizon in some pedons

Particle-size control section:
Content of clay-10 to 15 percent
Content of rock fragments-0 to 10 percent
Reaction-moderately alkaline to very strongly alkaline

A horizon:
Value-5 to 7 dry, 3 or 4 moist
Chroma-2 or 3
Content of clay-10 to 15 percent
Reaction-moderately alkaline or strongly alkaline

Btn horizon:
Value-5 to 7 dry, 4 to 6 moist
Texture-silty clay loam or silt loam
Content of clay-25 to 35 percent
Sodium absorption ratio-20 to more than 4)
Reaction-moderately alkaline to very strongly alkaline

Bk horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 to 4
Texture-silt loam or loam
Content of clay-10 to 15 percent
Content of rock fragments-0 to 10 percent
Reaction-moderately alkaline to very strongly alkaline

2C horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-3 or 4
Texture-gravelly silt loam, gravelly loam, very gravelly loam, or very gravelly sandy loam
Content of clay-5 to 12 percent
Content of rock fragments-15 to 50 percent
Reaction-moderately alkaline to very strongly alkaline

Sterling Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Hillsides
Parent material: Mixed alluvium
Slope: 4 to 20 percent
Elevation: 5,000 to 5,300 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 46 to 47 degrees F
Frost-free period: 100 to 115 days
Taxonomic class: Loamy-skeletal, mixed, mesic Typic Calcixerolls

Typical Pedon

A-0 to 4 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and common fine irregular pores; slightly effervescent; 5 percent cobbles and 25 percent gravel; mildly alkaline (pH 7.8); clear smooth boundary.

AB-4 to 12 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; strongly effervescent; 5 percent cobbles and 25 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

Bk1-12 to 25 inches; *very* pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; violently effervescent; 15 percent cobbles and 35 percent gravel; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk2-25 to 45 inches; *very* pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; strongly effervescent; 15 percent cobbles and 35 percent gravel; moderately alkaline (pH 8.4); gradual *wavy* boundary.

C-45 to 60 inches; very pale brown (10YR 7/3) very cobbly loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; strongly effervescent; 35 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Sterling gravelly loam, 2 to 20 percent slopes
Location in survey area: About 1,275 feet south and 700 feet east of the northwest corner of sec. 27, T. 16 S., R. 29 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 20 inches
Content of rock fragments: 35 to 60 percent

A horizon:
Value-4 or 5 dry
Chroma-2 or 3
Effervescence-slight or strong
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-7 or 8 dry, 5 or 6 moist
Chroma-3 or 4
Texture-very gravelly loam or very cobbly loam
Effervescence-strong or violent

C horizon:
Value-6 to 8 dry, 5 to 7 moist
Chroma-3 to 6
Texture-very cobbly loam or very gravelly loam

Stines Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderately rapid

Position on landscape: Hillsides, mountainsides, mesa sides
Parent material: Alluvium and residuum of weakly consolidated volcanic ash that have coarse fragments of quartz latite and quartzite
Slope: 25 to 70 percent
Elevation: 5,000 to 7,200 feet
Average annual precipitation: 12 to 18 inches
Average annual air temperature: 40 to 45 degrees F
Frost-free period: 60 to 100 days
Taxonomic class: Ashy-skeletal, frigid Mollic Vitrandepts

Typical Pedon

A1-0 to 2 inches; grayish brown (10YR 5/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; 10 percent stones, 15 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.4); clear smooth boundary.

A2-2 to 9 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine interstitial pores; 5 percent stones, 5 percent cobbles, and 25 percent gravel; mildly alkaline (pH 7.4); clear wavy boundary.

Bw1-9 to 22 inches; brown (10YR 5/3) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and medium and few fine roots; common very fine interstitial pores; 10 percent stones, 15 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.5); clear wavy boundary.

Bw2-22 to 33 inches; pale brown (10YR 6/3) very cobbly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine interstitial pores; 10 percent stones, 20 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.6); clear wavy boundary.

Bk-33 to 42 inches; light gray (2.5Y 7/2) very cobbly sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; common very fine interstitial pores; strongly effervescent; 15 percent stones, 20 percent cobbles, and 15 percent gravel; moderately alkaline (pH 8.1); gradual smooth boundary.

Cr-42 inches; light gray (2.5Y 7/0) weakly consolidated volcanic ash.

Typical Pedon Location

Map unit in which located: Stines very stony sandy loam, 35 to 70 percent slopes
Location in survey area: About 1,300 feet east and 500 feet south of the northwest corner of sec. 30, T. 15 S., R. 22 E.

Range in Characteristics

Thickness of mollic epipedon: 15 to 30 inches
Depth to paralithic contact: 40 to more than 60 inches
Depth to secondary lime: 27 to 38 inches

Particle-size control section:
Content of clay-5 to 15 percent
Content of rock fragments-35 to 55 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Content of rock fragments-35 to 50 percent
Reaction-neutral or mildly alkaline

Bw horizon:
Value-4 to 6 dry, 3 or 4 moist
Chroma-2 or 3
Texture-very gravelly sandy loam, extremely gravelly sandy loam, very cobbly sandy loam, or extremely cobbly sandy loam
Content of rock fragments-35 to 65 percent
Reaction-neutral or mildly alkaline

Bk horizon:
Hue-10YR or 2.5Y
Value-6 or 7 dry, 4 to 6 moist
Chroma-2 to 4
Content of rock fragments-35 to 70 percent
Reaction-mildly alkaline or moderately alkaline

Strevell Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Coalesced fan terraces
Parent material: Mixed alluvium
Slope: 1 to 12 percent
Elevation: 4,400 to 5,600 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 95 to 130 days
Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Calciorthids

Typical Pedon

A-0 to 2 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate coarse platy structure parting to moderate fine platy; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine vesicular pores; strongly effervescent; 1 percent gravel; strongly alkaline (pH 8.6); abrupt smooth boundary.

Bw-2 to 7 inches; very pale brown (10YR 7/3; silt loam, brown (10YR 4/3) moist; weak very coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; strongly effervescent; 1 percent gravel; very strongly alkaline (pH 9.4); clear smooth boundary.

Bk1-7 to 13 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; strongly effervescent; 5 percent gravel; very strongly alkaline (pH 9.2); clear smooth boundary.

Bk2-13 to 25 inches; very pale brown (10YR 3/3) silt loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and few fine tubular pores; violently effervescent; 5 percent gravel; strongly alkaline (pH 9.0); clear smooth boundary.

Bk3-25 to 31 inches; white (10YR 8/2) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine tubular pores; 15 percent nodules that are *very* hard when dry and friable when moist; violently effervescent; 5 percent gravel; strongly alkaline (pH 8.6); clear wavy boundary.

2Bkz1-31 to 42 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine tubular pores; strongly effervescent matrix; lime segregated into few fine violently effervescent irregularly shaped soft masses and filaments; salt segregated into common fine irregularly shaped soft masses and filaments; 45 percent gravel; moderately alkaline (pH 8.4); gradual wavy boundary.

2Bkz2-42 to 50 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 4/3) moist:; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine irregular pores; strongly effervescent matrix; lime segregated into few fine violently effervescent irregularly shaped soft masses and filaments on the underside of gravel; salt segregated into irregularly shaped soft masses and filaments; 5 percent cobbles and 45 percent gravel; moderately alkaline (pH 8.4); gradual wavy boundary.

3C-50 to 60 inches; pale brown (10YR 6/3) extremely gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; single grained; loose; many very fine irregular pores; strongly effervescent matrix; lime segregated into few fine violently effervescent irregularly shaped soft masses and filaments on the underside of gravel; 5 percent cobbles and 70 percent gravel; moderately alkaline (pH 8.2).

Typical Pedon Location

Map unit in which located: Strevell silt loam, 1 to 3 percent slopes

Location in survey area: About 1,000 feet east and 400 feet north of the southwest corner of sec. 14, T. 15 S., R. 27 E.

Range in Characteristics

Depth to calcic horizon: 10 to 20 inches
Depth to first lithologic discontinuity: 25 to 40 inches

Particle-size control section:
Content of clay-10 to 15 percent
Content of rock fragments-5 to 30 percent

A horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 to 4
Reaction-moderately alkaline or strongly alkaline

Bk horizon:
Value-6 to 8 dry, 5 to 7 moist
Chroma-2 to 4
Texture-silt loam, loam, or gravelly loam
Content of rock fragments-5 to 30 percent
Reaction-moderately alkaline to very strongly alkaline

2Bk horizon:
Value-7 or 8 dry, 4 to 7 moist
Chroma-2 to 4
Texture-very gravelly loam or very gravelly sandy loam
Content of rock fragments-35 to 55 percent
Reaction-moderately alkaline or strongly alkaline

3C horizon:
Value-5 to 8 dry, 4 to 6 moist
Chroma-2 to 4
Texture-very gravelly sand, very gravelly sandy loam, very gravelly loamy sand, extremely gravelly loamy coarse sand, or very cobbly sand
Reaction-mildly alkaline or moderately alkaline

Taunton Series

Depth class: Moderately deep (to a duripan)
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Basalt plains, coalesced fan terraces
Parent material: Mixed alluvium
Slope: 2 to 8 percent
Elevation: 4,200 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 135 days
Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Durorthids

Typical Pedon

A-0 to 5 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine pores; moderately alkaline (pH 8.2); clear smooth boundary.

Bw-5 to 11 inches; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

Bk1-11 to 16 inches; very pale brown (10YR 7/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, slightly sticky and slightly plastic; common very fine roots; few very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

Bk2-16 to 36 inches; white (10YR 8/1) fine sandy loam, very pale brown (10YR 7/3) moist; massive; very hard, friable, nonsticky and nonplastic; few very fine irregular pores; violently effervescent; strongly alkaline (pH 8.5); abrupt smooth boundary.

Bkqm-36 inches; white (10YR 8/1) indurated hardpan.

Typical Pedon Location

Map unit in which located: Taunton-Somsen complex, 2 to 4 percent slopes
Location in survey area: About 1,500 feet west and 1,500 feet north of the southeast corner of sec. 24, T. 9 S., R. 25 E.

Range in Characteristics

Depth to hardpan: 20 to 40 inches
Other characteristics: A very gravelly subhorizon in some pedons; loamy or sandy soil material below the hardpan in some pedons

Particle-size control section:
Content of clay-7 to 15 percent
Content of rock fragments-0 to 15 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3

Bw horizon:
Value-5 or 6 dry, 3 to 5 moist
Chroma-2 or 3
Texture-silt loam, loam, very fine sandy loam, or fine sandy loam

Bk horizon:
Value-6 or 7 dry, 4 to 6 moist
Chroma-1 to 4
Texture-silt loam, loam, or fine sandy loam
Reaction-moderately alkaline or strongly alkaline

Thornock Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Basalt plains
Parent material: Mixed alluvium and eolian material
Slope: 2 to 8 percent
Elevation: 4,200 to 4,400 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 48 degrees F
Frost-free period: 125 to 135 days
Taxonomic class: Loamy, mixed, mesic Lithic Xerollic Calciorthids

Typical Pedon

A-0 to 2 inches; pale brown (10YR 6/3) cobbly fine sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many *very* fine interstitial pores; moderately alkaline (pH 8.2); clear smooth boundary.

Bw-2 to 6 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; slightly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Bk1-6 to 12 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; many very fine and few fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

Bk2-12 to 15 inches; very pale brown (10YR 7/3) cobbly loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary.
R-15 inches; unweathered basalt that has common thin coatings of lime on the surface.

Typical Pedon Location

Map unit in which located: Thornock cobbly fine sandy loam, 2 to 8 percent slopes
Location in survey area: About 1,600 feet east and 1,000 feet north of the southwest corner of sec. 13, T. 9 S., R. 25 E.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Depth to calcic horizon: 6 to 12 inches
Particle-size control section:
Content of clay-8 to 18 percent
Content of rock fragments-5 to 35 percent
A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline
Bw horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-fine sandy loam, very fine sandy loam, loam, or silt loam
Bk horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 or 3
Texture-silt loam, fine sandy loam, cobbly loam, or very cobbly loam
Calcium carbonate equivalent-15 to 25 percent

Tomsherry Series

Depth class: Moderately deep (to a duripan)
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Fan terraces
Parent material: Ashy alluvium
Slope: 0 to 15 percent
Elevation: 5,000 to 6,600 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 100 days
Taxonomic class: Ashy, frigid Xeric Durandepts

Typical Pedon

A-0 to 4 inches; brown (10YR 5/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; many very fine interstitial pores; neutral (pH 6.7) in phenol red, neutral (pH 7.2) in sodium fluoride; abrupt wavy boundary.
AB-4 to 11 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine tubular pores; neutral (pH 6.8) in phenol red, neutral (pH 7.2) in sodium fluoride; abrupt wavy boundary.
Bk1-11 to 23 inches; white (10YR 8/2) fine sandy loam, pale brown (10YR 6/3) moist; massive; hard, firm, nonsticky and nonplastic; many very fine and common fine roots; common very fine tubular pores; violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary.
Bk2-23 to 32 inches; very pale brown (10YR 7/3) fine sandy loam, yellowish brown (10YR 5/4) moist; single grained; loose; many very fine and common fine roots; common very fine interstitial pores; 25 percent nodules that are hard when dry and friable when moist; violently effervescent; 5 percent gravel; moderately alkaline (pH 8.0); abrupt wavy boundary.
Bkqm-32 to 36 inches; white (10YR 8/2) fractured' duripan, very pale brown (10YR 7/3) moist; strong thick platy structure; very hard, very firm; many very fine roots matted between plates; few fine tubular pores; violently effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary.
2Ckz-36 to 53 inches; very pale brown (10YR 7/4) loamy fine sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; few fine tubular pores; violently effervescent; few fine irregularly shaped salt veins; moderately alkaline (pH 8.4); abrupt smooth boundary.
2C-53 to 60 inches; pale brown (10YR 6/3) loamy fine sand, brown (10YR 4/3) moist; single grained; loose; many very fine irregular pores; slightly effervescent; moderately alkaline (pH 8.4).

Typical Pedon Location

Map unit in which located: Cottonthomas-Tom sherry complex, 0 to 12 percent slopes
Location in survey area: About 650 feet east and 2,500 feet south of the northwest corner of sec. 26, T. 16 S., R. 21 E.

Range in Characteristics

Thickness of mollic epipedon: 7 to 11 inches
Depth to duripan: 20 to 40 inches
Thickness of duripan: 4 to 6 inches

Particle-size control section:
Content of volcanic ash: More than 60 percent
Content of clay-5 to 15 percent

A horizon:
Chroma-2 or 3
Reaction-neutral or mildly alkaline Reaction in sodium fluoride-less than 9.5

Bk horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 to 4
Texture-fine sandy loam, sandy loam, or loam
Content of gravel-0 to 15 percent
Effervescence-strong or violent

2C horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 to 4
Texture-fine sandy loam, sandy loam, loamy fine sand, or loamy sand
Content of rock fragments-0 to 15 percent
Reaction-moderately alkaline or strongly alkaline

Trevino Series

Depth class: Shallow
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Basalt plains
Parent material: Mixed eolian material
Slope: 1 to 12 percent
Elevation: 4,200 to 4,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 48 degrees F
Frost-free period: 130 to 135 days
Taxonomic class: Loamy, mixed, mesic Lithic Xerollic Camborthids

Typical Pedon

A-0 to 3 inches; brown (10YR 5/3) stony silt loam, brown (10YR 4/3) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many *very* fine irregular pores; 2 to 15 percent stones on the surface and 1 to 5 percent stones below; mildly alkaline (pH 7.8); clear wavy boundary.

Bw1-3 to 7 inches; pale brown (10YR 6/3) stony silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine irregular pores; 5 percent stones and 20 percent cobbles; mildly alkaline (pH 7.8); clear smooth boundary.

Bw2-7 to 11 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; moderately alkaline (pH 8.2); clear wavy boundary.

Bw3-11 to 15 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and few fine and medium tubular pores; slightly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bk-15 to 19 inches; very pale brown (10YR 7/3) cobbly loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; strongly effervescent; 10 percent stones and 20 percent cobbles; moderately alkaline (pH 8.4); abrupt wavy boundary.

R-19 inches; basalt that has common thin coatings of lime on the surface.

Typical Pedon Location

Map unit in which located: Trevino-Paulville complex, 0 to 8 percent slopes
Location in survey area: About 100 feet north and 530 feet west of the southeast corner of sec. 12, T. 10 S., R. 26 E.

Range in Characteristics

Depth to bedrock: 10 to 20 inches (fig. 10)
Depth to secondary lime: 10 to 18 inches

Particle-size control section:
Content of clay-12 to 18 percent
Content of rock fragments-5 to 30 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Reaction-neutral or mildly alkaline

Bw horizon:
Value-6 or 7 dry, 3 or 4 moist
Texture-silt loam, loam, cobbly silt loam, or stony loam
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-4 or 5 moist
Texture-loam, fine sandy loam, or cobbly loam
Content of rock fragments-5 to 35 percent
Reaction-mildly alkaline or moderately alkaline

Turbyfill Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid

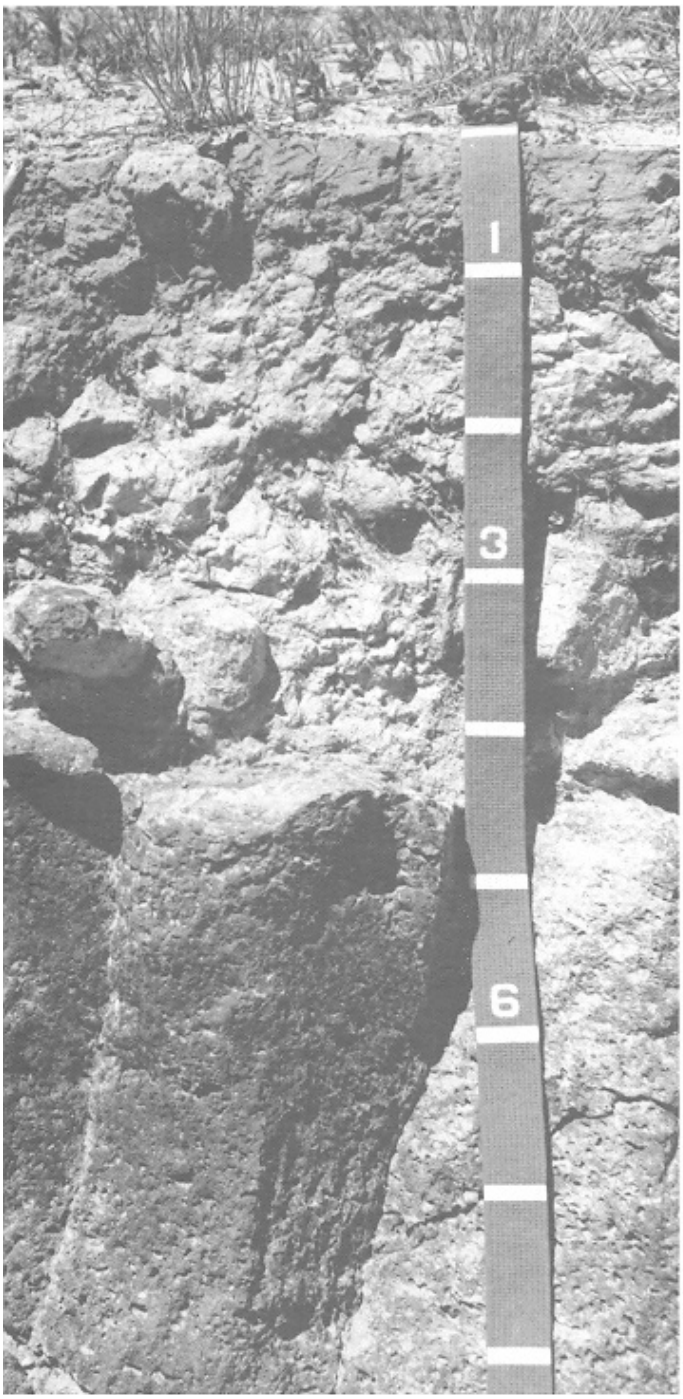

Figure 10.-Profile of a Trevino soil. Basalt is at a depth of about 4 decimeters (16 Inches). Depth is marked in decimeters.

breaks
Parent material. Mixed alluvium
Slope: 5 to 15 percent

Elevation: 4,900 to 5,100 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 110 days
Taxonomic class: Coarse-loamy, mixed (calcareous), mesic Xeric Torriorthents

Typical Pedon

A1-0 to 2 inches; light gray (10YR 7/2) fine sandy loam, grayish brown (10YR 5/2) moist; weak medium platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine irregular pores; slightly effervescent; mildly alkaline (pH 7.6); abrupt smooth boundary.

A2-2 to 5 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; weak medium platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

C1-5 to 35 inches; pale yellow (2.5Y 7/4) fine sandy loam, yellowish brown (2.5Y 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

C2-35 to 60 inches; pale yellow (2.5Y 7/4) fine sandy loam, yellowish brown (2.5Y 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.8).

Typical Pedon Location

Map unit in which located: Turbyfill-Quincy complex, 5 to 15 percent slopes
Location in survey area: About 3,100 feet west and 1,850 feet south of the northeast corner of sec. 13, T. 16 S., R. 29 E.

Range in Characteristics

Particle-size control section:

Content of rock fragments-0 to 10 percent
Content of clay-5 to 15 percent

A horizon:

Hue-10YR or 2.5Y
Value-6 or 7 dry, 3 to 5 moist
Chroma-2 or 3

C horizon:

Hue-10YR or 2.5Y
Position on landscape: Lake terraces, lake terrace
Value-6 or 7 dry, 4 to 6 moist

Chroma-2 to 4
Content of rock fragments-0 to 10 percent
Reaction-moderately alkaline or strongly alkaline

Ushar Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Flood plains, low terraces
Parent material: Mixed alluvium
Slope: 1 to 3 percent
Elevation: 4,400 to 5,200 feet
Average annual precipitation: 10 to 14 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 125 days
Taxonomic class: Fine-loamy, mixed, mesic Calciorthidic Haploxerolls

Typical Pedon

A-0 to 4 inches; brown (10YR 5/3) silt loam; grayish brown (10YR 3/2) moist; moderate thick and very thick platy structure; soft, very friable, slightly sticky and plastic; many very fine and few fine roots; many very fine irregular pores; mildly alkaline (pH 7.8); abrupt smooth boundary.

BA-4 to 12 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common very fine roots; many very fine tubular pores; 1 percent gravel; mildly alkaline (pH 7.4); clear smooth boundary.

Bk1-12 to 28 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common very fine and few fine roots; many very fine tubular pores; lime segregated into few fine violently effervescent irregularly shaped filaments and seams; 5 percent gravel with lime coatings on the underside; moderately alkaline (pH 8.2); gradual smooth boundary.

Bk2-28 to 45 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and plastic; few very fine roots; many very fine tubular pores; lime segregated into many fine violently effervescent irregularly shaped filaments and seams; 10 percent gravel; moderately alkaline (pH 8.0); gradual wavy boundary.

2Ck-45 to 60 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; lime segregated into common fine violently effervescent irregularly shaped filaments and seams; 50 percent gravel; moderately alkaline (pH 8.0).

Typical Pedon Location

Map unit in which located: Ushar silt loam, 1 to 3 percent slopes
Location in survey area: About 1,800 feet south and 50 feet west of the northeast corner of sec. 19, T. 12 S., R. 28 E.

Range in Characteristics

Thickness of mollic epipedon: 12 to 19 inches
Depth to secondary lime: 12 to 21 inches

Particle-size control section:
Content of clay-25 to 35 percent
Content of rock fragments-5 to 30 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 or 7 dry, 3 or 4 moist
Chroma-2 or 3
Texture-silt loam, silty clay loam, or loam
Reaction-moderately alkaline or strongly alkaline

2Ck horizon:
Value-6 to 8 dry, 4 or 5 moist
Chroma-2 to 4
Texture-very gravelly sandy loam, gravelly sandy loam, or very gravelly sand
Reaction-moderately alkaline or strongly alkaline

Vining Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Basalt plains
Parent material: Mixed eolian material
Slope: 1 to 3 percent
Elevation: 4,200 to 4,400 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 48 degrees F
Frost-free period: 125 to 135 days
Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Camborthids

Typical Pedon

A-0 to 3 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; neutral (pH 7.3); clear smooth boundary.

Bw1-3 to 11 inches; pale brown (10YR 6/3) fine sandy

loam, brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and medium roots; many very fine tubular pores; mildly alkaline (pH 7.4); clear smooth boundary.

Bw2-11 to 17 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and common medium roots; many very fine tubular pores; 5 percent gravel less than three-eighths of an inch in diameter; mildly alkaline (pH 7.4); gradual smooth boundary.

C-17 to 26 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; hard, vent friable, nonsticky and nonplastic; few very fine root: ; many very fine tubular pores; mildly alkaline (pH 7.4); abrupt wavy boundary.

2R-26 inches; basalt that has thin discontinuous coatings of lime.

Typical Pedon Location

Map unit in which located: Vining fine sandy loam, 1 to 3 percent slopes

Location in survey area: About 2,200 feet east and 2,100 feet north of the southwest corner of sec. 12, T. 9 S., R. 26 E.

Range in Characteristics

Depth to bedrock: 20 to 40 inches

Particle-size control section:
Texture-fine sandy loam or sandy loam

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Content of clay-6 to 10 percent
Reaction-neutral or mildly alkaline

Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Content of rock fragments-0 to 10 percent
Content of clay-10 to 15 percent

C horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 or 3
Content of clay-7 to 10 percent
Reaction-mildly alkaline or moderately alkaline

Vipont Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Mountainsides, cuestas
Parent material: Alluvium and residuum of mica schist and quartzite
Slope: 4 to 60 percent
Elevation: 5,000 to 7,000 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 70 to 85 days
Taxonomic class: Loamy-skeletal, mixed, frigid Pachic Argixerolls

Typical Pedon

A-0 to 3 inches; dark brown (10YR 4/3) very stony loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 30 percent stones on the surface and 25 percent stones, 5 percent cobbles, and 25 percent gravel below; neutral (pH 7.2); abrupt smooth boundary.

AB-3 to 8 inches; dark brown (10YR 4/3) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; soft, very friable, slightly sticky and plastic; common very fine and few medium roots; many very fine and few fine tubular pores; 20 percent stones, 5 percent cobbles, and 20 percent gravel; neutral (pH 7.2); clear smooth boundary.

Bt1-8 to 17 inches; brown (10YR 5/3) extremely cobbly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and few fine roots; many very fine and common fine tubular pores; many thin clay films on faces of peds and lining pores; 5 percent stones, 40 percent cobbles, and 20 percent gravel; mildly alkaline (pH 7.4); clear wavy boundary.

Bt2-17 to 26 inches; brown (10YR 5/3) extremely cobbly clay loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure; slightly hard, very friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; continuous thin clay films on faces of peds and lining pores; 10 percent stones, 40 percent cobbles, and 20 percent gravel; mildly alkaline (pH 7.4); abrupt wavy boundary.

R-26 inches; unweathered quartzite.

Typical Pedon Location

Map unit in which located: Chen-Vipont association, 30 to 50 percent slopes

Location in survey area: About 2,500 feet east and 500

feet south of the northwest corner of sec. 21, T. 13 S., R. 25 E.

Range in Characteristics

Depth to bedrock: 21 to 40 inches
Thickness of mollic epipedon: 21 to 27 inches

Particle-size control section:
Content of clay-28 to 38 percent
Content of rock fragments-35 to 60 percent

A horizon:
Value-3 to 5 dry, 2 or 3 moist
Chroma-2 or 3
Content of rock fragments-25 to 55 percent
Reaction-neutral or mildly alkaline

Bt horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Texture-very cobbly clay loam, extremely cobbly clay loam, or very gravelly clay loam
Content of rock fragments-35 to 70 percent

Vitale Series

Depth class: Moderately deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Mountainsides
Parent material: Alluvium and residuum of quartz latite
Slope: 30 to 60 percent
Elevation: 5,000 to 7,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 75 to 90 days
Taxonomic class: Loamy-skeletal, mixed, frigid Typic Argixerolls

Typical Pedon

A1-0 to 5 inches; brown (10YR 5/3) stony loam, dark brown (10YR 3/3) moist; moderate medium and fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 10 percent stones on the surface and 5 percent stones, 5 percent cobbles, and 15 percent gravel below; neutral (pH 7.0); clear wavy boundary.

A2-5 to 10 inches; brown (10YR 5/3) stony loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine roots; many very fine tubular pores; 10 percent stones, 5 percent cobbles, and 15 percent gravel; neutral (pH 7.2); clear wavy boundary.

Bt1-10 to 22 inches; yellowish brown (10YR 5/4) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; many very fine tubular pores; common thin clay films on faces of peds and lining pores; 10 percent stones, 30 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.4); gradual wavy boundary.

Bt2-22 to 27 inches; yellowish brown (10YR 5/4) very cobbly clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium subangular blocky structure; hard, very friable, sticky and plastic; common very fine and few fine roots; many very fine tubular pores; many thin clay films on faces of peds and lining pores; 5 percent stones, 30 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.4); gradual wavy boundary.

Bt3-27 to 30 inches; yellowish brown (10YR 5/4) very cobbly clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine roots; common very fine tubular pores; many thin clay films on faces of peds and lining pores; 5 percent stones, 25 percent cobbles, and 15 percent gravel; mildly alkaline (pH 7.6); abrupt wavy boundary.

R-30 inches; unweathered quartzite.

Typical Pedon Location

Map unit in which located: Jimsage-Vitale association, 30 to 65 percent slopes
Location in survey area: About 1,500 feet west and 1,600 feet south of the northeast corner of sec. 13, T. 14 S., R. 26 E.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of mollic epipedon: 10 to 17 inches
Reaction: Neutral or mildly alkaline

Particle-size control section:
Content of clay-25 to 35 percent
Content of rock fragments-35 to 60 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Content of rock fragments-25 to 35 percent

Bt horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-2 or 3
Texture-very cobbly clay loam, very gravelly clay loam, very cobbly loam, or very gravelly loam
Content of rock fragments-35 to 60 percent

Watercanyon Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Hillsides, mountainsides, fan terraces
Parent material: Loess and silty alluvium
Slope: 4 to 60 percent
Elevation: 4,600 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 45 degrees F
Frost-free period: 80 to 100 days
Taxonomic class: Coarse-silty, mixed, frigid Calcixerollic Xerochrepts

Typical Pedon

A-0 to 2 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak fine and very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few tine roots; many very fine interstitial pores; mildly alkaline (pH 7.4); clear smooth boundary.

Bw1-2 to 9 inches; yellowish brown (10YR 5/4) silt loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, *very* friable, slightly sticky and slightly plastic; common *very* fine and few fine roots; many very fine and few fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

Bw2-9 to 16 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate coarse subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and common tine tubular pores; mildly alkaline (pH 7.7); abrupt smooth boundary.

Bk1-16 to 22 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and common fine tubular pores; strongly effervescent; common fine irregularly shaped filaments of lime that are violently effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary.

Bk2-22 to 32 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky and nonplastic; common very fine tubular pores; violently effervescent; strongly alkaline (pH 8.8); gradual smooth boundary.

C-32 to 60 inches; very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.9).

Typical Pedon Location

Map unit in which located: Watercanyon silt loam, 4 to 12 percent slopes
Location in survey area: About 600 feet east and 150 feet south of the northwest corner of sec. 1, T. 11 S., R. 25 E.

Range in Characteristics

Particle-size control section:
Content of clay-5 to 18 percent

A horizon:
Value-5 or 6 dry, 3 or 4 moist
Content of clay-10 to 18 percent
Effervescence-none or slight

Bw horizon:
Value-5 or 6 dry, 3 or 4 moist
Chroma-3 or 4
Content of clay-10 to 18 percent
Effervescence-none or slight
Reaction-mildly alkaline or moderately alkaline

Bk horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-2 or 3
Content of clay-5 to 16 percent
Calcium carbonate equivalent-8 to 25 percent
Reaction-moderately alkaline or strongly alkaline

C horizon:
Value-5 to 7 dry, 4 to 6 moist
Chroma-2 to 4
Content of clay-5 to 10 percent
Calcium carbonate equivalent-5 to 15 percent
Reaction-moderately alkaline or strongly alkaline

Weeks Series

Depth class: Moderately deep (to a duripan)

Drainage class: Well drained
Permeability: Moderate
Position on landscape: Coalesced fan terraces, hillsides
Parent material: Mixed alluvium that has some loess
Slope: 4 to 12 percent
Elevation: 4,300 to 4,500 feet
Average annual precipitation: 11 to 13 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 120 to 135 days
Taxonomic class: Coarse-loamy, mixed, mesic Entic Durixerolls

Typical Pedon

A1-0 to 2 inches; brown (10YR 5/3) loam, very dark

grayish brown (10YR 3/2) moist; strong very coarse platy structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; mildly alkaline (pH 7.8); abrupt smooth boundary.

A2-2 to 5 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; mildly alkaline (pH 7.8); abrupt smooth boundary.

Bw1-5 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine tubular pores; moderately alkaline (pH 8.0); clear smooth boundary.

Bw2-12 to 20 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft:, very friable, slightly sticky and plastic; common very fine roots; many very fine and few fine tubular pores; moderately alkaline (pH 8.0); clear wavy boundary.

Bk-20 to 28 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; strongly effervescent (12 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); clear smooth boundary.

Bkgm1-28 to 40 inches; white (10YR 8/2) loam between plates, pale brown (10YR 6/3) moist; strong very coarse and coarse platy structure; very hard, very firm, nonsticky and nonplastic; few very fine roots; many very fine tubular pores; violently effervescent (20 percent calcium carbonate equivalent); strongly alkaline (pH 8.8); clear smooth boundary.

Bkqm2-40 to 55 inches; very pale brown (10YR 7/3) loam between plates, brown (10YR 4/3) moist; strong very coarse and coarse platy structure; extremely hard, very firm, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; violently effervescent (20 percent calcium carbonate equivalent); moderately alkaline (pH 8.3) ; abrupt smooth boundary.

Ck-55 to 60 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; moderate coarse platy structure; hard, friable, nonsticky and nonplastic; many very fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); moderately alkaline (pH 8.4.

Typical Pedon Location

Map unit in which located: Weeks loam, 4 to 12 percent slopes

Location in survey area: About 2,200 feet east and 500 feet south of the northwest corner of sec. 32, T. 10 S., R. 25 E.

Range in Characteristics

Thickness of mollic epipedon: 10 to 15 inches

Depth to cemented layer: 20 to 40 inches

Depth to secondary lime: 10 to 20 inches

Particle-size control section:
- Content of clay-12 to 18 percent
- Content of rock fragments-0 to 10 percent

A horizon:
- Chroma-2 or 3
- Content of clay-12 to 16 percent
- Content of rock fragments-0 to 10 percent

Bw horizon:
- Value-5 or 6 dry
- Chroma-2 or 3
- Texture-silt loam or loam
- Content of clay-15 to 24 percent
- Content of rock fragments-0 to 10 percent

Bk horizon:
- Value-6 or 7 dry, 4 or 5 moist
- Chroma-2 or 3
- Content of clay-12 to 18 percent
- Content of rock fragments-0 to 10 percent
- Calcium carbonate equivalent-15 to 25 percent
- Reaction-moderately alkaline or strongly alkaline

Bkqm horizon:
- Value-7 or 8 dry, 5 or 6 moist
- Chroma-2 or 3
- Reaction-moderately alkaline or strongly alkaline

C horizon:
- Value-6 or 7 dry
- Chroma-3 or 4
- Content of clay-10 to 15 percent
- Reaction-moderately alkaline to very strongly alkaline

Wheeler Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Position on landscape: Side slopes on dissected terraces

Parent material: Loess

Slope: 25 to 45 percent

Elevation: 4,200 to 4,400 feet

Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 125 to 135 days
Taxonomic class: Coarse-silty, mixed (calcareous), mesic Xeric Torriorthents

Typical Pedon

A-0 to 2 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; strong coarse platy structure; *soft,* very friable, slightly sticky and slightly plastic; many very fine roots; many very fine and few fine vesicular pores; strongly effervescent (4 percent calcium carbonate equivalent); moderately alkaline (pH 8.3); abrupt smooth boundary.

C1-2 to 6 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate coarse platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many *very* fine and few fine tubular pores; strongly effervescent matrix (11 percent calcium carbonate equivalent); lime segregated into many fine and medium filaments and seams; strongly alkaline (pH 8.5); clear smooth boundary.

C2-6 to 18 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; strongly effervescent matrix (7 percent calcium carbonate equivalent); lime segregated into many fine and medium filaments and seams; strongly alkaline (pH 8.5); gradual wavy boundary.

C3-18 to 60 inches; pale brown (10YR 6/3) sill loam, brown (10YR 4/3) moist; massive; *soft,* very friable, nonsticky and nonplastic; common *very* fine tubular pores; strongly effervescent (15 percent calcium carbonate equivalent); strongly alkaline (pH 9.0).

Typical Pedon Location

Map unit in which located: Wheeler silt loam, 25 to 45 percent slopes

Location in survey area: About 1,800 feet east and 700 feet north of the southwest corner of sec. 20, T. 9 S., R. 28 E.

Range in Characteristics

Calcium carbonate equivalent: 7 to 15 percent, average of 15 percent below a depth of 18 inches

Particle-size control section:
Content of clay-6 to 10 percent

A horizon:
Value-6 or 7 dry, 4 or 5 moist
Reaction-mildly alkaline or moderately alkaline

Bk horizon (if it occurs):
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Reaction-moderately alkaline or strongly alkaline

C horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-2 or 3
Texture-silt loam or silt
Reaction-moderately alkaline to very strongly alkaline

Wilsonguich Series

Depth class: Deep or very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: South-facing hillsides and mesa sides
Parent material: Ashy alluvium and residuum modified by coarse fragments of quartz latite
Slope: 20 to 60 percent
Elevation: 5,100 to 5,900 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 45 to 46 degrees F
Frost-free period: 95 to 115 days
Taxonomic class: Ashy-skeletal, mesic Mollic Vitrandepts

Typical Pedon

A-0 to 7 inches; brown (10YR 4/3) very stony loam, dark brown (10YR 3/3) moist; weak very fine granular structure; *soft,* very friable, nonsticky and nonplastic; many very fine and fine roots; many *very* fine irregular pores; slightly effervescent; 55 percent stones on the surface and 10 percent cobbles and 25 percent gravel below; moderately alkaline (pH 8.0); gradual smooth boundary.

Bw-7 to 14 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; *soft,* very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine tubular pores; strongly effervescent; 30 percent cobbles and 30 percent gravel; moderately alkaline (pH 8.2); clear wavy boundary.

Bk1-14 to 27 inches; white (10YR 8/2) *very* gravelly sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; strongly effervescent; 20 percent cobbles and 30 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

Bk2-27 to 60 inches; white (10YR 8/2) very gravelly

sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; strongly effervescent; 15 percent cobbler and 20 percent gravel; moderately alkaline (pH 8/4).

Typical Pedon Location

Map unit in which located: Wilsongulch very stony loam, 40 to 60 percent slopes

Location in survey area: About 2,300 feet east and 1,700 feet south of the northwest corner of sec. 5, T. 16 S., R. 22 E.

Range in Characteristics

Thickness of mollic epipedon: 7 to 14 inches

Depth to paralithic contact: 40 to more than 60 inches

Particle-size control section:
Content of rock fragments-35 to 60 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-2 or 3
Reaction-mildly alkaline or moderately alkaline

Bw horizon:
Value-5 or 6 dry, 2 or 3 moist
Chroma-2 or 3
Texture-very cobbly loam, very cobbly sandy loam, very gravelly loam, or very gravelly sandy loam
Effervescence-strong or violent

Bk horizon:
Hue-10YR or 2.5Y
Value-6 to 8 dry, 6 or 7 moist
Chroma-2 to 4
Texture-very cobbly sandy loam, very gravelly sandy loam, very gravelly loam, or very stony sandy loam
Effervescence-strong or violent

Womack Series

Depth class: Moderately deep (to a duripan)
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Coalesced fan terraces
Parent material: Mixed alluvium that has some loess
Slope: 1 to 8 percent
Elevation: 4,700 to 5,700 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 95 to 120 days
Taxonomic class: Loamy-skeletal, mixed, mesic Xerollic Durargids

Typical Pedon

A1-0 to 3 inches; pale brown (10YR 6/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak very thick platy structure parting to weak fine and very fine granular; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and common fine interstitial pores; 25 percent gravel on the surface and 15 percent gravel below; mildly alkaline (pH 7.6); abrupt smooth boundary.

A2-3 to 5 inches; pale brown (10YR 6/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak very thick platy structure parting to moderate fine and very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine and common fine tubular and interstitial pores; 15 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

Bt-5 to 11 inches; pale brown (10YR 6/3) gravelly clay loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure parting to strong fine and very fine subangular blocky; hard, very friable, sticky and plastic; common medium, fine, and very fine roots; many very fine tubular pores; many thin clay films on faces of peds and lining pores; 5 percent cobbles and 25 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

Btk-11 to 13 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine tubular pores; strongly effervescent; few thin clay films on faces of peds and lining pores; 5 percent cobbles and 35 percent gravel; moderately alkaline (pH 8.4); abrupt wavy boundary.

2Bk1-13 to 17 inches; very pale brown (10YR 7/3) *very* gravelly sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine tubular pores; violently effervescent (30 percent calcium carbonate equivalent); 5 percent cobbles and 50 percent gravel; moderately alkaline (pH 8.4); clear wavy boundary.

2Bk2-17 to 24 inches; very pale brown (10YR 8/3) extremely gravelly loamy coarse sand, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; violently effervescent (28 percent calcium carbonate equivalent); 5 percent cobbles and 60 percent gravel; moderately alkaline (pH 8.4); clear wavy boundary.

2Bk3-24 to 31 inches; multicolored, stratified extremely gravelly coarse sand; single grained; loose; few very fine roots; many very fine arid fine irregular pores; small pockets of strongly effervescent material similar to that of the horizon above; 15 percent cobbles and 60 percent gravel; moderately alkaline (pH 8.4); abrupt wavy boundary.

3Bkqm-31 inches; lime-silica indurated hardpan; extremely hard, extremely firm; violently effervescent; more than 80 percent rock fragments.

Typical Pedon Location

Map unit in which located: Womack gravelly silt loam, 4 to 8 percent slopes

Location in survey area: About 500 feet east and 1,000 feet south of the northwest corner of sec. 30, T. 13 S., R. 26 E.

Range in Characteristics

Depth to hardpan: 20 to 40 inches

Depth to secondary lime: 10 to 15 inches

Other characteristics: Loamy or sandy soil material below the hardpan in some pedons

Particle-size control section:
Content of clay-10 to 18 percent
Content of rock fragments-35 to 55 percent

A horizon:
Value-5 or 6 dry
Content of clay-10 to 18 percent
Content of rock fragments-15 to 25 percent

Bt horizon:
Value-6 or 7 dry, 4 or 5 moist
Texture-silty clay loam or gravelly clay loam
Content of clay-27 to 35 percent
Content of rock fragments-10 to 30 percent
Reaction-mildly alkaline or moderately alkaline

Btk horizon:
Value-6 or 7 dry, 4 or 5 moist
Chroma-3 or 4
Texture-very gravelly loam or gravelly clay loam
Content of clay-22 to 30 percent
Content of rock fragments-20 to 40 percent

Bk horizon:
Value-7 or 8 dry, 5 or 6 moist
Chroma-3 or 4
Texture-very gravelly loam, very gravelly sandy loam, extremely gravelly coarse sandy loam, or extremely gravelly loamy coarse sand
Content of clay-0 to 15 percent
Content of rock fragments-35 to 75 percent
Calcium carbonate equivalent-15 to 35 percent
Reaction-moderately alkaline or strongly alkaline

Bkqm horizon:
Thickness-3 to more than 18 inches Fractures-generally not fractured; in some pedons the upper 2 to 6 inches of material broken into plates that are 5 to 12 inches across and '/a to 1/2 inch thick

Xerollic Calciorthids

Depth class: Very deep
Drainage class: Well drained or somewhat excessively drained
Permeability: Moderate or moderately rapid
Position on landscape: Fan terrace breaks, hillsides
Parent material: Mixed alluvium that has some loess
Slope: 20 to 55 percent
Elevation: 4,250 to 5,600 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 45 to 49 degrees F
Frost-free period: 95 to 135 days

Representative Pedon

A-0 to 6 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; common medium and coarse and few very fine and fine roots; many very fine and fine irregular pores; strongly effervescent; 25 percent gravel; moderately alkaline (pH 8.4); clear smooth boundary.

Bk1-6 to 10 inches; light yellowish brown (10YR 6/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, medium, and coarse roots; many very fine and fine tubular pores; violently effervescent; 60 percent gravel; strongly alkaline (pH 8.6); gradual smooth boundary.

Bk2-10 to 13 inches; very pale brown (10YR 7/4) extremely gravelly loam, light yellowish brown (10YR 6/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine tubular pores; violently effervescent; 75 percent gravel; strongly alkaline (pH 8.6); clear smooth boundary.

C1-13 to 54 inches; light yellowish brown (10YR 6/4) extremely gravelly loam, yellowish brown (10YR 5/6) moist; massive; hard, friable, slightly sticky. and slightly plastic; few very fine, fine, and medium roots; common very fine pores; strongly effervescent; 75 percent gravel; moderately alkaline (pH 8.4); gradual smooth boundary.

2C2-54 to 60 inches; light yellowish brown (10YR 6/4)

gravelly loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; strongly effervescent; 20 percent gravel; strongly alkaline (pH 8.8).

Representative Pedon Location

Map unit in which located: Xerollic Calciorthids, 25 to 55 percent slopes

Location in survey area: About 2,100 feet north and 10 feet east of the southwest corner of sec. 8, T. 16 S., R. 28 E.

Range in Characteristics

Depth to calcic horizon: 6 to 20 inches

Particle-size control section:
Content of rock fragments-20 to 75 percent
Content of clay-10 to 18 percent

A horizon:
Value-6 or 7 dry, 3 or 4 moist
Chroma-2 or 3

Bk horizon:
Value-6 to 8 dry, 4 to 6 moist
Chroma-3 to 6
Texture-extremely gravelly loam, extremely gravelly sandy loam, gravelly loam, gravelly sandy loam, very cobbly sandy loam, or very gravelly loam
Content of rock fragments-20 to 75 percent
Reaction-moderately alkaline or strongly alkaline

C horizon:
Texture-extremely gravelly loam, extremely gravelly sandy loam, gravelly loam, gravelly sandy loam, or very cobbly sandy loam
Content of rock fragments-20 to 75 percent
Reaction-moderately alkaline or strongly alkaline

Yeates Hollow Series

Depth class: Deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Mountainsides, foothills
Parent material: Alluvium and residuum of mica schist and quartzite
Slope: 25 to 55 percent
Elevation: 5,500 to 7,000 feet
Average annual precipitation: 16 to 18 inches
Average annual air temperature: 40 to 43 degrees F
Frost-free period: 70 to 85 days
Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Typic Argixerolls

Typical Pedon

A-0 to 3 inches; dark grayish brown (10YR 4/2) very stony loam, black (10YR 2/1) moist; strong fine and medium granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and few fine irregular pores; 55 percent stones on the surface and 15 percent stones, 5 percent cobbles, and 20 percent gravel below; neutral (pH 7.0); clear smooth boundary.

BA-3 to 8 inches; brown (10YR 5/3) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure parting to strong fine granular; slightly hard, very friable, slightly sticky and plastic; common very fine and medium and few fine roots; many very fine, common medium, and few fine tubular pores; 15 percent stones, 20 percent cobbles, and 20 percent gravel; neutral (pH 7.0); clear wavy boundary.

Bt1-8 to 15 inches; brown (10YR 5/3) very cobbly clay, dark brown (10YR 3/3) moist; strong medium and coarse subangular blocky structure; slightly hard, very friable, sticky and very plastic; common very fine and few fine roots; many very fine and few fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 15 percent stones, 15 percent cobbles, and 20 percent gravel; neutral (pH 7.0); clear wavy boundary.

Bt2-15 to 31 inches; brown (7.5YR 5/4) extremely cobbly clay, dark brown (7.5YR 4/4) moist; strong medium and coarse subangular blocky structure; very hard, firm, sticky and very plastic; few very fine and fine roots; many very fine and few fine tubular pores; continuous thick clay films on faces of peds and lining pores; 15 percent stones, 30 percent cobbles, and 25 percent gravel; neutral (pH 7.0); clear wavy boundary.

Bt3-31 to 49 inches; brown (7.5YR 5/4) extremely cobbly clay, dark brown (7.5YR 4/4) moist; strong medium and coarse subangular blocky structure; very hard, firm, sticky and very plastic; few very fine and fine roots; many very fine and few fine tubular pores; continuous thick clay films on faces of peds and lining pores; 25 percent stones, 30 percent cobbles, and 25 percent gravel; neutral (pH 7.2); abrupt wavy boundary.

2R-49 inches; quartzite.

Typical Pedon Location

Map unit in which located: Yeates Hollow-Hades complex, 10 to 40 percent slopes

Location in survey area: About 2,200 feet south and 500 feet west of the northeast corner of sec. 28, T. 15 S., R. 22 E.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of mollic epipedon: 10 to 18 inches
Depth to argillic horizon: 7 to 11 inches
Other characteristics: No BA horizon in some pedons

Particle-size control section:
Content of clay-35 to 50 percent
Content of rock fragments-35 to 70 percent

A horizon:
Value-4 or 5 dry, 2 or 3 moist
Chroma-1 to 3

BA horizon:
Chroma-2 or 3
Content of clay-25 to 35 percent
Content of rock fragments-20 to 55 percent

Bt horizon:
Hue-7.5YR or 10YR
Value-5 or 6 dry, 3 to 5 moist
Chroma-3 to 6
Texture-extremely cobbly clay, extremely gravelly clay, very cobbly clay, or very stony clay
Content of clay-40 to 50 percent
Content of rock fragments-average of 50 to 70 percent

Formation of the Soils

Soil is a natural, three-dimensional body on the surface of the earth that supports or is capable of supporting plants. It is a fundamental part of the ecosystem and exists in balance with other components of the environment (10). It consists of a mixture of minerals, organic matter, water, and air, all of which occur in varying proportions (12).

Soils are characterized by a vertical sequence of layers, or horizons, that vary in color, texture, chemistry, or structure or a combination of these properties. Horizons continually form and evolve, generally over long periods of time, as a result of environmental forces. These forces, or soil-forming factors, are parent material; climate; biological activity; relief, or landscape position; and time. The interaction of these five soil-forming factors produces a soil profile with unique qualities that can be observed and characterized.

This section describes the interaction of the factors of soil formation, the relation of the factors to specific soils, and the geological history of the survey area.

Factors of Soil Formation

Parent Material

The soils in the survey area formed in residual, alluvial, colluvial, lacustrine, and eolian materials. These materials are derived from material that ranges in age from the late Precambrian (the Harrison Series of the Albion and Middle Mountains) (3) to recent times (alluvium along the Raft River) (19).

The soils of the Sublett Mountains formed in alluvium and colluvium derived from limestone of Mississippian age (3). During the Pleistocene, loess was deposited on the mountains and incorporated into the soils. Soil development prior to the loess deposition had been slow because of the high content of lime in the rocks and, at the higher elevations, the Pinedale Age glaciation and lingering snowfields. Soils that formed in limestone alluvium and were influenced by loess are Ireland and Hymas soils. These soils exhibit less soil development than other soils of similar age because of their large quantities of lime. Lime must be leached out of the soil before clay formation and translocation can occur (11).

On the foothills and at the base of the Sublett and Blackpine Mountains are deep deposits of loess and silty alluvium derived from the loess that was deposited on the adjacent mountains. Soils that formed in this silty material are Bancroft, Heglar, Rexburg, and Ririe soils.

In the Raft River valley, soils formed in alluvium and some lacustrine sediments that have a thin top layer of eolian material. They are underlain by coarse gravel and layers of sand that were deposited mainly during the. Pleistocene. The depth to gravel and sand varies greatly. It ranges from about 16 to 20 inches in Darkbull soils to about 5 feet or more in Declo soils.

On the flood plains and low stream terraces along the Raft River and various streams are recent deposits of moderately fine textured alluvial material. These deposits overlie coarser material, which was deposited by streamflows of higher velocity (6). Soils that formed in the finer alluvium are Downata, Freedom, Genola, Jett, and Stake soils. Kovich soils are associated with smaller streams in mountain valleys and have medium textured material about 40 inches thick over gravel and sand.

Soils on the flood basalts formed in alluvial and eolian material that ranges from medium sand to silt. The coarser textured material occurs closest to Lake Walcott. The material gradually becomes finer farther to the south and southeast. The gradation of particle sizes indicates that the source of the eolian material is localized near the present Lake Walcott, somewhat farther to the north and west. On the older flows, soils that developed in alluvium and eolian material have developed a duripan at a shallow to moderate depth. These soils include Scoon and Taunton soils. On the younger surfaces are soils that formed in moderately coarse alluvium and eolian material and that are shallow to very deep to the underlying basalt. These soils include Davey, Somsen, Trevino, and Vining soils. The finest textured soils in the survey area are the farthest from Lake Walcott. They developed in very deep loess and silty alluvium. These soils include Bahem, Portneuf, and Paulville soils.

Soils in the Cotterel and Jimsage Mountains formed in alluvium and colluvium that were derived primarily from rhyolite and have some loess influence. The rhyolite is early Pliocene in age (19). As this material weathers, montmorillonitic clays form. The soils on north-facing slopes show the least amount of soil development and have layers of lime. They include Jimsage soils. Soils that developed on south- and west-facing slopes have a well developed subsoil and no lime. These soils include Hutchley, Vipont, and Vitale soils.

Soils on the lower parts of the Albion Mountains and Middle Mountain formed primarily in residuum and alluvium of mica schist and quartzite of the Harrison Series (3). Quartzite weathers very slowly and has produced the stones, cobbles, and gravel found in these soils. As the mica schist material weathers, montmorillonitic clays form. The resulting soils have a strongly developed, clayey subsoil and no lime. They include Birchcreek, Chen, Itca, and Yeates Hollow soils. Loess has influenced the associated Conneridge soils and resulted in a weakly developed soil that has an accumulation of lime in the subsoil.

In the southern part of the Albion Mountains, west of Almo, is an area of granite and granodiorite that is part of the Cassia batholith, which is late Cretaceous or early Tertiary in age (3). Soils formed in residuum and alluvium derived from this material. The material is easily eroded, and the resultant soils are generally young and not well developed. These soils include Kanlee, Ola, and Ricrest soils.

The soils in the Goose Creek area formed in alluvium, colluvium, and residuum of weakly consolidated volcanic ash or tufaceous sandstone of the Beaverdam Formation (middle Miocene) or of the upper tufaceous member of the Salt Lake Formation (Pliocene) (19). These materials are easily eroded, and the resultant soils are young and not well developed. Soils that formed in volcanic ash include Bluehill, Coalbank, Cottonthomas, Hardister, Tomsherry, Stines, and Wilsongulch soils.

Climate and Living Organisms

Climate and living organisms, or plants and animals, have strongly influenced soil formation in the survey area. These two factors are described together because they are so intimately related. Climate affects the weathering of minerals, the activity of micro-organisms, the degree of water movement through the soil, and the kind and amount of vegetation, all of which affect soil formation.

The climate in the survey area is characterized by warm, dry summers and cold, moist winters. Temperature and precipitation are strongly influenced by relief. Generally, as elevation increases, the average annual precipitation increases and the average annual air temperature and frost-free period decrease. The warmest, driest part of the survey area is near Lake Walcott on the flood basalts. This area receives about 10 inches of precipitation annually, has an average annual air temperature of about 48 degrees F, and has a frost-free period of about 130 days. The high mountain areas receive the most precipitation annually, 20 inches or more; have the coldest temperatures, about 36 to 45 degrees; and have the shortest frost-free periods, less than 60 to about 85 days.

The soils in the driest and warmest parts of the survey area are dominantly Aridisols. They have a light-colored surface layer, have free carbonates at or near the surface, have a low amount of organic carbon, and support relatively sparse stands of shrubs and grasses. Microbial action is low due to the dry conditions. Insect activity, particularly that of cicadas, however, is fairly widespread. Cicadas burrow to a depth of about 20 to 30 inches and hibernate. The burrows eventually are filled with fine material, which becomes cemented with carbonates and silica. These cemented layers can be dense enough to restrict roots and the movement of water. Portneuf and Bahem soils have this type of insect activity. Other Aridisols include Darkbull, Declo, Scoon, and Somsen soils.

As the elevation increases along the foothills and in the higher valleys, the average annual precipitation increases to about 12 to 16 inches and the average annual temperature decreases. Thus, the rate of evapotranspiration is reduced. This results in an increase of available moisture for plant growth, microbial activity, and soil leaching. The soils that developed under these conditions generally are Mollisols. They have had the carbonates leached out of the surface layer and redeposited lower in their profile. These soils support a vigorous growth of plants, especially grasses. Because of the increased plant activity, organic matter has accumulated in the surface layer, making it dark. The leaching of lime from these soils has also promoted, in varying degrees, the formation and movement of clay. Soils that have a dark surface layer include Rexburg and Ririe soils. Bancroft soils have a dark surface layer and an accumulation of clay.

At the highest elevations, the average annual precipitation is 16 to 20 inches or more. The cooler temperatures further retard the rate of evapotranspiration. Generally, soils in these areas have had most or all the carbonates leached to a depth of 40 inches or more and support a dense stand of vegetation. The dominant vegetation is grasses and shrubs, but trees are common in small, concave

pockets and on north-facing slopes. An increased movement of water through these soils has helped the movement and accumulation of clay deeper in the profile. The lush vegetation has produced an abundant amount of organic carbon, which has been deposited deep in the soil and resulted in very thick, dark horizons. A buildup of organic matter has also occurred due to the cooler temperatures, which slow microbial activity and the breakdown of organic matter. Examples of soils that formed under these conditions include Hades, Manila, and Povey soils.

In areas where snows last until late spring, soil development is minimal. Soils in these areas have the least amount of microbial activity but generally support luxuriant vegetation. Organic matter generally ranges from fresh or slightly decomposed litter on the surface to well decomposed material deep in the profile. Soils that do not exhibit this general trend are in areas on ridges and mountaintops that have westerly aspects. These soils are exposed to high winds much of the time and have very high rates of evapotranspiration, which drastically reduce the effective moisture capacity. The vegetation is sparse, microbial activity is low, and the content of organic matter is low. Generally, carbonates have not been leached much below the surface layer. Soils on these windswept ridges include Conneridge, Hymas, and Middlehill soils.

Relief

The relief of the survey area has been determined mainly by geologic events. It influences the formation of soils through its effect on soil and air drainage; erosion; precipitation, or the effective moisture received; and exposure, or aspect, to the sun and wind.

The soils of the mountains generally have a high percentage of rock fragments throughout, are shallow to deep to bedrock, and are well drained. These characteristics reflect the steep landscapes on which the soils formed and the accelerated rate of erosion resulting from the steepness. Soils on convex, south- and west-facing ridges and summits are subject to the highest rates of geologic erosion and have the least effective available moisture. They have warmer soil temperatures and commonly dry out quickly. These soils are generally shallow to moderately deep and are well developed to poorly developed, depending on parent material. Examples of less developed soils are Conneridge, Hymas, and Ireland soils. Examples of well developed soils are Birchcreek, Chen, Itca, and Yeates Hollow soils.

Soils on concave, north-facing slopes and foot slopes tend to receive more moisture from runoff and snow. Because of the increased amount of moisture, vegetation is more abundant, erosion is decreased, and profiles generally are deeper and more developed. Examples of these soils are Arbone, Hades, Manila, and Pavohroo soils.

Soils on fan terraces and foothills covered by loess and silty alluvium generally are very deep and well drained. They have moderate relief and have slopes of 4 to 30 percent. On west- and north-facing slopes, these soils have a dark surface layer. Examples of these soils are Kucera, Rexburg, and Ririe soils.

Soils on south-facing and westerly slopes at the lower altitudes receive less effective moisture and dry out more quickly. They generally have a light colored surface layer and relatively little soil development. These soils commonly have lime near the surface and a layer of accumulation at a moderate depth. Examples of these soils are Watercanyon. and Heglar soils.

Soils on basalt plains and valley flats or bottoms are well drained and shallow to very deep. They have low relief and a low amount of rainfall. Soils in slightly concave areas receive additional moisture that flows from the higher surrounding areas. They support more vegetation than the surrounding soils and have been leached of lime in the upper part. Examples of these soils are McClenden and Paulville soils.

Soils in the flatter areas support less vegetation and generally have lime near or at the surface. Examples of these soils are Bahem, Darkbull, Declo, Escalante, Somsen, Strevell, Taunton, and Thornock soils.

Soils on low stream terraces and flood plains are well drained to poorly drained, respectively, and are very deep. They are nearly level and generally have slopes of 2 percent or less. They receive more effective moisture than soils in the higher adjacent areas, mostly as runoff from the higher areas. The soils generally support lush vegetation except where the content of sodium is high. Examples of soils on stream terraces are Freedom, Idahome, and Mellor soils.

Soils on flood plains have accumulated soil material during periods of high water levels. They support dense stands of grass and water-tolerant plants, which increase the content of organic matter. These soils are fine textured, are moderately well drained to poorly drained, and have a thick, dark surface layer. Because of the low landscape position, the water table is relatively high and generally fluctuates throughout the year. Examples of soils on flood plains are Downata, Genola, Jett, Kovich, and Stake soils.

Time

Time plays an important role in the formation of soils. The longer the soil-forming factors are active, the more the parent material can be altered and, generally, the more the soil can develop. The relative age of a soil is determined through observation of the soil horizons.

The more the horizons are differentiated and expressed, the longer the soil has been forming.

The soils in the survey area vary greatly in age. Soils on the flood plains and low stream terraces are generally young. These soils have formed in recent alluvium derived from active stream deposition and fluvial action. They have little horizon development and generally are stratified, indicating depositional events. Frequently, the soils have a buried surface layer. Most of the soil development has been limited to the accumulation of organic matter in the surface layer. Soils that are young include Downata, Genola, Jett, Kovich, and Stake soils.

Other young soils are the result of active geologic erosion. Soils that develop in weakly consolidated volcanic ash on steep slopes and valley bottoms are highly erodible. The rate of erosion on these soils is slightly less than the rate of soil formation. These soils show little horizon differentiation and have only had enough time to leach carbonates from the surface and accumulate a relatively small amount of organic carbon. They include Bluehill, Coalbank, and Hardister soils.

Soils on the flood basalts and wide valley bottoms have had a more stable environment for their formation. Although they receive less moisture, carbonates have had time to accumulate and concentrate in layers below the soil surface. These layers, or calcic horizons, have been cemented by silica in some of the older soils, forming duripans. Bahem, Darkbull, Somsen, and Thornock soils have calcic horizons. Scoon and Taunton soils have a duripan.

Soils on fan terraces and foothills that are covered by loess and silty alluvium derived from loess date to the late Pleistocene (5). In the lower, drier areas, carbonates have had time to leach out of the surface layer and a weak B horizon, or cambic horizon, has formed. Soils in these areas have not accumulated enough organic matter to develop a darkened surface layer but eventually will. These soils include Heglar and Watercanyon soils.

In areas that have a greater amount of precipitation and vegetative cover, soils have developed a dark surface layer, have been leached of lime to below the B horizon, and have an increase in clay formation and movement. Arbone, Bancroft, Rexburg, and Ririe soils are examples.

Soils on the higher fan terraces that are not covered with loess have had sufficient time for clay to form, move, and accumulate in layers. The layers of clay, or argillic horizons, indicate relatively stable conditions over a long period of time. Soils in these areas also have layers high in carbonates below the clay layers. In general, the greater the amount of clay in the argillic horizon and the more abrupt the transition to the argillic horizon, the older the soil. Acord, Aninto, and Manila soils have well developed, fine textured argillic horizons.

Soils on the mountains and foothills differ greatly in age and degree of development. The relative age depends on the parent material and its components after weathering; aspect, which greatly determines how much heat the soil receives; and landscape position. Soils that formed in limestone generally have less development than those that formed in noncalcareous materials. Limestone tends to erode more easily, resulting in steep slopes, and it contains carbonates, which retard the development of clay. Soils that develop in parent materials consisting of rhyolite, mica schist, and quartzite tend to develop clay argillic horizons.

Soils that developed in convex landscape positions and on ridges and summits are the youngest in appearance. They have either been subjected to geologic erosion or are cold enough to retard formation. They generally have a sparse vegetative cover and carbonates near or at the surface. These soils are shallow to moderately deep. They include Conneridge, Hymas, Ireland, and Middlehill soils.

Soils that developed in the clay-forming parent material on south-facing slopes have well developed argillic horizons. They are generally older than adjacent soils on north-facing slopes. They include Birchcreek, Chen, Itca, and Yeates Hollow soils.

In the rhyolite mountains of the Cotterel and Jimsage ranges, soils on south-facing slopes have moderately well developed argillic horizons. Hutchley, Vipont, and Vitale soils are examples.

On north-facing slopes, the soils are colder and geologic erosion is greater. Soils in these areas are much younger in appearance than those on south-facing slopes. They have little horizon development and generally have carbonates in the upper part of the profile. They include Doodlelink and Jimsage soils.

Geology

The survey area lies in a northern extension of the Basin and Range Province (19). It is generally characterized by steeply sloping mountain ranges and intervening wide, open valleys. The mountains are primarily composed of limestone in the eastern part of the survey area, rhyolite in the central part, and mica schist, quartzite, and some granodiorite in the western part. Mountain building occurred during the middle and late Cenozoic (8, 19). The intervening valleys have been filled with alluvium derived from the surrounding mountains and with later additions of loess and silty alluvium derived from loess during the late Pleistocene (5, 19). Loess storms occurring in the late Pleistocene

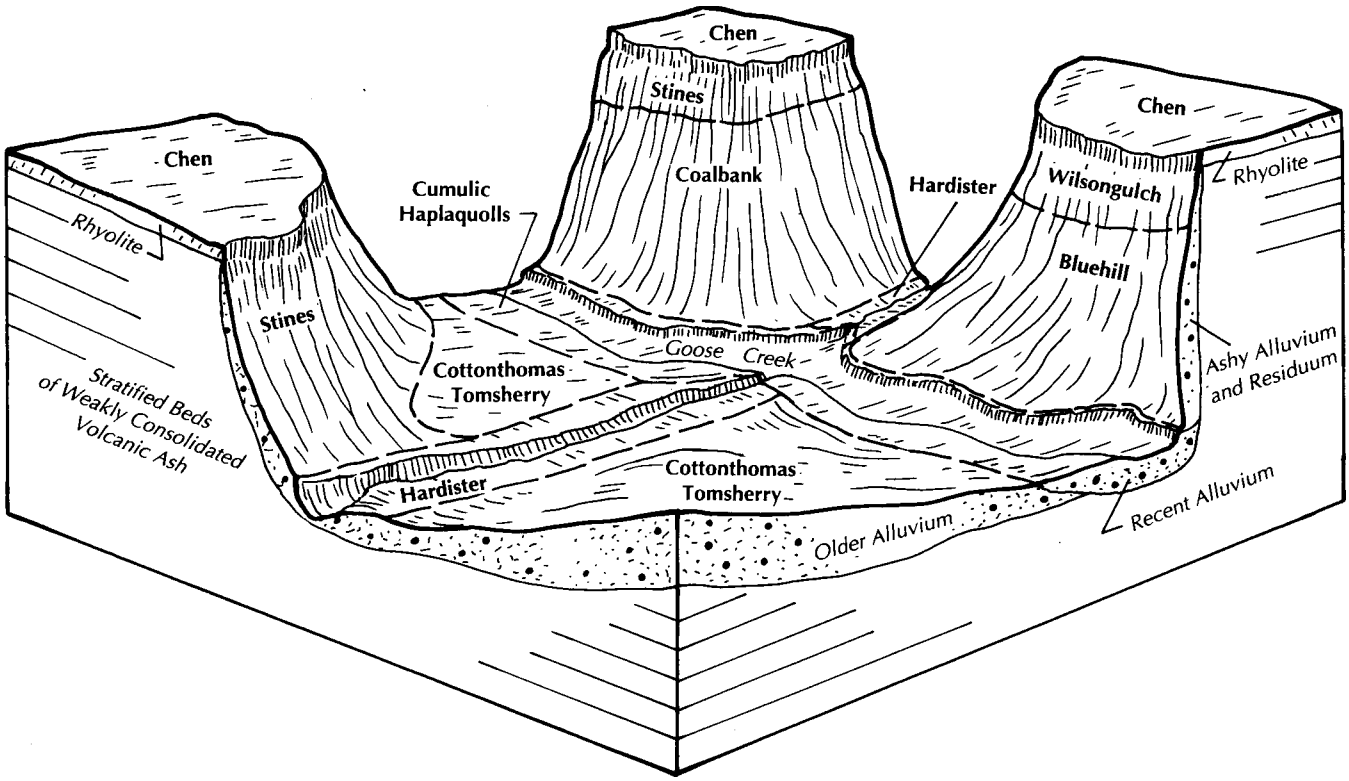

Figure 11.-Typical pattern of soils that formed in volcanic ash.

have influenced most of the survey area and produced locally very deep deposits.

The current landscapes in the survey area began developing in the middle and late Cenozoic. Late Tertiary events, which were largely the result of crustal extension, include folding and faulting that formed the present mountains and sediment-filled basins and local rhyolitic volcanism. During the Quaternary, extensional tectonics probably continued and flood basalts of the Snake River group were erupted from centers at the north end of the Raft River valley (19). The folding produced the Sublett, Black Pine, Albion, Middle, and Cassia Mountains.

The Sublett and Black Pine Mountains are primarily limestone with some quartzite and sandstone (17). The mountains have eroded at a fairly rapid rate, as evidenced by numerous, V-shaped, steep-sided, narrow valleys and narrow intervening ridges. The limestone has been fractured, and the soils on mountainsides and ridges have a large number of rock fragments.

The rhyolite flows are the parent material of the Cotterel and Jimsage Mountains. They also produced the cap rock on the Cassia Mountains, which are in the western part of the survey area *(8, 20).* These flows have been dated (by the K-Ar method) to be between 9 and 11 million years old (19). As uplifting occurred, the brittle rhyolite fractured in many places, allowing water to concentrate and subsequently erode deep, V-shaped, narrow canyons. These canyons are 300 to 400 feet deep in the Cotterel Mountains, and some are almost 1,000 feet deep in the Jimsage Mountains. By contrast, the material beneath the rhyolite cap rock in the Goose Creek area is weakly consolidated volcanic ash or tufaceous sandstone. This ashy material is of the Beaverdam Formation (middle Miocene) or the upper tufaceous member of the Salt Lake Formation (Pliocene) (19). Due to the highly erodible nature of this material and the gentle, broad-based uplift action, mesas and intervening valleys were produced (fig. 11). The mesa tops are inclined about 2 to 10 percent. The direction of incline is generally west to east but has been modified in places by local faulting. The valleys range in depth from about 300 to 1,000 feet.

The Albion and Middle Mountains have large

components of mica schist and quartzite. These materials weather more slowly than limestone. As a result, the mountains are rounded and smoother in appearance than the other mountains in the survey area. They generally lack the narrow, V-shaped valleys, except along major drainageways.

The flood basalts occur primarily in the northern part of the survey area, adjacent to the Snake River plain. This area is nearly level to gently rolling and gradually rises in elevation from 4,200 feet at Lake Walcott to about 4,500 feet at the base of the Cotterel Mountains. Several basalt flows of various ages exist in this area. The youngest flow, the basalt of Yale Road, dates to the middle Pleistocene or is approximately 200,000 to 400,000 years old. It is the southernmost flow. It diverted the Raft River northeastward to its present position (19). The second youngest flow is the basalt of Radio Relay Butte, which also dates to the middle Pleistocene. The oldest flow, the basalt of North Cotterel Mountain, is approximately 9 million years old and was uplifted when the mountain was formed.

The Raft River valley is the largest valley in the survey area. It is flanked on the east by the Sublett Mountains, on the south by the Raft River Mountains, on the southwest by the Albion Mountains, on the west by the Jimsage and Cotterel Mountains, and on the north by the Snake River plain. Large, overlapping alluvial fans have developed along the bases of these mountains and extend to the valley floor. The Raft River flood plain divides the valley unequally and is positioned on the western side of the valley. It ranges in width from a few hundred feet in the southwest, near the Utah border, to nearly 2 miles, in the Malta area. The valley has been accumulating material for approximately 11 million years (19), a period which coincides with the surrounding mountain building. The present surface resulted from the Pleistocene deposition of gravel and sand by streamflows of high velocity. Most of the streamflows coincide with varying climatic conditions rather than with single events, but they also roughly coincide with the melting of snow and ice during and after the Pinedale glacial period (5). During the mid to late Pleistocene, several major loess depositions occurred. The sources were Pleistocene lake beds and local flood plains (5).

The smaller valleys, including Albion, Elba, Almo, and Junction Valleys, have depositional histories similar to that of the Raft River valley. Their close proximity to major mountains has resulted in the movement and deposition of large rock fragments.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is listed in the detailed map unit description.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

Canyon. A long, deep, narrow, very steep-sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control wind erosion.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A

claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble. A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.-Noncoherent when dry or moist; does not hold together in a mass.

Friable.-When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.-When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.-Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.-Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard. When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.-When dry, breaks into powder or individual grains under very slight pressure.

Cemented.-Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Cuesta. An asymmetric, homoclinal ridge capped by resistant rock layers of slight or moderate dip.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial

saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.-These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained. - These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.-These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.-These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.-These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.-These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained. These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except for rice) unless a drainage system is installed.

Duripan. A subsurface horizon that is cemented with silica to the extent that fragments do not slake upon prolonged soaking in water or hydrochloric acid.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep. *Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, or clay.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.-An organic layer of fresh and decaying plant residue.

A horizon.-The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.-The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.-The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.-The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.-Soft, consolidated bedrock beneath the soil.

R layer.-Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of

soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Border.-Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Corrugation.-Water is applied to small, closely spaced furrows or ditches in fields of closegrowing crops or in orchards so that it flows in only one direction.

Furrow.-Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.-Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance-few, *common,* and *many,* size-fine, *medium,* and *coarse; and contrast-faint, distinct, and prominent.* The size measurements are of the diameter along

the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and a surface of considerably bare rock. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Munsell notation. A designation of color by degrees of three simple variables-hue, value, and chroma. For example, a notation of 1 OYR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential natural plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants

and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure *are-platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep, rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy* sand, *sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay*

loam, sandy clay, silty clay, and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.