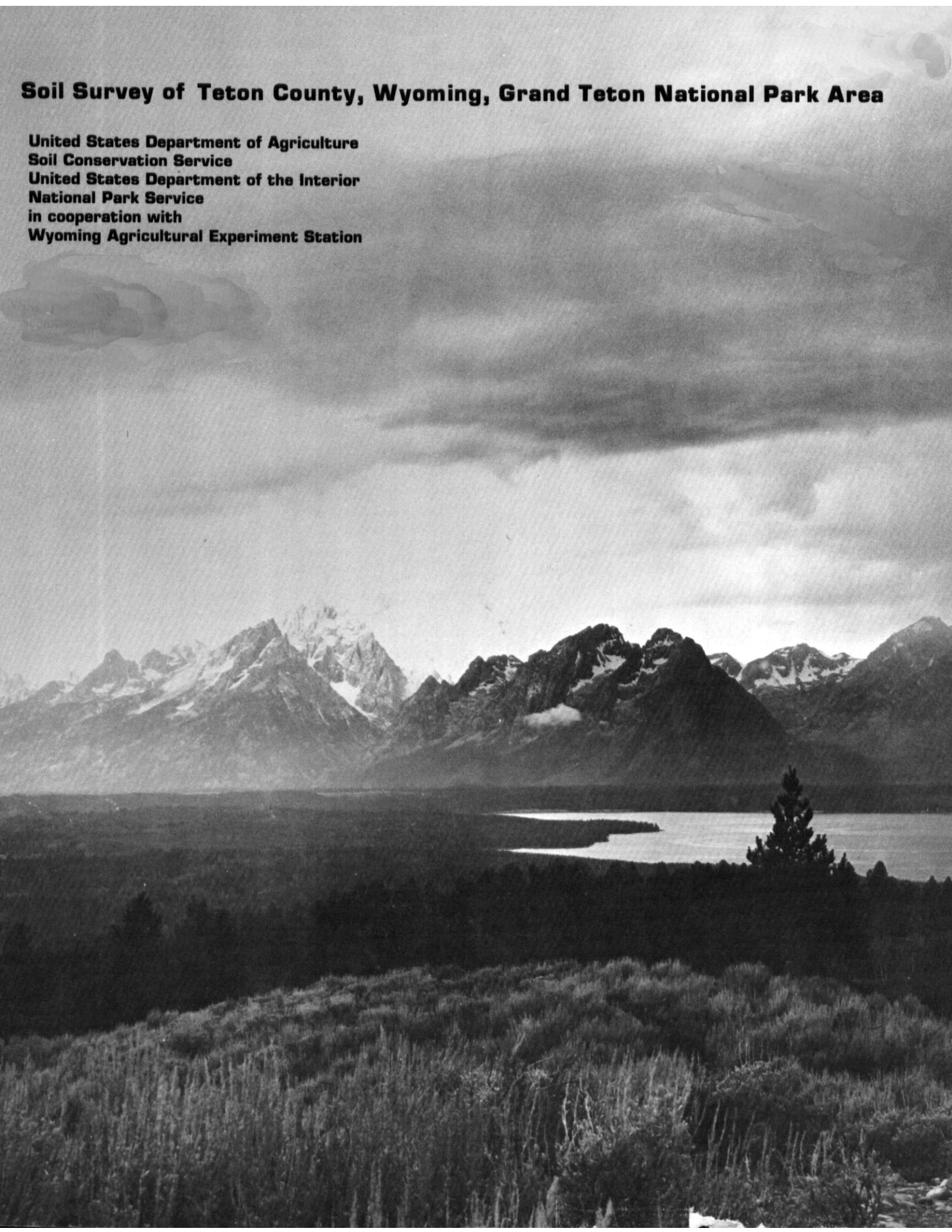
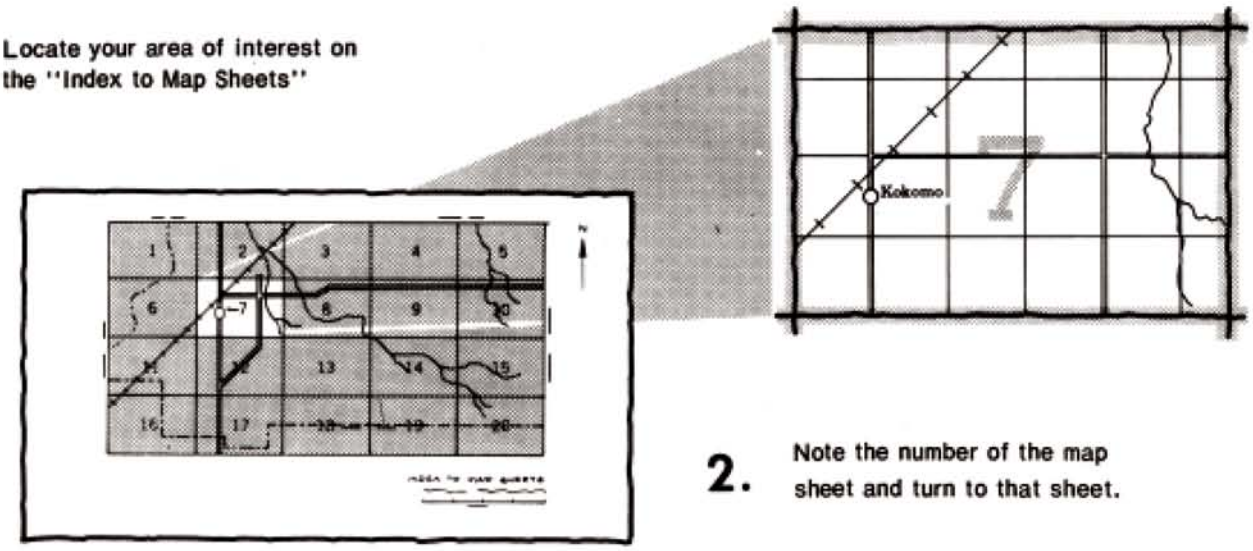
Soil Survey of Teton County, Wyoming, Grand Teton National Park Area

United States Department of Agriculture
Soil Conservation Service
United States Department of the Interior
National Park Service
in cooperation with
Wyoming Agricultural Experiment Station



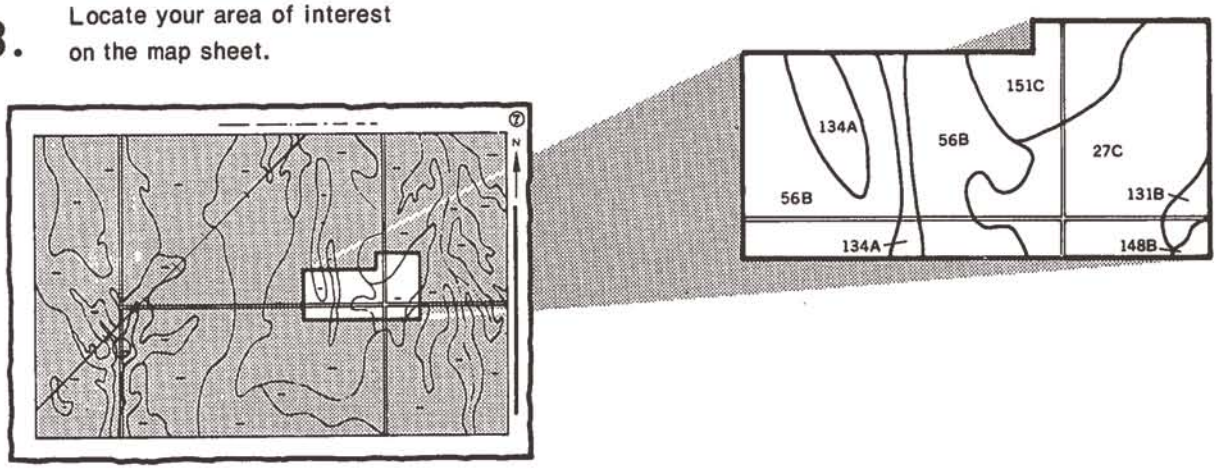
HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

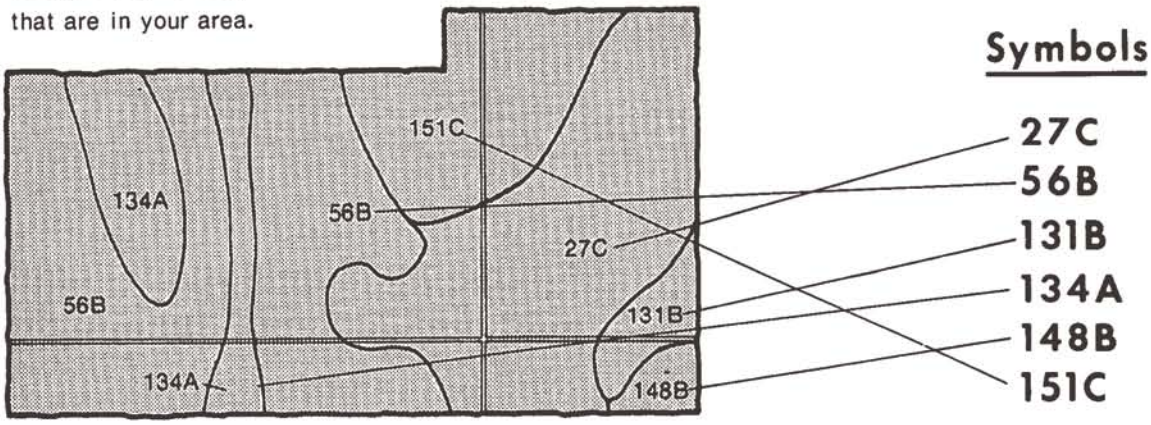


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

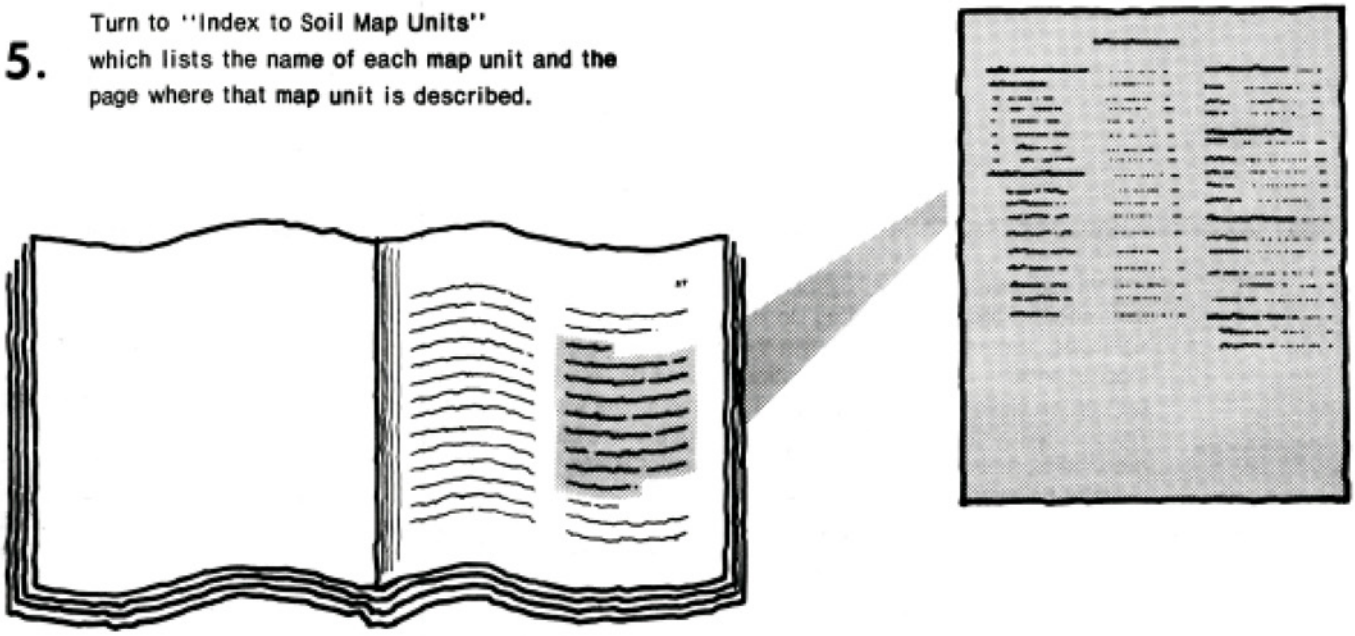


4. List the map unit symbols that are in your area.

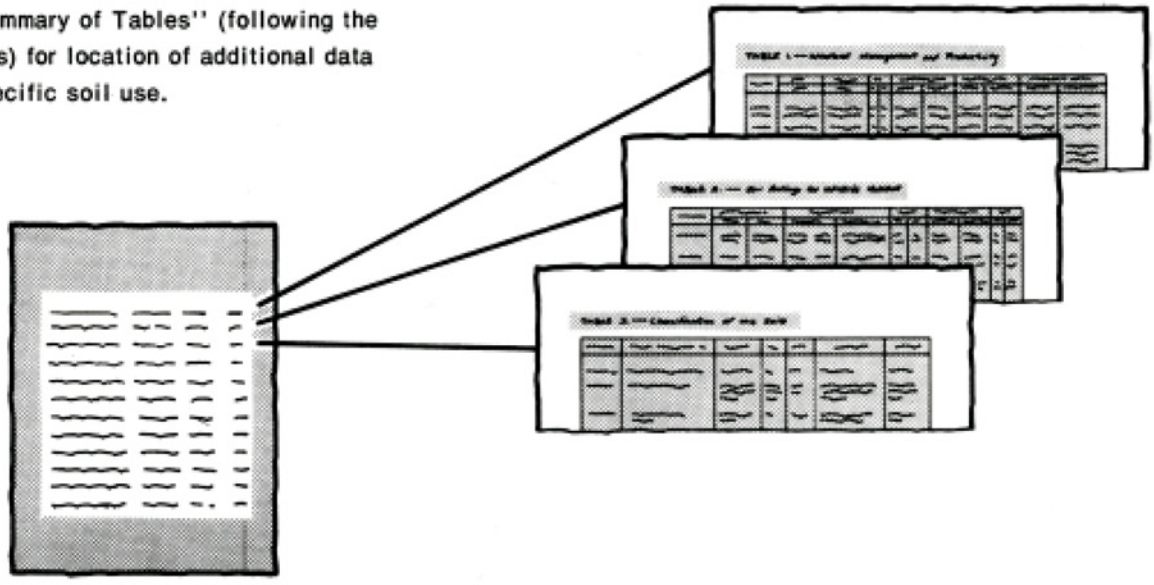


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1970-75. Soil names and descriptions were approved in 1975. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1975. This survey was made cooperatively by the Soil Conservation Service, the National Park Service, and the Wyoming Agricultural Experiment Station. It is part of the technical assistance furnished to the Teton County Soil and Water Conservation District.

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

Cover: The Teton Mountains, Jackson Hole, and Jackson Lake. The mountains are mainly in the Rock outcrop-Rubble land-Leighcan map unit on the general soil map. An area of the Taglake-Sebud map unit is in the foreground.

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Issued April 1982

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Summary of tables

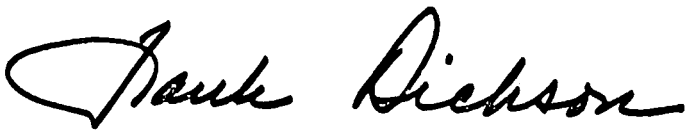
Foreword

This soil survey contains information that can be used in land-planning programs in Teton County, Grand Teton National Park Area, Wyoming. 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 insure 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.



Frank Dickson
State Conservationist
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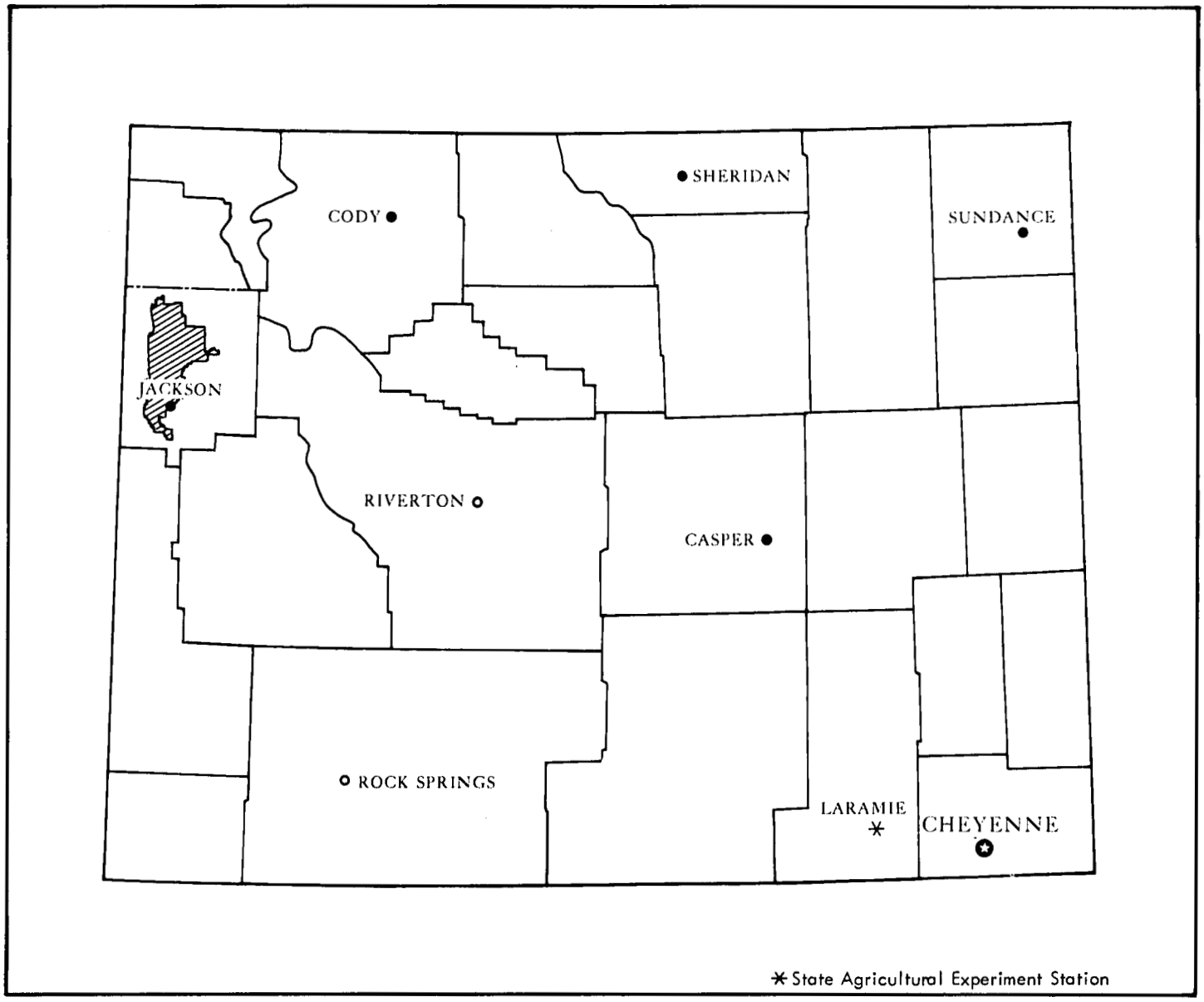

Location of Teton County, Grand Teton National Park Area in Wyoming.

Soil Survey of Teton County, Wyoming

Grand Teton National Park Area

By Jack F. Young, Soil Conservation Service

Soils surveyed by Don J. Lewis, Clarence J. Fowkes and Jack F. Young, Soil Conservation Service and William R. Glenn, Forest Service

United States Department of Agriculture
Soil Conservation Service
United States Department of the Interior
National Park Service
in cooperation with
Wyoming Agricultural Experiment Station

General nature of the survey area

THE TETON COUNTY, WYOMING, GRAND TETON NATIONAL PARK AREA is in the northwestern part of Wyoming. It has a total area of 411,535 acres, or about 643 square miles. This survey area includes Jackson Hole, the surrounding foothills, and the Teton Range to the west. Jackson Hole is a valley about 50 miles long by about 12 miles wide, oriented north-northeast by south-southwest. It slopes to the south and is drained by the Snake River. The mountains surrounding it range as high as the 13,766-foot Grand Teton.

The major part of the survey area is the Grand Teton National Park and the National Elk Refuge. Part is state-owned lands administered by the Wyoming Game and Fish Commission. Only about 3 percent of Teton County is under private ownership. Most privately owned land is within this survey area south of the Park.

The Grand Teton National Park protects the scenic and geologic values of the Teton Range and Jackson Hole and perpetuates the plant and animal life of the Park. According to the Grand Teton National Park master plan, these natural and scenic values and the historic significance of the region are interpreted in such a way that these resources are preserved for the benefit and pleasure of present and future generations.

History and development

Fur trappers were active in Jackson Hole in the 1820's. These old timers called the Snake River the "Mad River" where it runs through Jackson Hole. In the 1860's and 1870's explorers and prospectors visited the area. Some of the famous outlaws of the late 1800's hid in the area. In 1884 the first permanent settlers arrived, and by 1890 the cattle industry was thriving. Jackson had its first store in 1899 and was established as a town in 1914. In 1921 Teton County was formed from part of Lincoln County. Grand Teton National Park was created in 1929, and in 1943 the Jackson Hole National Monument was established. In 1950 the National Monument became part of the National Park.

Transportation and utilities

The survey area is served by U. S. Highways 26, 89, 187, and 287 and Wyoming Highway 22. The National Park Service maintains roads to scenic areas within the Park. County roads provide access to ranches.

Jackson is served by an airline and by charter air service. Limited bus service is provided in the Park. A bus line connects Jackson with Idaho Falls, Idaho.

Electricity is provided in Jackson Hole, but no natural gas is available.

Industry

Though Jackson Hole began as a cattle ranching area, its value to tourism was early recognized. Tourism is the major industry. Jackson has developed into a town of motels, cafes, art galleries, curio shops, and other tourist-related businesses. There are several guest ranches in the area. Several resorts are located within the Park. Skiing is a major winter activity. The lakes within the Park are available for water-based sports.

Natural resources

The natural beauty and recreational opportunities of the Teton landscape are the most important natural re-

sources. Many tourists come to photograph the beauty of the area, hike the trails, and ski the slopes. Tourism provides the largest economic return.

Some timber is harvested in the National Forest, which surrounds the survey area.

Wildlife is abundant. Many sportsmen come to the area to hunt deer, elk, and moose. Most of the hunting occurs in the National Forest.

Ground water is adequate for domestic use throughout the valley. Irrigation water is provided by streams. Irrigation water is stored at Jackson Lake and used downstream from Jackson Hole. There are about 23,000 acres of irrigated hay and pasture in the survey area.

The supply of gravel for construction is adequate for many years.

Physiography, relief, and drainage

Jackson Hole, a high mountain valley with a terraced floor more than 6,000 feet in elevation (*4*), is a north-northeast to south-southwest trending valley that slopes to the south. The valley is surrounded by mountains—the Gros Ventre Range to the east and southeast, the Snake River Range to the south and southwest, the Teton Range to the west, the Yellowstone Plateau to the north, the Absaroka Range to the northeast, and the Wind River Range to the east.

The Tetons, a north-south range 40 miles long formed by a normal fault to the east, reach a height of 13,766 feet in Grand Teton. The core is granite. On the west flank and at the north and south ends of the range is sedimentary rock. There are no foothills to the east of the range. The range slopes steeply to Jackson. The slope to the west is not so great.

The relief of the valley is characterized by several terrace levels and glacial moraines. The moraines are mainly on the west side of the valley. The terraces have been shaped by several cycles of erosion and deposition. The relief of the mountains has been sculptured by ice and water. Glacial ice has carved the U-shaped valleys and cirques, and streams, the deep V-shaped valleys. These processes are still active in shaping the landscape.

The survey area is drained by the Snake River and its tributaries, which are part of the Columbia River Basin.

Climate

Information in the paragraphs that follow is based principally on data from the Jackson Weather Station operated in cooperation with the National Oceanic and Atmospheric Administration. Other data is from the Moose and Moran Weather Stations and Snow Survey measurements of the Soil Conservation Service. Table 1 provides data on temperature and precipitation in the survey area.

The climate at Jackson is classified as cold-snowy-forest with humid winters. Temperatures show a wide range between summer and winter and between daily maximums and minimums because of high elevation and dry air, which permits rapid incoming and outgoing radiation and the passage of both warm and cold air masses. Shallow cold air masses seldom reach Jackson Hole; but deep cold air masses with a strong southerly push do move over the area and may cause very cold temperatures for several days. Cold air drainage from the surrounding mountains can also produce several days of very cold temperatures. The record low, not included in table 1, was -52 degrees F. in December 1924.

The mean annual temperature at Moose, elevation 6,627 feet, is about 2 degrees F. colder than at Jackson. At Moran, elevation 6,798 feet, the mean annual temperature is about 3 degrees F. colder than at Jackson.

Because of cold air outbreaks from Canada, cold air drainage from surrounding mountains, rapid nighttime radiation cooling, and high elevation, no dependable freeze-free period can be noted for the valley.

Precipitation is fairly evenly divided throughout the year, with a major dip in amounts in July. Snows are heavy and remain in place fairly well during the winter, with an accumulation of 2 feet or more throughout the valley. During the period 1931 through 1952, precipitation was 26.72 inches with 191.3 inches of snow at Moose and 21.17 inches with 121.5 inches of snow at Moran. Snow Survey records indicate precipitation in excess of 60 inches with snow depths in excess of 12 feet in the high mountains.

Sunshine is abundant in the Jackson area. Only a few days during spring, summer, and fall are without some sunshine. There is no instrumental record of sunshine duration at Jackson, but it is estimated to average about 55 percent of possible sunshine annually, ranging from about 40 percent in winter to about 70 percent in summer.

Relative humidity is comparatively low during the year and is estimated to average about 55 percent. It ranges from 65 to 70 percent in winter to about 35 to 40 percent in July and August. Average daily humidity is estimated to range from 75 percent in early morning to 55 percent in the heat of the day during winter. During summer it is estimated to range from 60 to 20 percent for those same times.

Winds are generally not strong as compared with those in much of the state. Occasional storms, however, can bring brief periods of high winds with gusts of more than 75 miles per hour.

Potential evapotranspiration from April through October totals about 19 inches.

How this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the

kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from ranch records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

General soil map for broad land use planning

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, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units 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 can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a ranch 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 soils in the survey area vary widely in their potential for major land uses. Table 2 shows the extent of the map units shown on the general soil map. It lists the potential of each, in relation to that of the other map units, for major land uses and shows soil properties that limit use. Soil potential ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

The land uses considered are homesites, recreation, wildlife habitat, irrigated hayland and pasture, and roads. Homesite ratings measure the potential of the soils as sites for dwellings with onsite sewage disposal. Recreation areas are campsites and trails. Wildlife habitat ratings indicate the potential of the soils to produce vegetation for wildlife use. Irrigated hayland and pasture support grasses and legumes for livestock. Local roads have an all-weather surface and a subgrade that is built mainly from the soil at hand.

Soils of the mountains and foothills

The soils, Rubble land, and Rock outcrop in this group occupy mountainsides and foothills at elevations of 6,000 to 13,000 feet in the western and northeastern part of the survey area. The landscape is rolling to very steep. The average annual air temperature is 34 to 36 degrees F. The average annual precipitation is 20 to 40 inches.

These are areas of mixed forest and rangeland. The vegetation is mainly Engelmann spruce, subalpine fir, grasses, and shrubs in the west-central part of the survey area and lodgepole pine, grasses, and shrubs in the northern part.

These areas are all within Grand Teton National Park. They are used for wildlife habitat and recreation.

The four map units in this group make up about 40.5 percent of the survey area.

1. Starman-Rubble land-Midfork

Gently sloping to very steep, very shallow and very deep, well drained soils; and Rubble land; on mountainsides and ridges

This map unit (fig. 1) is in the Teton Mountains. The slope range is 3 to 70 percent. The range in elevation is 7,500 to 11,000 feet. The average annual air temperature is about 34 degrees F, and the average annual precipitation is about 40 inches. The native vegetation is grasses and shrubs.

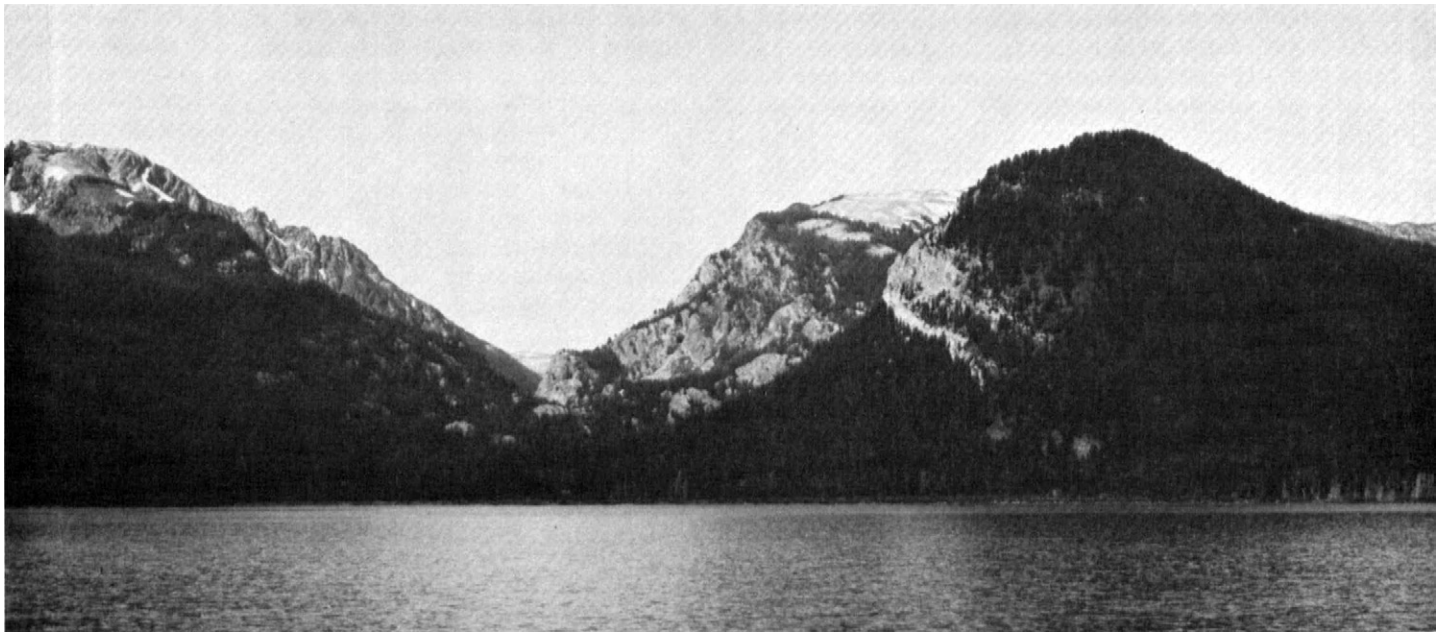

Figure 1.—Starman-Rubble land-Midfork map unit and Jackson Lake. Area to extreme right is the Hechtman-Rock outcrop unit.

This map unit makes up about 11 percent of the survey area. It is about 20 percent Starman and similar soils, 20 percent Rubble land, and 15 percent Midfork soils.

Starman soils are on ridges and upper mountainsides. They have a very stony loam surface layer and very stony clay loam underlying material. They are only 3 to 10 inches deep over limestone.

Rubble land, entirely stones and boulders, is on talus slopes.

Midfork soils are on low and mid slopes. They have a very stony loam surface layer and very cobbly loam underlying material. They are very deep.

Of minor extent in this unit are the very deep Owlcan and Spearhead soils, the shallow Starley and Sheege soils, and Rock outcrop. These soils and Rock outcrop make up 45 percent of the unit.

All of this unit is within the Park. It provides food and cover for deer, elk, bear, small animals, and birds. Rubble land provides habitat for pika. Trails and wilderness campgrounds are the chief recreation facilities. Campgrounds are in designated undeveloped areas. Erosion control is needed in developing and maintaining trails and campgrounds.

2. Rock outcrop-Rubble land-Leighcan

Rock outcrop, Rubble land, and gently sloping to very steep, very deep, well drained soils; on mountainsides and peaks

This map unit is in the Teton Mountains (cover photo). The slope range is 3 to 70 percent. The range in elevation is 6,800 to more than 13,000 feet. The average annual air temperature is about 35 degrees F, and the average annual precipitation is about 40 inches. The native vegetation is Engelmann spruce and subalpine fir.

This unit makes up about 25 percent of the survey area. It is about 45 percent Rock outcrop, 15 percent Rubble land, and 10 percent Leighcan soils.

The outcrops of granite, gneiss, and schist, or Rock outcrop, are the mountain peaks.

The stones and boulders, or Rubble land, are the talus slopes.

Leighcan soils are on mountainsides. They have a very stony sandy loam surface layer and subsoil.

Of minor extent in this unit are the very deep Moran and Walcott soils and the shallow Teewinot soils. These soils make up 30 percent of the unit.

All of this unit is within the Park. It provides food and cover for deer, elk, bear, small mammals, and birds. Rubble land provides habitat for pika. Trails and wilderness campgrounds are the chief recreation facilities. Campgrounds are in designated undeveloped areas. Erosion control is needed in developing and maintaining trails and campgrounds. The areas of Rock outcrop attract mountain climbers.

3. Buffork-Perceton-Tongue River

Gently sloping to steep, moderately deep, well drained soils; on foothills, mountainsides, and ridges

This map unit is in the Shoshone Mountains. The slope range is 3 to 60 percent. The range in elevation is 6,500 to 8,000 feet. The average annual air temperature is about 36 degrees F, and the average annual precipitation is about 20 inches. The native vegetation on Buffork

soils is grasses and shrubs; on Perceton and Tongue River soils, it is mainly lodgepole pine.

This map unit makes up about 3 percent of the survey area. It is about 25 percent Buffork soils, 25 percent Perceton soils, and 10 percent Tongue River soils.

Buffork soils are on foothills and mountainsides. They have a fine sandy loam surface layer and a sandy clay loam subsoil. They are 20 to 40 inches deep over sandstone.

Perceton soils are on mountainsides and ridges. They have a gravelly sandy loam surface layer and a gravelly sandy clay loam subsoil. The substratum is very gravelly sandy loam. These soils are 20 to 40 inches deep over weathered volcanic conglomerate.

Tongue River soils are on foothills and mountainsides. They have a very fine sandy loam surface layer and subsurface layer and a sandy clay loam subsoil. They are 20 to 40 inches deep over sandstone.

Of minor extent in this unit are the very deep Adel, Adel Variant, Clayburn, Tetonville, Tineman, and Bearmouth soils; the shallow Roxal soils; Rock outcrop; and Riverwash. These soils, Rock outcrop, and Riverwash make up about 40 percent of the unit.

All of this unit is within an undeveloped part of the Park. It provides food and cover for elk, deer, small mammals, and birds.

Erosion control is needed to maintain the road that provides access to the National Forest.

4. Hechtman-Rock outcrop

Sloping to very steep, shallow, well drained soils; and Rock outcrop; on mountainsides

This map unit is in the Teton Mountains. The slope range is 6 to 70 percent. The range in elevation is 6,500 to 9,000 feet. The average annual air temperature is about 34 degrees F, and the average annual precipitation is about 40 inches. The native vegetation is mainly lodgepole pine.

This unit makes up about 1 percent of the survey area. It is about 55 percent Hechtman soils and 20 percent Rock outcrop.

Hechtman soils are on mountainsides. They have a gravelly sandy loam surface layer and a very gravelly sandy loam subsoil. They are 10 to 20 inches deep over rhyolite.

Rock outcrop, mainly rhyolite, is on mountainsides and peaks.

Of minor extent in this unit are moderately deep soils similar to Hechtman soils, Perceton soils, and a grass- and shrub-covered soil similar to Hechtman soils. These soils make up 25 percent of the unit.

All of this unit is within the less developed part of the Park. It provides food and cover for deer, elk, bear, small mammals, and birds. Erosion control is needed in developing and maintaining trails.

Soils of the foothills, buttes, and glacial moraines

The soils in this group occupy foothills, buttes, and glacial moraines at elevations of 6,000 to 7,500 feet in the southern part of the survey area. The landscape is nearly level to steep. The average annual air temperature is about 35 degrees F. The average annual precipitation is 17 to 20 inches.

These are areas of mixed forest and rangeland. The vegetation is mainly lodgepole pine, grasses, and shrubs.

These areas are in the Park, on the Elk Refuge, and on private land. In the Park and on the Elk Refuge they are used for wildlife habitat and recreation. On private land they are used for wildlife habitat, recreation, timber, and homesites. Some cleared areas are used for hay and pasture.

The three map units in this group make up about 23 percent of the survey area.

5. Turnerville-Tetonia-Greyback

Nearly level to steep, very deep, somewhat excessively drained and well drained soils; on foothills, mountain foot slopes, and alluvial fans

This map unit (fig. 2) is in the southern part of the survey area. The slope range is 0 to 60 percent. The range in elevation is 6,000 to 7,000 feet. The average annual air temperature is about 35 degrees F, and the average annual precipitation is about 17 inches. The native vegetation on the Turnerville soil is mainly lodgepole pine; on Tetonia and Greyback soils, it is grasses and shrubs.

This unit makes up about 10 percent of the survey area. It is about 20 percent Turnerville soils, 15 percent Tetonia soils, and 15 percent Greyback soils.

Turnerville soils are on foothills, buttes, and mountain foot slopes. They are well drained. They have a silt loam surface layer and a silt loam and silty clay loam subsoil. The substratum is silt loam.

Tetonia soils are on foothills and buttes. They are well drained. They have a silt loam surface layer and subsoil. The substratum is silt loam.

Greyback soils are on alluvial fans. They are somewhat excessively drained. They have a gravelly loam surface layer and subsoil. The substratum is extremely gravelly loam and very gravelly loamy sand.

Of minor extent in this map unit are the very deep Crow Creek, Lantonia, Robana, Willow Creek, Thayne, Grobutte, and Uhl soils; the shallow Starley soils; and the very shallow Starman soils. These soils make up 50 percent of the unit.

This unit is used for wildlife habitat, homesites, dryland hay, pasture, timber, and recreation. It provides food and cover for antelope, deer, bear, elk, small mammals, and birds. It is grazed by cattle and horses. It produces good yields of forage. It provides good homesites if the limita-

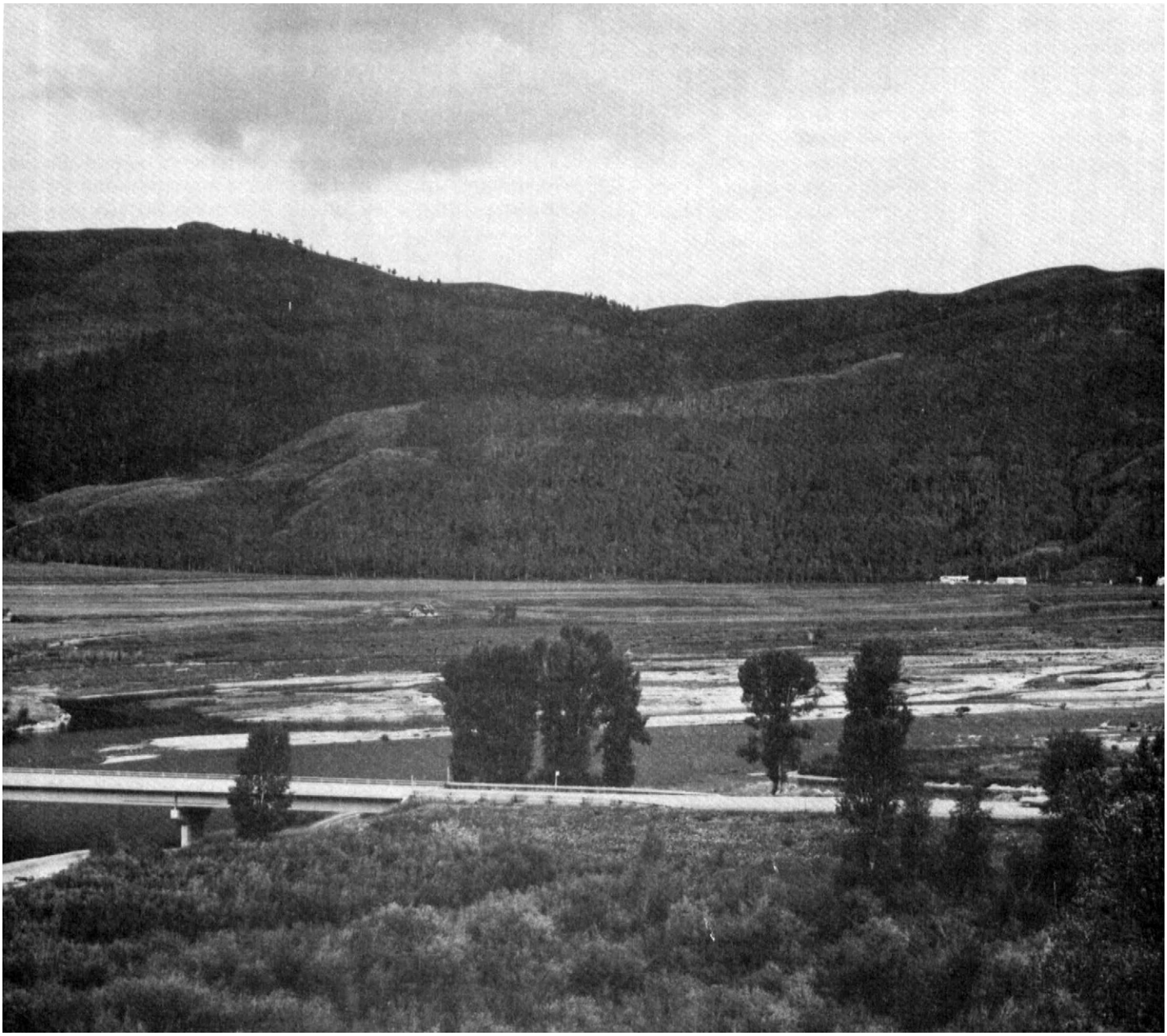

Figure 2.—Snake River Valley near South Park. In foreground and on mountain is the Turnerville-Tetonia-Greyback map unit. On the flood plain are the Tetonville-Wilsonville-Tineman and the Tetonville-Riverwash map units. Tetonville soils and Riverwash are along the braided channel of the Snake River.

tions of low strength, steep slope, and, in some places, moderate permeability are overcome by good design. Trails and campgrounds are the chief recreation facilities. Because the erosion hazard is severe where the slope is more than 6 percent, erosion control is needed for all uses.

6. Taglake-Sebud

Gently sloping to steep, very deep, well drained soils; on glacial moraines

This map unit is mainly on the west side of Jackson Hole. The slope range is 3 to 60 percent. The range in

elevation is 6,500 to 7,200 feet. The average annual air temperature is about 36 degrees F, and the average annual precipitation is about 20 inches. The native vegetation on Taglake soil is mainly lodgepole pine; on Sebud soil, it is grasses and shrubs.

This unit makes up about 11 percent of the survey area. It is about 75 percent Taglake soils and 20 percent Sebud soils.

Taglake soils are on glacial moraines. They have a very stony sandy loam surface layer and a very stony and very cobbly sandy loam subsoil.

Sebud soils are on glacial moraines. They have a stony sandy loam surface layer and a very stony sandy clay loam subsoil. The substratum is very stony sandy loam.

Of minor extent in this unit are the well drained Tineman and Bearmouth soils and the very poorly drained Cryaquolls and Cryofibrists. These soils make up 5 percent of the map unit.

This unit is mainly within the Park. It is used for recreation and wildlife habitat. It provides food and cover for deer, elk, moose, bear, small mammals, and birds. More recreation facilities are on this unit than on any other unit. Campgrounds, resorts, and trails are the chief facilities. Stones and boulders are a severe limitation for building developments.

7. Uhl-Roxal

Sloping to steep, very deep and shallow, well drained soils; on foothills, buttes, and alluvial fans

This map unit (fig. 3) is in the northeastern part of the Park. The slope range is 6 to 65 percent. The range in elevation is 6,500 to 7,500 feet. The average annual air temperature is about 35 degrees F., and the average annual precipitation is about 18 inches. The native vegetation is grasses and shrubs.

This unit makes up about 2 percent of the survey area. It is about 50 percent Uhl soils and 20 percent Roxal soils.

Uhl soils are on alluvial fans and foot slopes. They are very deep. They have a loam surface layer and underlying material.

Roxal soils are on side slopes of foothills and buttes. They are shallow. They have a loam surface layer and underlying material. They are 10 to 20 inches deep over shale.

Of minor extent in this unit are the very deep Thayne soils and a shallow soil that is similar to Roxal soils but is noncalcareous. Included soils make up 30 percent of the unit.

Figure 3.—Uhl-Roxal map unit on Uhl Hill. Roxal soils are on the upper slope. Uhl soils are on the foot slope and the valley fill.

All of this unit is within the Park. It provides food and cover for antelope, deer, elk, small mammals, and birds.

Soils of the terraces and alluvial fans

These soils occupy stream and outwash terraces, moraines, and alluvial fans at elevations of 6,000 to 7,000 feet in the central part of the survey area. The landscape is nearly level to steep. The average annual air temperature is 35 degrees F. The average annual precipitation is about 17 inches.

In these areas the vegetation is grasses and shrubs.

These areas are in the Park, on the Elk Refuge, and on private land. In the Park and on the Elk Refuge they are used for wildlife habitat and recreation. On private land they are used for irrigated hay and pasture, for grazing, and for homesites.

This one map unit makes up about 21 percent of the survey area.

8. Tineman-Bearmouth-Greyback

Nearly level to steep, very deep, well drained and somewhat excessively drained soils; on stream terraces and alluvial fans

This map unit (fig. 4) is on the floor of Jackson Hole. The slope range is 0 to 40 percent. The range in elevation is 6,000 to 7,000 feet. The average annual air tem-

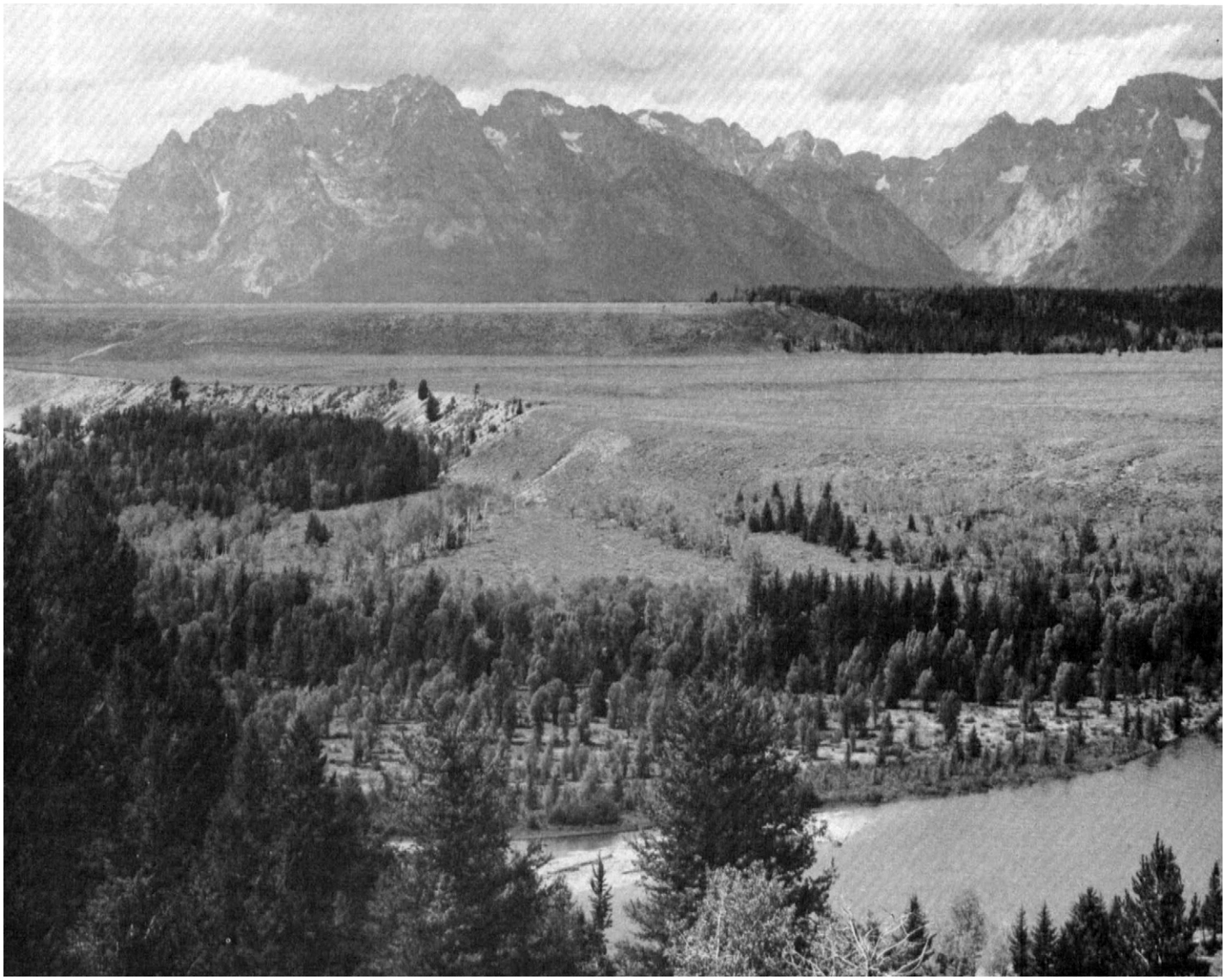

Figure 4.—Tineman-Bearmouth-Greyback map unit on terraces along the Snake River. Mt. Moran is to the right.

perature is about 35 degrees F, and the average annual precipitation is about 17 inches. The native vegetation is grasses and shrubs.

This unit makes up about 21 percent of the survey area. It is about 40 percent Tineman soils, 15 percent Bearmouth soils, and 10 percent Greyback soils.

Tineman soils are on stream terraces. They are well drained. They have a gravelly loam surface layer and a gravelly loam and very gravelly sandy loam subsoil. The substratum is extremely gravelly sand.

Bearmouth soils are on stream terraces. They are well drained. They have a gravelly loam surface layer and a very gravelly loam subsoil. The substratum is extremely gravelly loamy sand.

Greyback soils are on alluvial fans and high stream terraces. They are somewhat excessively drained. They have a gravelly loam surface layer and subsoil. The substratum is extremely gravelly loam.

Of minor extent in the unit are the very deep, well drained Leavitt, Youga, Charlos, and Tetonia soils and the very deep, somewhat poorly drained Tineman wet, Slocum, Silas, Charlos Variant, and Leavitt Variant soils. These soils make up 35 percent of the unit.

This unit is used for irrigated hay and pasture and for homesites, wildlife habitat, and recreation. It is grazed by cattle and horses. It produces good yields of forage if it is irrigated. It has good areas for homesites, but pollution of ground water is a hazard because of rapid permeability. It provides food and cover for antelope, sage grouse, small mammals, and birds. Trails are the main recreation facilities.

Soils of the flood plains

The soils and Riverwash in this group occupy flood plains and low terraces at elevations of 6,000 to 7,000 feet in the central part of the survey area. The landscape is nearly level. The average annual air temperature is about 35 degrees F. The average annual precipitation is about 17 inches.

In these areas the vegetation is mainly grasses and shrubs. There are some trees.

These areas are in the Park, on the Elk Refuge, and on private land. In the Park and on the Elk Refuge they are used for wildlife habitat and recreation. On private land they are used for irrigated hay and pasture and for grazing, wildlife habitat, and homesites.

The three map units in this group make up about 16 percent of the survey area.

9. Tetonville-Wilsonville-Tineman

Nearly level, very deep, somewhat poorly drained soils; on flood plains and low terraces

This map unit (fig. 2) is along the Snake, Gros Ventre, and Buffalo Rivers. The slope range is 0 to 3 percent. The range in elevation is 6,000 to 7,000 feet. The average annual air temperature is about 35 degrees F, and the average annual precipitation is about 17 inches. The native vegetation is grasses, shrubs, and willows.

This map unit makes up about 8 percent of the survey area. It is about 55 percent Tetonville soils, 15 percent Wilsonville soils, and 15 percent Tineman wet soils.

Tetonville soils are on flood plains. They have a fine sandy loam surface layer. The underlying material is extremely gravelly loamy sand thinly stratified with gravelly loam or loamy sand.

Wilsonville soils are on flood plains. They have a fine sandy loam surface layer. The underlying material is stratified fine sandy loam, very fine sandy loam, loamy coarse sand, and extremely gravelly loamy sand.

Tineman wet soils are on low terraces. They have a gravelly loam surface layer and a gravelly and very gravelly loam subsoil. The substratum is extremely gravelly loam.

Of minor extent in this unit are the somewhat poorly drained Slocum, Charlos Variant, and Leavitt Variant soils; the poorly drained Newfork soils; and the well drained Tineman soils. These soils make up 15 percent of the unit.

This unit is used for irrigated hay and pasture and as homesites and wildlife habitat. Careful management of irrigation is essential to avoid raising the already high water table. The water table is a hazard for homesites. Only dwellings without basements should be constructed. The water table is also a hazard for onsite sewage disposal. This unit provides some food for antelope and sage grouse and cover for nesting birds.

10. Cryaquolls-Cryofibrists

Nearly level, very deep, poorly drained and very poorly drained soils; on flood plains

This map unit (fig. 5) is along the Snake River and some of its tributaries. The slope range is 0 to 3 percent. The range in elevation is 6,000 to 7,000 feet. The average annual air temperature is about 35 degrees F, and the average annual precipitation is about 17 inches. The native vegetation is grasses, sedges, and willows.

This unit makes up about 4 percent of the survey area. It is about 55 percent Cryaquolls and 30 percent Cryofibrists.

Cryaquolls are on flood plains. They have a loam or sandy loam surface layer. The underlying material is loam or sandy loam.

Cryofibrists are in old oxbows on flood plains. They have a peat surface layer. The underlying material is loam or sandy loam.

Of minor extent in this unit are the poorly drained Newfork soils and the somewhat poorly drained Tineman wet, Tetonville, and Wilsonville soils. These soils make up 15 percent of the unit.

This unit is mainly in the Park and on the Elk Refuge; a small acreage is privately owned. Areas within the Park and on the Elk Refuge provide habitat for moose, small mammals, and waterfowl. The privately owned areas are used for pasture and wildlife habitat.

Figure 5.—Cryaquolls-Cryofibrists map unit in the National Elk Refuge. Mountains in background are the Turnerville-Tetonia-Greyback unit.

11. Tetonville-Riverwash

Nearly level, very deep, somewhat poorly drained soils; and Riverwash; on flood plains

This map unit (fig. 2) occurs as one area along the Snake and Gros Ventre Rivers. The slope range is 0 to 3 percent. The range in elevation is 6,000 to 7,000 feet. The average annual air temperature is about 35 degrees F, and the average annual precipitation is about 17 inches. The native vegetation is grasses and willows.

This unit makes up about 4 percent of the survey area. It is about 40 percent Tetonville soils and 25 percent Riverwash.

Tetonville soils are on flood plains. They have a fine sandy loam surface layer. The underlying material is extremely gravelly loamy sand thinly stratified with gravelly loam or loamy sand.

Riverwash, adjacent to the river channel, is sand, gravel, and cobbles.

Of minor extent in this unit are Cryaquolls, Cryofibrists, Wilsonville soils, and a calcareous soil similar to Tetonville soils along the Gros Ventre River. These soils make up 35 percent of the unit.

This unit provides some food and cover for deer, moose, elk, small mammals, and waterfowl. It provides

fishing and also launching areas for canoes and rafts. It provides limited grazing for cattle.

Soil maps for detailed planning

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

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

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil, a brief description of the soil profile, and a listing of the principal hazards and limitations to be considered in planning management.

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

Soils of one series can differ in texture of the surface layer or of the underlying material. 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, Tetonville fine sandy loam is one of several phases in the Tetonville series.

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

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

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Leighcan-Moran-Walcott association is an example.

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

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

Table 3 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

This survey was mapped at two levels of detail. At the most detailed level, map units are narrowly defined. This means that soil boundaries were plotted and verified at closely spaced intervals. At the less detailed level, map units are broadly defined. Soil boundaries were plotted and verified at wider intervals. The broadly defined units are indicated by an asterisk in the soil map legend. The detail of mapping was selected to meet the anticipated long-term use of the survey, and the map units were designed to meet the needs for that use.

Soil descriptions

1—Adel Variant loam. This very deep, somewhat poorly drained soil is near Two Ocean Lake. It formed in loamy alluvium at an elevation of about 6,900 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

Small areas of Adel soils are included in mapping.

In a typical profile of this Adel Variant soil the surface layer is grayish brown loam 26 inches thick. The underlying material is light brownish gray loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight. The seasonal water table is at a depth of 1 foot to 3 feet during May to September.

All the acreage is within the National Park and is rangeland. It is used for recreation and wildlife habitat.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Hiking is the main recreation. Hikers observe and photograph wildlife, wild flowers, and landscapes. During part of the year, however, trails are soft and muddy.

This soil provides food and cover for moose, small mammals, and birds.

The capability subclass is VIw dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

2—Aquic Cryoborolls-Aquic Cryoboralfs complex, 30 to 70 percent slopes. These steep to very steep soils are on mountainsides east of Lizzard Point in the Park and in the eastern part of the Elk Refuge. They formed in mixed residuum of sedimentary rock and rhyolite at elevations of 7,000 to 8,000 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 30 to 70 percent.

This map unit is about 50 percent Aquic Cryoborolls and 35 percent Aquic Cryoboralfs. Aquic Cryoborolls are in areas of grass-shrub cover, and Aquic Cryoboralfs are forested. Areas of the soils are too intermixed to be mapped separately.

Included areas of Typic Cryochrepts and Rock outcrop make up 15 percent of the unit.

Aquic Cryoborolls and Aquic Cryoboralfs are moderately deep, somewhat poorly drained soils formed in residuum and landslide deposits. Texture is variable because of stratified bedrock and mixing of the soil material by landslides. Content of rock fragments is also variable. These soils are highly unstable and are subject to solifluction, soil creep, and mass wasting.

Permeability is moderate to slow. The seasonal water table rises to within 1 foot or less of the surface during snowmelt in spring and early in summer. The available water capacity is usually high. The root zone is 20 to 40 inches. Surface runoff is rapid, and the erosion hazard is high.

The soils in this unit, a complex of rangeland and forest, provide recreation and wildlife habitat.

The potential native vegetation of Aquic Cryoborolls is dominantly Nebraska sedge, northern reedgrass, and willows. If the vegetation deteriorates, sedges and willows increase. Under further deterioration of the plant cover, willows are dominant. In an average year the yield is approximately 6,500 pounds of air dry herbage per acre. It ranges from 5,500 pounds in unfavorable years to 7,500 pounds in favorable years.

Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs.

If the vegetation is overutilized to the extent that seeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

The potential vegetation on Aquic Cryoboralfs is lodgepole pine and subalpine fir. Columbine and Oregon-grape are dominant understory forbs. The forest provides cover for deer, elk, and bear and is pleasing esthetically against the mountainous background.

Trails are the recreation facilities in this forested area. Trails are used by hikers to observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss. A plant cover should be maintained to reduce the hazards of landslides and erosion. If roads are constructed, the hazard of landslides is extreme.

The capability subclass is VIIe dryland. The range site for Aquic Cryoborolls is Wetland, 20-inch or more precipitation zone.

3—Bearmouth gravelly loam. This very deep, well drained soil is along the Snake River throughout the central part of the survey area. It formed in gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent, but most slopes are about 2 percent.

Small areas of Tineman soils are included in mapping.

In a typical profile of this Bearmouth soil the surface layer is brown gravelly loam about 6 inches thick. The subsoil is brown very gravelly loam about 9 inches thick. The substratum is brown extremely gravelly loamy sand to 60 inches or more.

Permeability is rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

Most of the acreage is rangeland and is used for recreation, wildlife habitat, and grazing. A small acreage is used for irrigated hay and pasture. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

The potential vegetation is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and low sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They are used by hikers and horseback riders to observe and photograph wildlife, wild flowers, and landscapes. They should be designed to control or prevent erosion.

This soil provides some food for antelope, elk, deer, small mammals, and birds.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats

is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excessive seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The capability subclass is IVs irrigated and VIs dryland. The range site is Gravelly, 15- to 19-inch precipitation zone.

4—Buffork-Adel association. These steep soils are on mountainsides from Lozier Hill to north of Two Ocean Lake. They formed in residuum or in alluvium at elevations of 6,500 to 7,600 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F. The slope range is 20 to 60 percent.

This unit is about 55 percent Buffork fine sandy loam, 20 percent Adel loam, and 15 percent Perceton gravelly sandy loam. The Buffork soil is on grass-shrub covered escarpments that have south- and west-facing exposures. Adel soils are along drainageways and in alluvial pockets. Perceton soils are in less sloping, forested areas and on escarpments that do not have direct south-facing exposures.

Adel Variant soils on toe slopes are included in mapping. They make up 10 percent of the unit.

The moderately deep, well drained Buffork soil formed in residuum. In a typical profile the surface layer is grayish brown and brown fine sandy loam 9 inches thick. The upper 6 inches of the subsoil is dark brown fine sandy loam, and the lower part is yellowish brown sandy clay loam. Sandstone is at 26 inches.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 20 to 40 inches. Surface runoff is rapid. The erosion hazard is high.

The very deep, well drained Adel soil formed in alluvium. In a typical profile the surface layer is dark grayish brown loam 26 inches thick. The underlying material is light brownish gray loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The moderately deep, well drained Perceton soil formed in residuum. In a typical profile the surface is covered with 2 inches of forest litter. The subsurface layer is pinkish gray gravelly sandy loam 7 inches thick. The subsoil is brown gravelly sandy clay loam 18 inches thick. The substratum is brown very gravelly sandy loam 10 inches thick. Weathered volcanic conglomerate is at 35 inches.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 20 to 40 inches. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The soils in this unit are rangeland. Scattered patches of forest are on the Perceton soil. The entire acreage is within the National Park and is used for recreation and wildlife habitat.

The potential vegetation on Buffork and Adel soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs.

If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer and bear.

The potential native vegetation on Perceton soils is lodgepole pine. Vaccinium, heartleaf arnica, elk sedge, and Oregon-grape are the dominant understory forbs. The patches of forest provide cover for deer, elk, and bear and are pleasing esthetically against the mountainous background.

Hiking is the main recreation on this unit. Hikers observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIe dryland. The range site for Buffork and Adel soils is Loamy, 15- to 19-inch precipitation zone.

5—Buffork-Tongue River association. These hilly to steep soils are on hills and mountainsides of the divide between the Buffalo River and Pacific Creek, east of Moran Junction and on Blacktail Butte. They are at elevations of 6,800 to 8,000 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F. The slope range is 15 to 40 percent.

This map unit is about 45 percent Buffork fine sandy loam, 20 percent Tongue River very fine sandy loam, and 15 percent Clayburn sandy loam. The Buffork soil is on grass-shrub covered southeast-facing slopes. The Tongue River soil is on forested northwest-facing slopes. The Clayburn soil is on grass-shrub covered valleys and lower slopes.

Included in mapping are Starman soils and a soil that has a sandier texture but is otherwise similar to the Tongue River soil. These included soils make up 20 percent of the unit.

The moderately deep, well drained Buffork soil formed in residuum of sandstone. In a typical profile the surface layer is grayish brown and brown fine sandy loam 9 inches thick. The upper 6 inches of the subsoil is dark brown fine sandy loam, and the lower part is yellowish brown sandy clay loam. Sandstone is at 26 inches.

Permeability is moderate. The available water capacity is low. The root zone is 20 to 40 inches. Surface runoff is rapid, and the erosion hazard is high.

The moderately deep, well drained Tongue River soil formed in residuum of sandstone. In a typical profile the surface layer is grayish brown very fine sandy loam 2 inches thick. The subsurface layer is light brownish gray very fine sandy loam 6 inches thick. Next is a 12-inch layer of mixed subsoil and subsurface material of pale brown very fine sandy loam. The subsoil is brown sandy clay loam. Sandstone is at 36 inches.

Permeability is moderate. The available water capacity is moderate. The root zone is 20 to 40 inches. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Clayburn soil formed in glacial drift. In a typical profile the surface layer is very dark brown, grayish brown, and brown sandy loam 26 inches thick. The subsoil is brown sandy clay loam 10 inches thick. The substratum is pale brown sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. The root zone is 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The entire acreage is mixed rangeland and forest. It is within the National Park and is used for recreation and wildlife habitat.

The potential native vegetation on Buffork and Clayburn soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs.

If the vegetation is overutilized to the extent that seeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

The potential native vegetation on the Tongue River soil is lodgepole pine. Lupine is the dominant understory forb. The patches of forest provide cover for deer, elk, and bear and are pleasing esthetically against the mountainous background.

Trails are the chief need in this forested area. They are used by hikers to observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIe dryland. The range site for Buffork and Clayburn soils is Loamy, 15- to 19-inch precipitation zone.

6—Buffork-Tongue River-Clayburn association. These gently sloping to moderately steep soils are on hills of the divide between the Buffalo River and Pacific Creek, east of Moran Junction. They are at elevations of 6,800 to 8,000 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F. The slope range is 3 to 15 percent.

This map unit is about 30 percent Buffork fine sandy loam, 30 percent Tongue River very fine sandy loam, and 25 percent Clayburn sandy loam. The Buffork soil is on grass-shrub covered southeast-facing slopes. The Tongue River soil is on forested, northwest-facing slopes. The Clayburn soil is in grass-shrub covered valleys and on the lower southeast-facing slopes.

Included in mapping are areas of a soil that has a sandier texture but is otherwise similar to the Clayburn soil. Also included are areas of steeper soils. These included soils make up 15 percent of the map unit.

The moderately deep, well drained Buffork soil formed in residuum of sandstone. In a typical profile the surface layer is grayish brown and brown fine sandy loam 9 inches thick. The upper 6 inches of the subsoil is dark brown fine sandy loam, and the lower part is yellowish brown sandy clay loam. Sandstone is at 26 inches.

Permeability is moderate. The available water capacity is low. The root zone is 20 to 40 inches. Surface runoff is moderate. The erosion hazard is moderate to high.

The moderately deep, well drained Tongue River soil formed in residuum of sandstone. In a typical profile the surface layer is grayish brown very fine sandy loam 2 inches thick. The subsurface layer is light brownish gray very fine sandy loam 6 inches thick. Next is a 12-inch layer of mixed subsoil and subsurface material of pale brown very fine sandy loam. The subsoil is brown sandy clay loam. Sandstone is at 36 inches.

Permeability is moderate. The available water capacity is moderate. The root zone is 20 to 40 inches. Surface runoff is moderate to high.

The very deep, well drained Clayburn soil formed in glacial drift. In a typical profile the surface layer is very dark brown, grayish brown, and brown sandy loam 26 inches thick. The subsoil is brown sandy clay loam 10 inches thick. The substratum is pale brown sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, the hazard of landslide is high.

The entire acreage is mixed rangeland and forest. It is within the National Park and is used for recreation and wildlife habitat.

The potential native vegetation on Buffork and Clayburn soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs.

If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

The potential native vegetation on Tongue River soils is lodgepole pine. Lupine is the dominant understory forb. The patches of forest provide cover for deer, elk, and bear and are pleasing esthetically against the mountainous background.

Trails are the chief need in this forested area. Trails are used by hikers to observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIe dryland. The range site for Buffork and Clayburn soils is Loamy, 15- to 19-inch precipitation zone.

7—Charlos loam. This very deep, well drained soil is throughout the central part of the survey area. It formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

Included in mapping are areas of Leavitt and Tineman soils and areas of a soil that has carbonate accumulation at a depth of less than 40 inches but is otherwise similar to the Charlos soil. The included soils make up about 15 percent of the unit.

In a typical profile of this Charlos soil the upper 4 inches of the surface layer is grayish brown loam, and the lower 5 inches is grayish brown sandy clay loam. The subsoil is pale brown and brown clay loam and sandy clay loam 19 inches thick. The substratum is pale brown extremely gravelly loamy sand to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

This soil is used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support four animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Heavy applications of irrigation water cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential native vegetation is dominantly spike fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition.

This soil provides some food for antelope, elk, deer, small mammals, and birds.

If this soil is used for homesites, pollution of ground water is a hazard.

The capability subclass is IIIc irrigated and IVc dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

8—Charlos Variant loam. This very deep, somewhat poorly drained soil is throughout the central part of the survey area, south of the National Park. It formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

Included in mapping are areas of Leavitt and Tineman soils and areas of a soil that has a gravelly substratum but is otherwise similar to this Charlos Variant soil. These soils make up about 15 percent of the unit.

In a typical profile of this Charlos Variant soil the surface layer is grayish brown loam 7 inches thick. The subsoil is light brownish gray clay loam 31 inches thick. The substratum is light brownish gray extremely gravelly loamy sand to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight. The seasonal high water table is at a depth of 1 to 3 feet during April to September. The soil is subject to rare flooding.

This soil is used for irrigated hay and pasture and for recreation and wildlife habitat. Irrigated hayland produces about 1 ton of hay per acre. Irrigated pasture produces enough forage per acre to support 2 1/2 animal units per month.

Garrison creeping foxtail, reed canarygrass and red clover are suitable for hay or pasture. The amount of red clover in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Heavy applications of irrigation water cause excess seepage and loss of water and soil nutrients and cause the already high water table to rise.

Grasses respond to nitrogen fertilizer. Red clover responds to phosphate.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Hiking is the main recreation. Sometimes trails are soft and muddy.

This soil provides some food for antelope, elk, deer, small mammals, and birds.

The capability subclass is IIIw irrigated and IIIw dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

9—Crow Creek silt loam, 3 to 10 percent slopes. This very deep, well drained soil is on the Elk Refuge. It formed in loess at elevations of 6,500 to 7,100 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

About 15 percent of the unit is included areas of the Tetonia soil.

In a typical profile of this Crow Creek soil the surface layer is grayish brown and dark grayish brown silt loam 9 inches thick. The subsoil is pale brown silt loam 5 inches thick. The substratum is light brownish gray, white, and light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is moderate, and the erosion hazard is moderate.

All the acreage is rangeland.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

This soil provides some food for antelope, elk, deer, sage grouse, small mammals, and birds.

The capability subclass is VIe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

10—Crow Creek silt loam, 10 to 20 percent slopes. This very deep, well drained soil is on the Elk Refuge adjacent to the National Park. It formed in loess at elevations of 6,500 to 7,100 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 3 to 10 percent.

About 15 percent of the unit is included areas of Tetonia, Roxal, Starley, and Greyback soils.

In a typical profile the surface layer of this Crow Creek soil is grayish brown and dark grayish brown silt loam 9 inches thick. The subsoil is pale brown silt loam 5 inches thick. The substratum is light brownish gray, white, and light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

All the acreage is rangeland and is used for wildlife habitat.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

This soil provides some food for antelope, elk, deer, sage grouse, small mammals, and birds.

The capability subclass is VIe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

11—Crow Creek-Starley association. These hilly to steep soils are on the Elk Refuge. They formed in loess or in residuum of sedimentary and volcanic rock at elevations of 6,500 to 7,200 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 15 to 40 percent.

This map unit is 55 percent Crow Creek silt loam, 15 percent Starley gravelly loam, and 15 percent Roxal loam. The Crow Creek soil is in loess deposits on north-

or east-facing slopes. Starley soils are on ridgetops and south- or west-facing slopes that have welded tuff bedrock. Roxal soils are on ridgetops and south- or west-facing slopes that have shale bedrock.

About 15 percent of this unit is included areas of Greyback and Starman soils.

The very deep, well drained Crow Creek soil formed in loess. In a typical profile the surface layer is grayish brown and dark grayish brown silt loam 9 inches thick. The subsoil is pale brown silt loam 5 inches thick. The substratum is light brownish gray, white, and light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The shallow, well drained Starley soil formed in residuum of welded tuff. In a typical profile the surface layer is grayish brown gravelly loam 8 inches thick. The substratum is light gray very gravelly loam. Welded tuff is at 15 inches.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is high.

The shallow, well drained Roxal soil formed in residuum of shale. In a typical profile the surface layer is light gray loam 7 inches thick. The underlying material is pale olive loam. Shale is at 13 inches.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is severe.

If the plant cover on this unit is disturbed, landslides are a hazard.

All the acreage is rangeland and is used for wildlife habitat.

The potential vegetation on the Crow Creek soil is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The potential vegetation on the Roxal and Starley soils is dominantly spike fescue, bluebunch wheatgrass, and Idaho fescue. If the vegetation deteriorates, thickspike wheatgrass, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,400 pounds of air dry herbage per acre. It ranges from 1,000 pounds in unfavorable years to 1,700 pounds in favorable years.

The soils of this association provide food for antelope, elk, deer, sage grouse, small mammals, and birds.

The capability subclass is VIe dryland. The range site for Crow Creek soil is Loamy, 15- to 19-inch precipitation zone; for Roxal and Starley soils, it is Shallow Loamy, 15- to 19-inch precipitation zone.

12—Cryaquolls-Cryofibrists complex. These nearly level soils are in seep areas surrounding springs and old stream oxbows throughout the central part of the survey area. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent, but the slope is generally less than 1 percent.

This map unit is about 65 percent Cryaquolls and 35 percent Cryofibrists. There is no topographic distinction between the soils because the area is now a plain. Cryofibrists, which occur in old oxbows filled with peat, are generally slightly wetter than Cryaquolls. Areas of the soils are too intermixed to be mapped separately.

Cryaquolls are very deep, poorly drained and very poorly drained soils formed in alluvium. They are sandy loam and loam. Cryofibrists are very deep, poorly drained and very poorly drained soils. The surface layer is peat, and the substratum is sandy loam and loam.

Permeability in both soils is moderate to slow. The available water capacity is moderate to high. The water table is at or near the surface during most of the year. Roots penetrate to a depth of 60 inches or more. Surface runoff is very slow, and the erosion hazard is slight.

Most of the acreage is rangeland and is used for grazing and wildlife habitat. Small areas used for hay produce about 1 ton of poor quality hay per acre.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and northern reedgrass. If the vegetation deteriorates, sedges and willows increase. Under further deterioration of the plant cover, unpalatable rushes and sedges invade. In an average year the yield is approximately 6,000 pounds of air dry herbage per acre. It ranges from 5,000 pounds in unfavorable years to 7,000 pounds in favorable years.

The soils in this unit provide food and cover for moose and waterfowl.

The capability subclass is Vw irrigated and Vw dryland. The range site is Wetland 15- to 19-inch precipitation zone.

13—Cryorthents-Cryoborolls complex, 60 to 90 percent slopes. These very steep soils are on south- and west-facing mountainsides and buttes, mainly in the southern part of the survey area. They formed in alluvium, colluvium, and residuum of sedimentary rock at elevations of 6,000 to 8,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 60 percent Cryorthents and 25 percent Cryoborolls. Cryorthents are on direct south- and west-facing exposures. Cryoborolls are in draws and notches that do not have direct south- or west-facing exposures. Areas of the soils are too intermixed to be mapped separately.

Areas of Starley and Starman soils, Rubble land, and Rock outcrop are included in mapping. Included areas make up 15 percent of the unit.

Cryorthents and Cryoborolls are very deep, well drained, very stony or very gravelly soils.

Permeability is moderate. The available water capacity is moderate to low. Roots penetrate to a depth of 60 inches or more. Surface runoff is very rapid, and the erosion hazard is high.

If the plant cover on this complex is disturbed, landslides are a hazard.

The entire acreage is rangeland and is used for very limited grazing and recreation and as wildlife habitat.

The potential native vegetation is dominantly grass and low sagebrush. If the vegetation deteriorates, desirable grasses decrease and forbs and shrubs increase. Undesirable weeds and annuals become more abundant as range condition becomes poorer.

Trails are the chief recreation facilities. They should be designed to reduce the hazard of erosion.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

The capability subclass is VIIIe dryland.

14—Greyback gravelly loam, 0 to 3 percent slopes. This very deep, somewhat excessively drained soil is at the edge of the valley in the southern part of the survey area. It formed in gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

About 20 percent of the unit is included areas of a soil that has a cobbly loam surface layer but is otherwise similar to this Greyback soil.

In a typical profile of this Greyback soil the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

This soil is used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces about 1 ton of hay per acre. Irrigated pasture produces enough forage per acre to support about 2 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The proportion of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

Trails are the main recreation facilities. They should be designed on the contour or with water bars to reduce soil loss.

This soil provides some food for antelope, elk, deer, small mammals, and birds.

If this soil is used for homesites, septic tank effluent may pollute ground water.

The capability subclass is IVs irrigated and VIs dryland. The range site is Gravelly, 15- to 19-inch precipitation zone.

15—Greyback gravelly loam, 3 to 6 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans and terraces at the edge of the valley in the southern part of the survey area. It formed in mixed gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

About 20 percent of the unit is included areas of a soil that has a cobbly loam surface layer but is otherwise similar to this Greyback soil.

In a typical profile of this Greyback soil the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

This soil is used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces about three-fourths of a ton of hay per acre. Irrigated pasture produces enough forage per acre to support about 2 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The proportion of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season prevents maturity of most grain crops. Oats are sometimes grown as a companion crop in establishing hay or pasture. If temperatures prevent

maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through contour ditches or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be constructed on the contour and lined, or the water should be piped to prevent erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

Trails are the main recreation facilities. They should be designed on the contour or with water bars to reduce soil loss.

This soil provides some food for antelope, elk, deer, small mammals, and birds.

If this soil is used for homesites, septic tank effluent may pollute ground water.

The capability subclass is IVs irrigated and VIs dryland. The range site is Gravelly, 15- to 19-inch precipitation zone.

16—Greyback-Charlos complex. These nearly level soils are on stream terraces east of Teton Village. They formed in alluvium at an elevation of about 6,300 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is 35 degrees F. The slope range is 0 to 3 percent.

This map unit is about 45 percent Greyback gravelly loam and 45 percent Charlos loam. It is on a plain. The Charlos soil occupies old channels and oxbows filled with loamy sediment. The soils do not occur in a repeating pattern.

About 10 percent of the unit is included areas of a soil that has a cobbly loam surface layer but is otherwise similar to this Greyback soil.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Charlos soil formed in alluvium. In a typical profile the upper 4 inches of the surface layer is grayish brown loam, and the lower 5 inches is grayish brown sandy clay loam. The subsoil is pale brown and brown clay loam and sandy clay loam about 19 inches thick. The substratum is pale brown extremely gravelly loamy sand to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The soils in this unit are used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces about 1 1/2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support about 3 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity of the Greyback soil, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation on the Greyback soil is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

The potential vegetation on the Charlos soil is dominantly spike fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to reduce the hazard of erosion.

The soils in this unit provide some food for antelope, elk, deer, small mammals, and birds.

If the soils are used as homesites, pollution of ground water is a hazard.

The capability subclass is IVs irrigated and VIs dryland. The range site for Greyback soil is Gravelly, 15- to 19-inch precipitation zone; for Charlos soil, it is Loamy, 15- to 19-inch precipitation zone.

17—Greyback-Thayne complex, 3 to 6 percent slopes. These gently sloping soils are on alluvial fans and colluvial foot slopes that have scattered patches of loess. They are along the valley margin in the southern part of the survey area. They formed in gravelly alluvium and loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 50 percent Greyback gravelly loam, 20 percent Thayne gravelly loam, and 20 percent Tetonia silt loam. Areas of the soils are too intermixed to be mapped separately. Greyback and Thayne soils are on the alluvial fans and foot slopes. The Tetonia soil is in the patches of loess.

Included in mapping are areas of a soil that has a cobbly loam surface layer but is otherwise similar to the Greyback soil and areas of Crow Creek, Lantonia, Robana, and Willow Creek soils. Included soils make up 10 percent of the unit.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Thayne soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 6 inches thick. The subsoil is pale brown gravelly loam 28 inches thick. The substratum is light gray extremely gravelly sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

These soils are used for irrigated hay and pasture, for dryland pasture, and for homesites, recreation, and wildlife habitat. Irrigated hayland produces about 1 ton of hay per acre. Irrigated pasture produces enough forage per acre to support about 2 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation on the Greyback soil is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

The potential vegetation on Thayne and Tetonia soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

If homesites are developed on the Greyback or Thayne soil, septic tank effluent may pollute the ground water. If homesites are developed on the Tetonia soil, moderate permeability is a moderate limitation for septic tank absorption fields.

The capability subclass is IVs irrigated and VIs dryland. The range site for Greyback soil is Gravelly, 15- to 19-inch precipitation zone; for Thayne and Tetonia soils, it is Loamy, 15- to 19-inch precipitation zone.

18—Greyback-Thayne complex, 6 to 10 percent slopes. These sloping soils are on alluvial fans and colluvial foot slopes that have scattered patches of loess. They are along the valley margin in the southern

part of the survey area. They formed in gravelly alluvium and loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This unit is about 50 percent Greyback gravelly loam, 20 percent Thayne gravelly loam, and 20 percent Tetonia silt loam. Areas of the soils are too intermixed to be mapped separately. Greyback and Thayne soils are on the alluvial fans and foot slopes. The Tetonia soil is in the patches of loess.

Included in mapping are a soil that has a cobbly loam surface layer but is otherwise similar to the Greyback soil and areas of Crow Creek, Lantonia, Robana, and Willow Creek soils. Also included is a soil that is similar to Greyback and Thayne soils but has a very thick, dark surface layer or is deeper to calcareous material. In some areas the surface layer is thick and depth to calcareous material is greater than in Greyback and Thayne soils. Included soils make up about 10 percent of the unit.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Thayne soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 6 inches thick. The subsoil is pale brown gravelly loam 28 inches thick. The substratum is light gray extremely gravelly sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

These soils are used for irrigated hay and pasture, for dryland pasture, grazing, homesites, recreation, and wildlife habitat. Irrigated hayland produces about 1 ton of hay per acre. Irrigated pasture produces enough forage per acre to support about 2 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or by sprinklers. Corrugations should be constructed on the contour to minimize soil loss. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be constructed on the contour and lined, or the water should be piped to prevent erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate fertilizer.

The potential vegetation on the Greyback soil is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

The potential vegetation on Thayne and Tetonia soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

If homesites are developed on the Greyback or Thayne soil, septic tank effluent may pollute the ground water. If homesites are developed on the Tetonia soil, moderate permeability is a moderate limitation for septic tank absorption fields.

The capability subclass is IVs irrigated and VIs dryland. The range site for Greyback soil is Gravelly, 15- to 19-inch precipitation zone; for Thayne and Tetonia soils, it is Loamy, 15- to 19-inch precipitation zone.

19—Greyback-Thayne complex, 10 to 20 percent slopes. These moderately steep soils are on alluvial fans and colluvial foot slopes that have scattered patches of loess. They are along the valley margin in the southern part of the survey area. They formed in gravelly

alluvium and loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This unit is about 60 percent Greyback gravelly loam, 15 percent Thayne gravelly loam, and 15 percent Tetonia silt loam. Areas of the soils are too intermixed to be mapped separately. Greyback and Thayne soils are on the alluvial fans and foot slopes. The Tetonia soil is in the patches of loess.

Included in mapping are a soil that has a cobbly loam surface layer but is otherwise similar to the Greyback soil and areas of Crow Creek, Lantonia, Robana, and Willow Creek soils. Also included is a soil that has a very thick, dark surface layer or is deeper to calcareous material than Greyback and Thayne soils. In some areas the surface layer is thick and the depth to calcareous material is greater than in Greyback and Thayne soils. Included soils make up about 10 percent of the unit.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Thayne soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 6 inches thick. The subsoil is pale brown gravelly loam 28 inches thick. The substratum is light gray extremely gravelly sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The soils in this unit are rangeland and are used for dryland pasture, homesites, recreation, and wildlife habitat.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for pasture.

The potential vegetation on the Greyback soil is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

The potential vegetation on Thayne and Tetonia soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

If homesites are developed on the Greyback or Thayne soil, septic tank effluent may pollute the ground water. If homesites are developed on the Tetonia soil, moderate permeability is a moderate limitation for septic tank absorption fields. On all the soils, slope is a limitation for homesites.

The capability subclass is VIs dryland. The range site for Greyback soil is Gravelly, 15- to 19-inch precipitation zone; for Thayne and Tetonia soils, it is Loamy, 15- to 19-inch precipitation zone.

20—Greyback-Thayne complex, 20 to 30 percent slopes. These steep soils are on alluvial fans and colluvial foot slopes that have scattered patches of loess. They are along the valley margin in the southern part of the survey area. They formed in gravelly alluvium and loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This unit is about 60 percent Greyback gravelly loam, 15 percent Thayne gravelly loam, and 15 percent Tetonia silt loam. Areas of the soils are too intermixed to be mapped separately. Greyback and Thayne soils are on the alluvial fans and foot slopes. The Tetonia soil is in the patches of loess.

Included in mapping are a soil that has a cobbly loam surface layer but is otherwise similar to the Greyback soil and areas of Crow Creek, Lantonia, Robana, and Willow Creek soils. Also included is a soil that is similar to Greyback and Thayne soils but has a very thick, dark surface layer or has calcareous material at a greater depth or has both a thick surface layer and greater depth to calcareous material. Included soils make up about 10 percent of the unit.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches

thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Thayne soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 6 inches thick. The subsoil is pale brown gravelly loam 28 inches thick. The substratum is light gray extremely gravelly sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The soils in this unit are rangeland and are used for grazing, homesites, recreation, and wildlife habitat.

The potential vegetation on the Greyback soil is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

The potential vegetation on Thayne and Tetonia soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

If homesites are developed on the Greyback or Thayne soil, septic tank effluent may pollute the ground water. If homesites are developed on the Tetonia soil, moderate permeability is a moderate limitation for septic tank absorption fields. On all the soils, slope is a severe limitation for homesites.

The capability subclass is VIs dryland. The range site for Greyback soil is Gravelly, 15- to 19-inch precipitation zone; for Thayne and Tetonia soils, it is Loamy, 15- to 19-inch precipitation zone.

21—Grobutte-Thayne gravelly loams, 30 to 60 percent slopes. These steep soils are on south- and west-facing slopes of mountains and buttes in the southern part of the survey area. They formed in gravelly alluvium at elevations of 6,000 to 7,500 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 50 percent Grobutte gravelly loam, 20 percent Thayne gravelly loam, and 20 percent Greyback gravelly loam. The Grobutte soil is on direct south- and west-facing exposures. Thayne and Greyback soils are along draws and in notches. They do not have direct south- or west-facing exposure. Areas of these soils are too intermixed to be mapped separately.

About 10 percent of the unit is included areas of Crow Creek soils and Rock outcrop.

The very deep, well drained Grobutte soil formed in colluvium and alluvium. In a typical profile the surface layer is light brownish gray gravelly loam 4 inches thick. The upper 6 inches of the underlying material is light gray gravelly loam, and the lower part to 60 inches or more is light gray very gravelly sandy loam.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Thayne soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 6 inches thick. The subsoil is pale brown gravelly loam 28 inches thick. The substratum is light gray extremely gravelly sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The soils in this unit are rangeland and are used for grazing, recreation, and wildlife habitat.

The potential vegetation on Grobutte and Greyback soils is dominantly bluebunch wheatgrass, Idaho fescue, and mountainmahogany. If the vegetation deteriorates, big sagebrush and low rabbitbrush increase. Under further deterioration of the plant cover, forbs, annuals, and juniper invade. In an average year the yield is approximately 1,500 pounds of air dry herbage per acre. It ranges from 1,100 pounds in unfavorable years to 1,900 pounds in favorable years.

The potential vegetation on the Thayne soil is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

Because of the south- and west-facing exposures, these soils are snowfree in winter. They provide winter habitat for deer and elk and year-round habitat for small mammals and birds.

The capability subclass is VIIs dryland. The range site for Grobutte and Greyback soils is Steep Stony, 15- to 19-inch precipitation zone; for Thayne soil, it is Loamy, 15- to 19-inch precipitation zone.

22—Hechtman-Rock outcrop association. These rolling to steep soils and areas of Rock outcrop are between the highway and Jackson Lake north of Lizzard Point. The soils formed in residuum of rhyolite at elevations of 6,500 to 7,500 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 6 to 60 percent.

This map unit is about 40 percent Hechtman gravelly sandy loam and 25 percent Rock outcrop. The Hechtman soil is on south- and west-facing side slopes. Most areas of Rock outcrop are in the northern part of the map area.

Included in mapping are areas of soils that are similar to Teewinot, Perceton, and Starley soils but are underlain by rhyolite. These included soils make up about 35 percent of the map unit.

The shallow, well drained Hechtman soil formed in residuum. In a typical profile the surface is covered with a thin layer of forest duff. The subsurface layer is light brownish gray gravelly sandy loam 6 inches thick. The subsoil is very pale brown very gravelly sandy loam. Rhyolite is at 15 inches.

Permeability is rapid. The available water capacity is low. Roots penetrate to a depth of 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is high. The Rock outcrop is rhyolite.

The Hechtman soil is forested and provides wildlife habitat. It is mainly in an undeveloped part of the National Park.

The potential native vegetation is lodgepole pine.

The soils in this unit provide food and cover for elk, deer, small mammals, and birds.

The capability subclass is VIIe for the Hechtman soil and VIIIs for Rock outcrop.

23—Leavitt-Youga complex, 0 to 3 percent slopes. These nearly level soils are on alluvial fans and stream terraces along the Snake River in the central part of the survey area. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 45 percent Leavitt loam and 45 percent Youga silty clay loam. Areas of the soils are too intermixed to be mapped separately.

About 10 percent of the unit is included areas of Tineman soils.

The very deep, well drained Leavitt soil formed in alluvium. In a typical profile the surface layer is dark grayish brown loam about 8 inches thick. The upper 30 inches of the subsoil is grayish brown clay loam, and the lower 14 inches is light gray sandy clay loam. The substratum is light gray extremely gravelly loamy sand to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Youga soil formed in alluvium. In a typical profile the surface layer is very dark grayish brown silty clay loam about 6 inches thick. The subsoil is grayish brown clay loam about 9 inches thick. The substratum is grayish brown or light brownish gray clay loam and sandy clay loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The soils in this unit are used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Almost all of this unit is outside the Park and is privately owned. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The seeding rate should be increased if production of hay is the intended use. The short growing season prevents maturity of most grain crops, but oats is sometimes grown as a companion crop in establishing hay or pasture. If temperatures prevent maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to control seepage, irrigation water should be applied through furrows or borders or by sprinklers. It should be applied when the

available water capacity reaches about 50 percent. Only sufficient water should be applied to bring the available water capacity to 100 percent.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation on these soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Trails are the main recreation facilities. They should be designed on the contour or with water bars to reduce soil loss.

These soils provide some food for antelope, deer, elk, small mammals, and birds. Ground squirrel burrows are common.

If these soils are used for homesites, special design of septic tank absorption fields is required because of moderate permeability. Lengthening the tile lines is one method.

The capability subclass is IIIc irrigated and IVc dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

24—Leavitt-Youga complex, 3 to 6 percent slopes. These gently sloping soils are on alluvial fans and stream terraces along the Snake River in the central part of the survey area. They formed in loamy alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 45 percent Leavitt loam and 45 percent Youga silty clay loam.

About 10 percent of the unit is included areas of Tineman soils.

The very deep, well drained Leavitt soil formed in alluvium. In a typical profile the surface layer is dark grayish brown loam about 8 inches thick. The upper 30 inches of the subsoil is grayish brown clay loam, and the lower 14 inches is light gray sandy clay loam. The substratum is light gray extremely gravelly loamy sand to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Youga soil formed in alluvium. In a typical profile the surface layer is very dark grayish brown silty clay loam about 6 inches thick. The subsoil is grayish brown silty clay loam about 9 inches thick. The substratum is grayish brown or light brownish gray clay loam or sandy clay loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The soils in this unit are used for irrigated hay and pasture and for rangeland, recreation, wildlife habitat, and homesites. Almost all of the unit is outside the Park and is privately owned. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is the intended use. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crops can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through contour ditches or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be constructed on the contour and lined, or the water should be piped.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation on these soils is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed on the contour or with water bars to reduce soil loss.

These soils provide some food for antelope, deer, elk, small mammals, and birds. Ground squirrel burrows are in some areas.

Moderate permeability is a moderate limitation for septic tank absorption fields if these soils are used for homesites.

The capability subclass is IIIe irrigated and IVe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

25—Leavitt Variant loam. This very deep, somewhat poorly drained soil occurs along major streams throughout the valley. It formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

Included in mapping are small areas of Charlos Variant soils and a soil that does not have a well developed B horizon but is otherwise similar to this Leavitt Variant soil. In the Spring Gulch drainageway, some areas of this Leavitt Variant soil have a clayey layer between 36 and 48 inches.

In a typical profile of this Leavitt Variant soil the surface layer is dark grayish brown loam 7 inches thick. The upper 31 inches of the subsoil is grayish brown clay loam, and the lower 14 inches light gray sandy clay loam. The substratum is light gray extremely gravelly loamy sand to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight. The seasonal high water table is at a depth of 2 to 3 feet during May to August.

This soil is used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 3 animal units per month.

Garrison creeping foxtail and reed canarygrass are suitable for hay or pasture. Red clover is a suitable legume. The amount of red clover in the seeding mixture should be increased if production of hay is the intended use. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients and raise the already high water table.

Grasses respond to nitrogen fertilizer. Red clover responds to phosphate.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. During part of the year they are soft and muddy.

This soil provides some food for antelope, elk, deer, small mammals, and birds.

If this soil is used for homesites, the seasonal high water table is a hazard to dwellings with basements and to onsite sewage disposal.

The capability subclass is IIIw irrigated and IIIw dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

26—Leighcan-Moran-Walcott association. These gently sloping to moderately steep soils are on valley bottoms and side slopes in areas of granite, gneiss, and schist rock in the central part of the Teton Mountains. They formed in alluvium, colluvium, and glacial till at elevations of 6,500 to 8,000 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 3 to 20 percent.

This map unit is 40 percent Leighcan very stony sandy loam, 20 percent Moran very stony sandy loam, and 20 percent Walcott gravelly sandy loam. Leighcan soils are forested. Moran soils are along streams and on active alluvial fans. Walcott soils are on valley side slopes and stable alluvial fans.

About 20 percent of this unit is included areas of Teewinot soils, Moran wet soils, Rock outcrop, and Rubble land.

The very deep, well drained Leighcan soil formed in colluvium and glacial till. In a typical profile the surface is covered with 1 inch of forest duff. The subsurface layer is light brownish gray very stony sandy loam 7 inches thick. The subsoil to 60 inches or more is pale brown and light yellowish brown very stony sandy loam.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Moran soil formed in alluvium. In a typical profile the surface layer is brown very stony sandy loam 6 inches thick. The subsoil is brown very stony sandy loam 9 inches thick. The substratum is light brown very stony sandy loam to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow to medium, and the erosion hazard is slight to moderate.

The very deep, well drained Walcott soil formed in alluvium, colluvium, and glacial till. In a typical profile the surface layer is brown gravelly sandy loam 8 inches thick. The underlying material is pale brown very gravelly sandy loam to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow to medium, and the erosion hazard is slight to moderate.

The entire acreage is mixed forest and rangeland and is used for wildlife habitat and recreation. It is within the National Park and is not used for livestock grazing. It provides cover for elk, deer, and bear.

The potential native vegetation on the Leighcan soil is Engelmann spruce, subalpine fir, and whitebark pine. Columbine is the dominant understory forb.

The potential native vegetation on Moran and Walcott is bluebunch wheatgrass, spike fescue, Columbia needlegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,600 pounds of air dry herbage per acre. It ranges from 1,100 pounds in unfavorable years to 2,000 pounds in favorable years.

When the shrubs are overgrazed by deer, desirable shrubs such as antelope bitterbrush decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear. Willows growing on the included Moran wet soils are habitat for moose.

Trails are the main recreation facilities. They are used by hikers to observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIIs dryland. The range site for Moran and Walcott soils is Coarse Uplands, 20-inch or more precipitation zone.

27—Leighcan-Rock outcrop-Walcott association. These steep and very steep soils are on mountainsides and in glacial trough valleys in the Teton Mountains. They formed in colluvium, alluvium, and glacial till at elevations of 7,000 to 11,000 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 30 to 70 percent.

This map unit is about 40 percent Leighcan very stony sandy loam, 30 percent Rock outcrop, and 15 percent Walcott gravelly sandy loam. Leighcan and Walcott soils are on mountainsides and valley sides where the soil mantle covers the bedrock. Leighcan soils are forested. Walcott soils are in the parks. Rock outcrop occurs as scattered areas throughout the map unit. These areas are subject to debris from rock flows from higher areas.

About 15 percent of the unit is included areas of Teewinot, Moran, and Moran wet soils and Rubble land.

The very deep, well drained Leighcan soil formed in colluvium and glacial till. In a typical profile the surface is covered with 1 inch of forest duff. The subsurface layer is light brownish gray very stony sandy loam 7 inches thick. The subsoil to 60 inches or more is pale brown and light yellowish brown very stony sandy loam.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The Rock outcrop is exposed igneous and metamorphic rock.

The very deep, well drained Walcott soil formed in colluvium, alluvium, and glacial till. In a typical profile the surface layer is brown gravelly sandy loam 8 inches thick. The underlying material to 60 inches or more is pale brown very gravelly sandy loam.

Permeability is moderately rapid. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The entire acreage is mixed forest and rangeland and is used for recreation and wildlife habitat.

The potential native vegetation on the Leighcan soil is Engelmann spruce, subalpine fir, and whitebark pine. Patches of forest provide cover for deer, elk, and bear and are pleasing esthetically against the mountainous background.

The potential native vegetation on the Walcott soil is spike-fescue, bluebunch wheatgrass, Idaho fescue, and antelope bitterbrush. If the vegetation deteriorates, big sagebrush and rubber rabbitbrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,500 pounds in unfavorable years to 2,500 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of this habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as antelope bitterbrush decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear. Willows growing in the included areas of Moran wet soils provide habitat for moose.

Trails are the chief recreation facilities in this forested area. Trails are used by hikers to observe and photograph wildlife, wild flowers, and landscapes. They should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIIe for Leighcan and Walcott soils and VIIIs for Rock outcrop. The range site for Walcott soil is Coarse Uplands, 20-inch or more precipitation zone.

28—Midfork-Spearhead association. These gently sloping to very steep soils are on valley bottoms and side slopes in areas of sedimentary rock in the Teton Mountains. They formed in alluvium, colluvium, glacial till,

and calcareous landslide deposits at elevations of 7,500 to 9,500 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 0 to 70 percent.

This map unit is about 30 percent Midfork very stony loam, 30 percent Spearhead very gravelly loam, and 20 percent Owlcan loam. Midfork and Owlcan soils are on valley side slopes. The Midfork soil is in grass-shrub areas, and the Owlcan soil is forested. The Spearhead soil is on valley bottoms.

Included in mapping are areas of Sheege soils, Starman soils, Rock outcrop, and a very deep, fine textured soil. These included areas make up 20 percent of the unit.

The very deep, well drained Midfork soil formed in calcareous alluvium, colluvium, and landslide deposits. In a typical profile the surface layer is brown very stony loam 10 inches thick. The underlying material is brown and light brownish gray very cobbly loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium to rapid, and the erosion hazard is moderate to high.

The very deep, well drained Spearhead soil formed in alluvium and glacial till. In a typical profile the surface layer is dark brown very gravelly loam 36 inches thick. The underlying material is very pale brown extremely cobbly sandy loam to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium to rapid, and the erosion hazard is moderate to high.

The very deep, well drained Owlcan soil formed in alluvium. In a typical profile 1 inch of forest duff covers the surface. The surface layer is dark grayish brown loam 1 inch thick. The subsurface layer is pinkish gray loam 4 inches thick. The upper 11 inches of the subsoil is brown clay loam, and the lower 7 inches is pinkish gray channery clay loam. The substratum is pinkish gray very channery clay loam to 60 inches or more.

Permeability is moderately slow. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The entire acreage is mixed rangeland and forest. It is used for wildlife habitat and recreation. It is within the National Park and is not used for livestock grazing.

The potential native vegetation on Midfork and Spearhead soils is spike-fescue, bluebunch wheatgrass, Idaho fescue, and antelope bitterbrush. If the vegetation deteriorates, big sagebrush and rubber rabbitbrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,500 pounds in unfavorable years to 2,500 pounds in favorable years.

When the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of this habitat for elk is reduced. When the shrubs are overgrazed by deer, desirable shrubs such as antelope bitterbrush decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

The potential native vegetation on the Owlcan soil is Engelmann spruce and subalpine fir. Columbine is the understory vegetation. The patches of forest provide cover for deer, elk, and bear.

Trails are the main recreation facilities. They are used by hikers to observe and photograph wildlife, wild flowers, and landscapes. If the main interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIs dryland. The range site for Midfork and Spearhead soils is Coarse Uplands, 20-inch or more precipitation zone.

29—Newfork fine sandy loam. This very deep, poorly drained soil is on bottom lands and terraces along the Snake River and its tributaries. It is in the southern part of the survey area. It formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

Small areas of Tetonville and Wilsonville soils are included in mapping.

In a typical profile of this Newfork soil the surface layer is very dark gray and dark gray fine sandy loam 10 inches thick. The subsoil is light gray fine sandy loam 6 inches thick. The substratum is light gray extremely gravelly loamy sand to 60 inches or more.

Permeability is moderately rapid in the surface layer and subsoil and very rapid in the substratum. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight. The seasonal water table is at a depth of 1/2 foot to 4 feet during April to July. This soil is subject to occasional flooding for brief periods during April through July.

This soil is used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support about 4 animal units per month.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hay or pasture. The amount of red clover in the seeding mixture should be increased if production of hay is the intended use. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing

hay or pasture. If weather prevents maturing the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and northern reedgrass. If the vegetation deteriorates, sedges and willows increase. Under further deterioration of the plant cover, unpalatable rushes and sedges invade. In an average year the yield is approximately 6,000 pounds of air dry herbage per acre. It ranges from 5,000 pounds in unfavorable years to 7,000 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. Sometimes they are soft and muddy.

This soil provides habitat mainly for waterfowl and mammals, such as beavers and muskrats, that live in wet areas.

The seasonal high water table and flooding severely limit the use of this soil for dwellings and onsite sewage disposal.

The capability subclass is Vw irrigated and Vw dryland. The range site is Wetland, 15- to 19-inch precipitation zone.

30—Perceton-Buffork association. These hilly to steep soils are on uplands and mountainsides in the area around Two Ocean and Emma Matilda Lakes. They formed in residuum of volcanic and sedimentary rock at elevations of 6,800 to 8,000 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 15 to 40 percent.

This map unit is about 60 percent Perceton gravelly sandy loam and 30 percent Buffork fine sandy loam. Perceton soils are on hilly uplands and north-facing mountainsides. Buffork soils are on south- and west-facing mountainsides.

Included in mapping are areas of soils that contain more pebbles and cobbles and have bedrock at a depth of 20 to 40 inches but are otherwise similar to these Perceton and Buffork soils. The included soils make up 10 percent of the map unit.

The moderately deep, well drained Perceton soil formed in residuum. In a typical profile the surface is covered with 2 inches of forest litter. The subsurface layer is pinkish gray gravelly sandy loam 7 inches thick. The subsoil is brown gravelly sandy clay loam about 18 inches thick. The substratum is very gravelly sandy loam 10 inches thick. Weathered volcanic conglomerate is at 35 inches.

Permeability is moderate. The available water capacity is low. The root zone is 20 to 40 inches. Surface runoff is rapid, and the erosion hazard is high.

The moderately deep, well drained Buffork soil formed in residuum. In a typical profile the surface layer is grayish brown or brown fine sandy loam 9 inches thick. The upper 6 inches of the subsoil is dark brown fine sandy loam, and the lower part is yellowish brown sandy clay loam. Sandstone is at 26 inches.

Permeability is moderate. The available water capacity is low. The root zone is 20 to 40 inches. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The entire acreage is mixed forest and rangeland. It is used for wildlife habitat and recreation. It is wholly within the National Park and is not used for livestock grazing.

The potential native vegetation on the Perceton soil is lodgepole pine. Vaccinium, heartleaf arnica, elk sedge, and Oregon-grape are the dominant understory forbs. The patches of forest provide cover for deer, elk, and bear and are pleasing esthetically against the mountainous background.

The potential native vegetation on the Buffork soil is spike fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

When the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of the habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as antelope bitterbrush decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

Hiking is the main recreation. Hikers observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are generally not compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIe dryland. The range site for Buffork soil is Loamy, 15- to 19-inch precipitation zone.

31—Robana-Willow Creek silt loams, 3 to 6 percent slopes. These gently sloping soils are on hills and

mountain fronts in the southwest part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is 45 percent Robana silt loam and 45 percent Willow Creek silt loam. The Robana soil is on north- and east-facing slopes. The Willow Creek soil is on south- and west-facing slopes. Areas of these soils are too intermixed to be mapped separately.

Crow Creek and Turnerville soils are included in mapping. They make up 10 percent of the unit.

The very deep, well drained Robana soil formed in loess. In a typical profile the surface layer is dark grayish brown silt loam 7 inches thick. The subsoil is grayish brown, pale brown, and very pale brown silt loam 43 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Willow Creek soil formed in loess. In a typical profile the surface layer is dark grayish brown silt loam 7 inches thick. The subsoil is grayish brown, pale brown, and very pale brown silt loam 28 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

These soils are used for irrigated and dryland hay and pasture and for wildlife habitat and homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through contour ditches or by sprinklers. Heavy applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be constructed on the contour and lined, or the water should be piped to prevent soil erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

The soils in this unit provide some food for antelope, elk, deer, small mammals, and birds.

If these soils are used for homesites, moderate permeability is a limitation for onsite sewage disposal. Onsite investigation is needed to determine system design.

The capability subclass is IIIe irrigated and IVe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

32—Robana-Willow Creek silt loams, 6 to 10 percent slopes. These sloping soils are on hills and mountain fronts in the southwestern part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 40 percent Robana silt loam and 40 percent Willow Creek silt loam. The Robana soil is on north- and east-facing slopes. The Willow Creek soil is on south- and west-facing slopes. Areas of these soils are too intermixed to be mapped separately.

Crow Creek and Turnerville soils are included in mapping. They make up 20 percent of the unit.

The very deep, well drained Robana soil formed in loess. In a typical profile the surface layer is dark grayish brown silt loam 7 inches thick. The subsoil is grayish brown, pale brown, and very pale brown silt loam 43 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Willow Creek soil formed in loess. In a typical profile the surface layer is dark grayish brown silt loam 7 inches thick. The subsoil is grayish brown, pale brown, and very pale brown silt loam 28 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

These soils are used for dryland hay and pasture and for wildlife habitat and homesites.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short

growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

The soils in this unit provide some food for antelope, elk, deer, small mammals, and birds.

If these soils are used for homesites, moderate permeability is a limitation for onsite sewage disposal. Onsite investigation is needed in designing a disposal system.

The capability subclass is IVe irrigated and IVe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

33—Robana-Willow Creek silt loams, 10 to 20 percent slopes. These moderately steep soils are on hills and mountain fronts in the southwestern part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 30 percent Robana silt loam and 30 percent Willow Creek silt loam. The Robana soil is on north- and east-facing slopes. The Willow Creek soil is on south- and west-facing slopes. Areas of the soils are too intermixed to be mapped separately.

Crow Creek, Tetonia, Lantonia, and Turnerville soils are included in mapping. They make up 40 percent of the unit.

The very deep, well drained Robana soil formed in loess. In a typical profile the surface layer is dark grayish brown silt loam 7 inches thick. The subsoil is grayish brown, pale brown, and very pale brown silt loam 43 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is high, and the erosion hazard is high.

The very deep, well drained Willow Creek soil formed in loess. In a typical profile the surface layer is dark grayish brown silt loam 7 inches thick. The subsoil is grayish brown, pale brown, and very pale brown silt loam 28 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is high, and the erosion hazard is high.

These soils are used for dryland hay and pasture and for wildlife habitat and homesites.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

The soils in this unit provide some food for antelope, elk, deer, small mammals, and birds.

If these soils are used for homesites, moderate permeability may be a limitation for onsite sewage disposal. Onsite investigation is needed in designing a disposal system. The slope is a limitation and must be considered in design.

The capability subclass is VIe dryland. The range site is Loamy, 15 to 19-inch precipitation zone.

34—Rock outcrop. This map unit consists of gently sloping to very steep exposures of bedrock. It is on mountains at elevations of more than 10,000 feet. The mean annual precipitation is about 60 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 3 to more than 100 percent. Included with this unit in mapping are some glaciers.

Runoff is very rapid.

Rock outcrop is used for recreation.

The capability subclass is VIIIs.

35—Rock outcrop-Sheege-Starman association. These gently sloping to moderately steep soils and areas of Rock outcrop are on glacier-scoured valley bottoms and mountain dip slopes in the Teton Mountains. The soils formed in residuum of limestone at elevations of 8,000 to 10,000 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 3 to 30 percent.

This map unit is about 40 percent Rock outcrop, 25 percent Sheege extremely channery loam, and 25 per-

cent Starman very stony loam. Areas of Sheege and Starman soils are too intermixed to be mapped separately. They occur in a repeating pattern with Rock outcrop.

About 10 percent of this unit is included areas of Midfork soils.

The Rock outcrop is exposed sedimentary rock, most commonly limestone.

The shallow, well drained Sheege soil formed in residuum of limestone. In a typical profile the surface layer is grayish brown and brown extremely channery loam. Limestone is at 12 inches.

Permeability is moderate. The available water capacity is very low. The root zone is 10 to 20 inches. Surface runoff is medium to rapid, and the erosion hazard is high.

The very shallow, well drained Starman soil formed in residuum of limestone. In a typical profile the surface layer is pale brown very stony loam 4 inches thick. The underlying material is pale brown very stony clay loam. Limestone is at 8 inches.

Permeability is moderate. The available water capacity is very low. The root zone is 3 to 10 inches. Surface runoff is medium to rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The entire acreage is rangeland and provides wildlife habitat and recreation. It is wholly within the National Park and is not used for livestock grazing.

The potential native vegetation on Sheege and Starman soils is spike-fescue, spike trisetum, Idaho fescue, and bluebunch wheatgrass. If the vegetation deteriorates, big sagebrush, balsamroot, and snowberry increase. Under further deterioration of the plant cover, Kentucky bluegrass, unpalatable forbs, and annuals invade. In an average year the yield is approximately 1,700 pounds of air dry herbage per acre. It ranges from 1,300 pounds in unfavorable years to 2,000 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of the habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as serviceberry decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

Hiking is the main recreation. Hikers observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are generally not compatible. Trails for hikers should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIIIs for Rock outcrop and VIIs for Sheege and Starman soils. The range site is Shallow Loamy, 20-inch or more precipitation zone.

36—Rock outcrop-Teewinot-Moran association. These steep to very steep soils and areas of Rock outcrop are on mountainsides in the central part of the Teton Mountains. Upper slopes have V-drainageways, and lower slopes have been smoothed by glaciation. The soils formed in alluvium, colluvium, and residuum of granite and gneiss at elevations of more than 8,000 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 20 to 70 percent.

This map unit is about 70 percent Rock outcrop, 10 percent Teewinot very cobbly sandy loam, and 10 percent Moran very stony sandy loam. Rock outcrop is on mountainsides. Teewinot and Moran soils occur in pockets and along drainageways.

About 10 percent of the unit is included areas of Leighcan and Walcott soils and Rubble land.

The Rock outcrop is exposed granite and gneiss.

The shallow, well drained Teewinot soil formed in residuum of granite. In a typical profile the surface layer is grayish brown very cobbly sandy loam. Granite is at 15 inches.

Permeability is moderately rapid. The available water capacity is low. The root zone is 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Moran soil formed in alluvium or colluvium. In a typical profile the surface layer is brown very stony sandy loam 6 inches thick. The subsoil is brown very stony sandy loam 9 inches thick. The substratum is light brown very stony sandy loam to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The entire acreage is rangeland and scattered patches of forest. It provides recreation and wildlife habitat. It is wholly within the National Park and is not used for livestock grazing.

The potential native vegetation on the Teewinot soil is bluebunch wheatgrass, spike-fescue, and antelope bitterbrush. If the vegetation deteriorates, big sagebrush, threetip sagebrush, and balsamroot increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,500 pounds of air dry herbage per acre. It ranges from 1,200 pounds in unfavorable years to 1,800 pounds in favorable years.

The potential native vegetation on the Moran soil is spike-fescue, bluebunch wheatgrass, Idaho fescue, and antelope bitterbrush. If the vegetation deteriorates, big sagebrush and rubber rabbitbrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,500 pounds in unfavorable years to 2,500 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of the

habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as snowberry decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that seeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

Hiking is the main recreation. Hikers observe and photograph wildlife, wild flowers, and landscapes. Trails for hikers should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIIIs for Rock outcrop and VIe for Teewinot and Moran soils. The range site for Teewinot soil is Shallow Igneous, 20-inch or more precipitation zone; for Moran soil, it is Coarse Uplands, 20-inch or more precipitation zone.

37—Roxal-Starley association. These steep soils are on hills in the Elk Refuge. They formed in residuum of sedimentary and volcanic rock and in loess at elevations of 6,500 to 7,200 feet. The mean annual precipitation is about 18 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 30 to 60 percent.

This map unit is about 45 percent Roxal loam, 30 percent Starley gravelly loam, and 15 percent Crow Creek silt loam. Areas of the soils are too intermixed to be mapped separately. The Roxal soil occurs over shale. The Starley soil occurs over welded tuff.

About 10 percent of the unit is included areas of Greyback soil.

The shallow, well drained Roxal soil formed in residuum of shale. In a typical profile the surface layer is light gray loam 7 inches thick. The underlying material is pale olive loam 6 inches thick. Soft shale is at 13 inches.

Permeability is moderate. The available water capacity is low. The root zone is 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is high.

The shallow, well drained Starley soil formed in welded tuff. In a typical profile the surface layer is grayish brown gravelly loam 8 inches thick. The underlying material is light gray very gravelly loam. Welded tuff is at 15 inches.

Permeability is moderate. The available water capacity is low. The root zone is 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Crow Creek soil formed in loess. In a typical profile the surface layer is grayish brown and dark grayish brown silt loam 9 inches thick. The subsoil is pale brown silt loam 5 inches thick. The substratum is light brownish gray, white, or light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The soils in this unit are rangeland and provide wildlife habitat.

The potential vegetation on Roxal and Starley soils is dominantly spike-fescue, bluebunch wheatgrass, and Idaho fescue. If the vegetation deteriorates, thickspike wheatgrass, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,400 pounds of air dry herbage per acre. It ranges from 1,000 pounds in unfavorable years to 1,700 pounds in favorable years.

The potential vegetation on the Crow Creek soil is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The soils in this association provide some food for antelope, elk, deer, sage grouse, small mammals, and birds.

The capability subclass is VIIe. The range site for Roxal and Starley soils is Shallow Loamy, 15- to 19-inch precipitation zone; for Crow Creek soil, it is Loamy, 15- to 19-inch precipitation zone.

38—Rubble land. This map unit consists of very steep talus slopes of granite and gneiss stones and boulders. It is in the mountains at elevations of more than 10,000 feet. The mean annual precipitation is about 60 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 70 to 100 percent.

There is no surface runoff because water percolates into the rubble and is slowly released through springs and ground water.

Rubble land provides habitat for pika.

The capability subclass VIIIs.

39—Rubble land-Midfork-Starman association. These steep to very steep soils and areas of Rubble land are on mountainsides in the Teton Mountains. The soils formed in alluvium, colluvium, and residuum of sedimentary rock at elevations of 8,000 to 11,000 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 20 to 100 percent.

This map unit is about 30 percent Rubble land, 15 percent Midfork very stony loam, and 15 percent Starman very stony loam. Starman soils are on the upper part of slopes. Rubble land and Midfork soils are on the talus slope below Starman soils.

Included in mapping are areas of Spearhead and Sheege soils and Rock outcrop. Included areas make up 40 percent of the unit.

Rubble land is of talus slopes of stones and boulders. There is no surface runoff.

The very deep, well drained Midfork soil formed in alluvium and colluvium of sedimentary rock. In a typical profile the surface layer is brown very stony loam 10 inches thick. The underlying material is brown and light brownish gray very cobbly loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is high.

The very shallow, well drained Starman soil formed in residuum of limestone. In a typical profile the surface layer is pale brown very stony loam 4 inches thick. The underlying material is pale brown very stony clay loam. Limestone is at 8 inches.

Permeability is moderate. The available water capacity is very low. The root zone is 3 to 10 inches. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The soils in this unit are rangeland and provide wildlife habitat and recreation. They are wholly within the National Park and are not used for livestock grazing.

The potential native vegetation on the Midfork soil is spike-fescue, bluebunch wheatgrass, Idaho fescue, and antelope bitterbrush. If the vegetation deteriorates, big sagebrush and rubber rabbitbrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,500 pounds in unfavorable years to 2,500 pounds in favorable years.

The potential vegetation on the Starman soil is dominantly spike-fescue, spike trisetum, Idaho fescue, and bluebunch wheatgrass. If the vegetation deteriorates, big sagebrush, balsamroot, and snowberry increase. Under further deterioration of the plant cover, Kentucky bluegrass, unpalatable forbs, and annuals invade. In an average year the yield is approximately 1,700 pounds of air dry herbage per acre. It ranges from 1,300 pounds in unfavorable years to 2,000 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of the habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as snowberry decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

Hiking is the main recreation use. Hikers observe and photograph wildlife, wild flowers, and landscapes. Trails for hikers should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIIIs for Rubble land and VIIs for Midfork and Starman soils. The range site for Midfork soil is Coarse Uplands, 20-inch or more precipitation zone; for Starman soil, it is Shallow Loamy, 20-inch or more precipitation zone.

40—Rubble land-Walcott-Leighcan association. These steep to very steep soils and areas of Rubble land are on mountainsides in the central part of the Teton Mountains. The soils formed in alluvium, colluvium, and glacial till at elevations of 7,500 to 12,000 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 20 to 100 percent.

This map unit is about 40 percent Rubble land, 20 percent Walcott gravelly sandy loam, and 20 percent Leighcan very stony sandy loam. Areas of Rubble land, Walcott soils, and Leighcan soils are intermixed on fan-shaped talus slopes. Rubble land is in areas of recent talus. Walcott soils are in areas of grass-shrub vegetation. Leighcan soils are in areas of forest.

About 20 percent of the unit is included areas of Moran, Moran wet, and Teewinot soils.

Rubble land is talus slopes of granite and gneiss stones and boulders. There is no surface runoff.

The very deep, well drained Walcott soil formed in alluvium and colluvium of granite and gneiss and in glacial till. In a typical profile the surface layer is brown gravelly sandy loam 8 inches thick. The underlying material is pale brown very gravelly sandy loam to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is high.

The very deep, well drained Leighcan soil formed in colluvium and glacial till. In a typical profile the surface is covered with 1 inch of forest duff. The subsurface layer is light brownish gray very stony sandy loam 7 inches thick. The subsoil to 60 inches or more is pale brown and light yellowish brown very stony sandy loam.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is high.

The entire acreage is mixed rangeland and forest. It is used for wildlife habitat and recreation. It is wholly within the National Park and is not used for livestock grazing.

The potential native vegetation on the Walcott soil is spike-fescue, bluebunch wheatgrass, Idaho fescue, and antelope bitterbrush. If the vegetation deteriorates, big sagebrush and rubber rabbitbrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,500 pounds in unfavorable years to 2,500 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of the habitat for elk is reduced. If the shrubs are overgrazed

by deer or elk, desirable species such as antelope bitterbrush decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

The potential native vegetation on the Leighcan soil is Engelmann spruce, subalpine fir, and whitebark pine. The forest provides cover for deer, elk, and bear and is pleasing esthetically against the mountainous background.

Willows growing on the included Moran wet soils provide habitat for moose.

Hiking is the main recreation use. Hikers observe and photograph wildlife, wild flowers, and landscapes. Trails for hikers should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIIIs for Rubble land and VIIe for Walcott and Leighcan soils. The range site for Walcott soil is Coarse Uplands, 20-inch or more precipitation zone.

41—Sebud complex, 3 to 6 percent slopes. These gently sloping soils are on alluvial fans along the mountain front in the southern part of the valley. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F. The slope range is 0 to 6 percent, but the slope is generally more than 3 percent.

This map unit is about 60 percent Sebud gravelly loam and 20 percent Sebud stony sandy loam. Areas of the soils are too intermixed to be mapped separately.

About 20 percent of the unit is included areas of soils that have a thinner dark surface layer and stronger development in the subsoil but are otherwise similar to these Sebud soils.

The very deep, well drained Sebud gravelly loam formed in alluvium. In a typical profile the surface layer is dark grayish brown gravelly loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Sebud stony sandy loam formed in alluvium. In a typical profile the surface layer is dark grayish brown stony sandy loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

Both soils are used for irrigated hay and pasture and for homesites and wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or contour ditches or by sprinklers. Because of the low available water capacity, frequent light applications of water are needed. Heavy applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be constructed on the contour and lined or enclosed to prevent soil erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation on Sebud gravelly loam is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The potential vegetation on Sebud stony sandy loam is dominantly bluebunch wheatgrass, spike-fescue, Columbia needlegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,600 pounds of air dry herbage per acre. It ranges from 1,100 pounds in unfavorable years to 2,000 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

If these soils are used for homesites, the stony areas are a limitation to shallow excavations and basements for dwellings. Because of the moderate permeability, onsite investigation is needed to determine proper design of septic tank absorption fields.

The capability subclass is IIIe irrigated and IVe dryland. The range site for Sebud gravelly loam is Loamy, 15- to

19-inch precipitation zone; for Sebud stony sandy loam, it is Coarse Uplands, 15- to 19-inch precipitation zone.

42—Sebud complex, 6 to 10 percent slopes. These sloping soils are on alluvial fans along the mountain front in the southwestern part of the valley. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

This map unit is about 60 percent Sebud gravelly loam and 20 percent Sebud stony sandy loam. Areas of the soils are too intermixed to be mapped separately.

About 20 percent of this unit is included areas of soils that have a thinner dark surface layer and stronger development in the subsoil but are otherwise similar to these Sebud soils.

The very deep, well drained Sebud gravelly loam formed in alluvium. In a typical profile the surface layer is dark grayish brown gravelly loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is high.

The very deep, well drained Sebud stony sandy loam formed in alluvium. In a typical profile the surface layer is dark grayish brown stony sandy loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

Both soils are used for irrigated hay and pasture and for homesites and wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or by sprinklers. Corrugations should be placed on the contour to minimize soil loss. Because of the low available water capacity, frequent light applications of water are needed. Heavy applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be constructed on the contour and lined or enclosed to prevent soil erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation on Sebud gravelly loam is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The potential vegetation on Sebud stony sandy loam is dominantly bluebunch wheatgrass, spike-fescue, Columbia needlegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,600 pounds of air dry herbage per acre. It ranges from 1,100 pounds in unfavorable years to 2,000 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

If these soils are used for homesites, the stoniness is a limitation to shallow excavations and basements for dwellings. Because of the moderate permeability, onsite investigation is needed to determine proper design of septic tank absorption fields.

The capability subclass is IVe irrigated and IVe dryland. The range site for Sebud gravelly loam is Loamy, 15- to 19-inch precipitation zone; for Sebud stony sandy loam, it is Coarse Uplands, 15- to 19-inch precipitation zone.

43—Sebud complex, 10 to 20 percent slopes. These moderately steep soils are on alluvial fans and foot slopes along the mountain fronts. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

This map unit is about 55 percent Sebud stony sandy loam and 35 percent Sebud gravelly loam. Areas of the soils are too intermixed to be mapped separately.

About 10 percent of this unit is included areas of a soil that has more advanced development in the subsoil but is otherwise similar to these Sebud soils.

The very deep, well drained Sebud stony sandy loam formed in alluvium. In a typical profile the surface layer is dark grayish brown stony sandy loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more.

Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Sebud gravelly loam formed in alluvium. In a typical profile the surface layer is dark grayish brown gravelly loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

Both soils are rangeland and are used for grazing, homesites, recreation, and wildlife habitat.

The potential vegetation on Sebud stony sandy loam is dominantly bluebunch wheatgrass, spike-fescue, Columbia needlegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,600 pounds of air dry herbage per acre. It ranges from 1,100 pounds in unfavorable years to 2,000 pounds in favorable years.

The potential vegetation on Sebud gravelly loam is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

If these soils are used for homesites, the slope must be considered in designing dwellings, roads, and onsite sewage disposal. The stoniness is a limitation for shallow excavations and basements for dwellings.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

The capability subclass is VIe. The range site for Sebud stony sandy loam is Coarse Uplands, 15- to 19-inch precipitation zone; for Sebud gravelly loam, it is Loamy, 15- to 19-inch precipitation zone.

44—Slocum-Silas loams. These nearly level soils are in braided stream channels on alluvial fans, stream terraces, and flood plains. They are along the Buffalo River and on the east side of the Snake River south to the Snake River Overlook. They formed in loamy alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

This map unit is about 35 percent Slocum loam and 35 percent Silas loam. The Slocum soil is on the lower topographic positions, and the Silas soil is on slightly higher positions. Areas of the soils are too intermixed to be mapped separately.

Included in mapping are areas of Tineman, Uhl, Tetonville, and Wilsonville soils and Cryaquolls and Cryofibrists. These soils make up about 30 percent of the unit.

The very deep, somewhat poorly drained Slocum soil formed in alluvium. In a typical profile the surface layer is grayish brown loam 8 inches thick. The subsoil is light brownish gray silty clay loam 19 inches thick. The upper 5 inches of the substratum is light brownish gray silty clay loam, and the lower part to 60 inches or more is light brownish gray very fine sandy loam.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches. The water table is within 1 1/2 to 3 1/2 feet of the surface during April to August. The soil is subject to occasional brief to very long periods of flooding during April to June. Surface runoff is slow, and the erosion hazard is slight.

The very deep, moderately well drained Silas soil formed in alluvium. In a typical profile the surface layer is dark gray loam 26 inches thick. The underlying material is gray loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. The water table is within 4 to 6 feet of the surface during April to July. The soil is subject to rare flooding during April to June. Surface runoff is slow, and the erosion hazard is slight.

Both soils are used for irrigated hay and pasture and for recreation and wildlife habitat (fig. 6). Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hay or pasture. The amount of red clover in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Heavy applications cause excess seepage and loss of water and soil nutrients.

Good irrigation water management is essential to maximize production, conserve water, and prevent seepage.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate fertilizer. Fertilizer should be applied according to the results of soil tests to obtain maximum crop quality and yield.

The potential vegetation on these soils is dominantly tufted hairgrass, Nebraska sedge, and slender wheat-

Figure 6.—Uinta ground squirrels attract many park visitors. This is the Silas soil of the Slocum-Silas loams.

grass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

The capability subclass is IIIw irrigated and IIIw dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

45—Starley-Tetonia association. These hilly to steep soils are on mountain foothills in the Elk Refuge. They formed in residuum of volcanic and sedimentary rock and in loess at elevations of 6,500 to 7,200 feet. The mean annual precipitation is about 17 inches, and the

mean annual air temperature is about 35 degrees F. The slope range is 15 to 40 percent.

This map unit is about 30 percent Starley gravelly loam, 25 percent Tetonia silt loam, and 15 percent Roxal loam. Areas of Starley and Roxal soils are intermixed on south- and west-facing slopes. Tetonia soils are on north- and east-facing slopes. Starley soils are over welded tuff. Roxal soils are over shale.

Included in mapping are areas of Crow Creek, Greyback, and Starman soils. These soils make up 30 percent of the unit.

The shallow, well drained Starley soil formed in residuum of welded tuff. In a typical profile the surface layer is grayish brown gravelly loam 8 inches thick. The underlying material is light gray very gravelly loam. Welded tuff is at 15 inches.

Permeability is moderate. The available water capacity is low. The root zone is 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The shallow, well drained Roxal soil formed in residuum of shale. In a typical profile the surface layer is light gray loam 7 inches thick. The underlying material is pale olive loam. Soft shale is at 13 inches.

Permeability is moderate. The available water capacity is low. The root zone is 10 to 20 inches. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The soils in this unit are rangeland and provide wildlife habitat.

The potential vegetation on Starley and Roxal soils is dominantly spike-fescue, bluebunch wheatgrass, and Idaho fescue. If the vegetation deteriorates, thickspike wheatgrass, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,400 pounds of air dry herbage per acre. It ranges from 1,000 pounds in unfavorable years to 1,700 pounds in favorable years.

The potential vegetation on the Tetonia soil is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

These soils provide some food for antelope, elk, deer, sage grouse, small mammals, and birds.

The capability subclass is VIe. The range site for Starley and Roxal soils is Shallow Loamy, 15- to 19-inch precipitation zone; for Tetonia soil, it is Loamy, 15- to 19-inch precipitation zone.

46—Starman-Owlcan association. These steep and very steep soils are on mountainsides in the Teton Mountains. They formed in residuum of sedimentary rock, colluvium, and alluvium at elevations of 8,000 to 11,000 feet. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F. The slope range is 30 to 70 percent.

This map unit is about 25 percent Starman very stony loam, 25 percent Owlcan loam, and 25 percent Midfork very stony loam. Starman and Midfork soils occur under grass-shrub vegetation. The Owlcan soil is under forest.

Included in mapping are areas of Sheege and Spearhead soils, Rock outcrop, and a fine textured soil associated with shale. These areas make up 25 percent of the unit.

The very shallow, well drained Starman soil formed in residuum of limestone. In a typical profile the surface layer is pale brown very stony loam 4 inches thick. The underlying material is pale brown very stony clay loam. Limestone is at 8 inches.

Permeability is moderate. The available water capacity is very low. The root zone is 3 to 10 inches. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Owlcan soil formed in alluvium. In a typical profile the surface is covered with 1 inch of forest duff. The surface layer is dark grayish brown loam 1 inch thick. The subsurface layer is pinkish gray loam 4 inches thick. The upper 11 inches of the subsoil is brown clay loam, and the lower 7 inches is pinkish gray channery clay loam. The substratum is pinkish gray very channery clay loam to 60 inches or more.

Permeability is moderately slow. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Midfork soil formed in alluvium and colluvium derived from sedimentary rock. In a typical profile the surface layer is brown very stony loam 10 inches thick. The underlying material is brown and light brownish gray very cobbly loam to 60 inches or more.

Permeability is moderate. The available water capacity is moderate. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The soils in this unit are mixed rangeland and forest and provide wildlife habitat and recreation. They are wholly within the National Park and are not used for livestock grazing.

The potential native vegetation on the Starman soil is spike-fescue, spike trisetum, Idaho fescue, and blue-

bunch wheatgrass. If the vegetation deteriorates, big sagebrush, balsamroot, and snowberry increase. Under further deterioration of the plant cover, Kentucky bluegrass, unpalatable forbs, and annuals invade. In an average year the yield is approximately 1,700 pounds of air dry herbage per acre. It ranges from 1,300 pounds in unfavorable years to 2,000 pounds in favorable years.

The potential native vegetation on the Midfork soil is spike-fescue, bluebunch wheatgrass, Idaho fescue, and antelope bitterbrush. If the vegetation deteriorates, big sagebrush and rubber rabbitbrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,500 pounds in unfavorable years to 2,500 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of the habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as snowberry decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

The potential native vegetation on the Owlcan soil is Engelmann spruce and subalpine fir. The patches of forest provide cover for deer, elk, and bear and are pleasing esthetically against the mountainous background.

Hiking is the main recreation. Hikers observe and photograph wildlife, wild flowers, and landscapes. Trails for hikers should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIIe for Starman soil and VIe for Owlcan and Midfork soils. The range site for Starman soil is Shallow Loamy, 20-inch or more precipitation zone; for Midfork soil, it is Coarse Uplands, 20-inch or more precipitation zone.

47—Taglake-Sebud association. These nearly level to moderately steep soils are on glacial moraines along the mountain fronts and Burnt Ridge. They formed in glacial till at elevations of 6,500 to 7,200 feet. The slope range is 3 to 30 percent. The mean annual precipitation is about 18 inches, and the mean annual air temperature is about 36 degrees F.

This map unit is about 75 percent Taglake very stony sandy loam and 15 percent Sebud stony sandy loam. The Taglake soil is forested, and the Sebud soil has a grass-shrub cover.

About 10 percent of this unit is included areas of Walcott soils.

The very deep, well drained Taglake soil formed in glacial till. In a typical profile the surface is covered with 1 inch of forest duff. The subsurface layer is light gray very stony sandy loam 4 inches thick. The subsoil is pale brown and light gray very cobbly sandy loam and very stony sandy loam to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow to medium, and the erosion hazard is slight to moderate.

The very deep, well drained Sebud soil formed in alluvium. In a typical profile the surface layer is dark grayish brown stony sandy loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The entire acreage is forest mixed with patches of rangeland. It is used for recreation and wildlife habitat.

The potential native vegetation on the Taglake soil is lodgepole pine. Lupine is the dominant understory forb. The patches of forest provide cover for deer, elk, and bear and are pleasing esthetically against the mountainous background.

The potential native vegetation on the Sebud soil is bluebunch wheatgrass, spike-fescue, Columbia needlegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,600 pounds of air dry herbage per acre. It ranges from 1,100 pounds in unfavorable years to 2,000 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of this habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as antelope bitterbrush decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

Trails are the main recreation facilities (fig. 7). They are used by hikers to observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

The capability subclass is VIe dryland. The range site for Sebud soil is Coarse Uplands, 15- to 19-inch precipitation zone.

Figure 7.—Hiking trail through an area of Taglake-Sebud association. Many visitors use the 200 miles of maintained trails in the Park.

48—Taglake-Sebud association, steep. These steep soils are on glacial moraines along the mountain fronts. They formed in glacial till at elevations of 6,500 to 7,200 feet. The slope range is 30 to 60 percent. The mean annual precipitation is about 18 inches, and the mean annual air temperature is about 36 degrees F.

This map unit is about 75 percent Taglake very stony sandy loam and 20 percent Sebud stony sandy loam. The Taglake soil is forested, and the Sebud soil has a grass-shrub cover.

About 5 percent of this unit is included areas of Walcott soils.

The very deep, well drained Taglake soil formed in glacial till. In a typical profile the surface is covered with 1 inch of forest duff. The subsurface layer is light gray very stony sandy loam 4 inches thick. The subsoil is pale

brown and light gray very cobbly sandy loam and very stony sandy loam to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Sebud soil formed in alluvium. In a typical profile the surface layer is dark grayish brown stony sandy loam 6 inches thick. The upper 5 inches of the subsoil is grayish brown stony sandy loam, and the lower 6 inches is brown very stony sandy clay loam. The substratum is pale brown very stony sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The entire acreage is forest mixed with patches of rangeland. It provides recreation and wildlife habitat. It is wholly within the National Park and is not used for livestock grazing.

The potential native vegetation on the Taglake soil is lodgepole pine. Lupine is the dominant understory forb. The forest provides cover for deer, elk, and bear and is pleasing esthetically against the mountainous background.

The potential native vegetation on the Sebud soil is bluebunch wheatgrass, spike-fescue, Columbia needlegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue and black sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,600 pounds of air dry herbage per acre. It ranges from 1,100 pounds in unfavorable years to 2,000 pounds in favorable years.

If the range is overgrazed by elk, desirable grasses such as Idaho fescue decrease and the value of the habitat for elk is reduced. If the shrubs are overgrazed by deer or elk, desirable species such as antelope bitterbrush decrease and the value of the habitat for deer is reduced. Burrowing rodents and bears digging for plant roots and rodents in spring destroy many of the desirable grasses, shrubs, and forbs. If the vegetation is overutilized to the extent that reseeding is needed, smooth brome or orchardgrass can be seeded. These grasses provide forage for elk but do not provide desirable forage for deer or bear.

Hiking is the main recreation. Hikers observe and photograph wildlife, wild flowers, and landscapes. If the major interest is observation of wildlife, campgrounds should not be developed because campgrounds and wildlife populations are not generally compatible. Trails should be designed on the contour or with water bars to minimize soil loss.

This capability subclass is VIe dryland. The range site for Sebud soil is Coarse Uplands, 15- to 19-inch precipitation zone.

49—Tetonia-Lantonia silt loams, 0 to 3 percent slopes. These nearly level soils are on loess-mantled terraces and uplands in the southern part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 45 percent Tetonia silt loam and 45 percent Lantonia silt loam. The Tetonia soil is generally on flats and south- and west-facing slopes. The Lantonia soil is on north- and east-facing slopes and in snowdrift areas. Areas of the soils are too intermixed to be mapped separately.

Crow Creek and Willow Creek soils are included in mapping. They make up 10 percent of the unit.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Lantonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 16 inches thick. The subsoil is grayish brown, brown, and pale brown silt loam to a depth of 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

Both soils are used for irrigated and dryland hay and pasture and for wildlife habitat and homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and

annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years. Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

Because permeability is moderate, onsite investigation is needed to determine proper design of septic tank absorption fields. Soil strength and potential frost action limit the use of the soils for local roads and streets.

The capability subclass is IIIc irrigated and IVc dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

50—Tetonia-Lantonia silt loams, 3 to 6 percent slopes. These gently sloping soils are on loess-mantled terraces and hills in the southern part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 45 percent Tetonia silt loam and 45 percent Lantonia silt loam. The Tetonia soil is generally on south- and west-facing slopes. The Lantonia soil is on north- and east-facing slopes. Areas of the soils are too intermixed to be mapped separately.

Crow Creek and Willow Creek soils are included in mapping. They make up 10 percent of the unit.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Lantonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 16 inches thick. The subsoil is grayish brown, brown, and pale brown silt loam to a depth of 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

Both soils are used for irrigated and dryland hay and pasture and for wildlife habitat and homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Corrugations and borders should be placed on the contour to minimize soil loss. Heavy applications cause excess seepage loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

Because permeability is moderate, onsite investigation is needed to determine proper design of septic tank absorption fields. Low strength and potential frost action limit the use of the soils for local roads and streets.

The capability subclass is IIIe irrigated and IVe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

51—Tetonia-Lantonia silt loams, 6 to 10 percent slopes. These rolling soils are on loess-mantled hills in the southern part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 40 percent Tetonia silt loam and 40 percent Lantonia silt loam. The Tetonia soil is on south- and west-facing slopes. The Lantonia soil is on north- and east-facing slopes. Areas of the soils are too intermixed to be mapped separately.

Crow Creek, Robana, and Willow Creek soils are included in mapping. They make up 20 percent of the unit.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The very deep, well drained Lantonia soil formed in loess. In a typical profile the surface layer is grayish

brown silt loam 16 inches thick. The subsoil is grayish brown, brown, and pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

Both soils are used for irrigated and dryland hay and pasture and for wildlife habitat and homesites. Irrigated hayland produces about 1 1/2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 3 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or by sprinklers. Corrugations should be placed on the contour to minimize soil losses. Heavy applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be constructed on the contour and lined or enclosed to prevent soil erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

Because permeability is moderate, onsite investigation is needed to determine proper design of septic tank absorption fields. Low strength and potential frost action are limitations for local roads and streets. Slope is a limitation for dwellings and onsite sewage disposal.

The capability subclass is IVe irrigated and IVe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

52—Tetonia-Lantonia silt loams, 10 to 20 percent slopes. These hilly soils are on loess-mantled hills in the southern part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 30 percent Tetonia silt loam, 30 percent Lantonia silt loam, and 25 percent Crow Creek silt loam. The Tetonia soil is on south- and west-facing slopes. The Lantonia soil is on north- and east-facing slopes. The Crow Creek soil is on ridges and some steeper upper south- and west-facing slopes. Areas of the soils are too intermixed to be mapped separately.

Robana, Willow Creek, and Turnerville soils are included in mapping. They make up 15 percent of the unit.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Lantonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 16 inches thick. The subsoil is grayish brown, brown, and pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Crow Creek soil formed in loess. In a typical profile the surface layer is grayish brown and dark grayish brown silt loam 9 inches thick. The subsoil is pale brown silt loam 5 inches thick. The substratum is light brownish gray, white, and light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

These soils are used for irrigated and dryland hay and pasture and for wildlife habitat and homesites.

Irrigated hayland produces about three-fourths of a ton of hay per acre. Irrigated pasture produces enough forage per acre to support 1 1/2 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied by sprinklers. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and

annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

The slope is a limitation for homesites and must be considered in design. Because permeability is moderate, onsite investigation is needed to determine proper design of septic tank absorption fields. Low strength and potential frost action limit the use of the soils for local roads and streets.

The capability subclass is VIe irrigated and VIe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

53—Tetonia-Lantonia silt loams, 20 to 30 percent slopes. These steep soils are on loess mantled hills in the southern part of the survey area. They formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 30 percent Tetonia silt loam, 30 percent Lantonia silt loam, and 25 percent Crow Creek silt loam. The Tetonia soil is on south- and west-facing slopes. The Lantonia soil is on north- and east-facing slopes. The Crow Creek soil is on ridges and some steeper upper south- and west-facing slopes. Areas of the soils are too intermixed to be mapped separately.

Robana, Willow Creek, and Turnerville soils are included in mapping. They make up 15 percent of the unit.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Lantonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 16 inches thick. The subsoil is grayish brown, brown, and pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Crow Creek soil formed in loess. In a typical profile the surface layer is grayish brown and dark grayish brown silt loam 9 inches thick. The subsoil is pale brown silt loam 5 inches thick. The substratum is light brownish gray, white, and light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

These soils are used for dryland hay and pasture and for wildlife habitat.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

The capability subclass is VIe dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

54—Tetonia-Tineman complex. These nearly level soils are on alluvial fans and stream terraces that have a discontinuous mantle of loess. They are in the southern part of the survey area. They formed in loess and alluvium at elevations of 6,000 to 7,000 feet. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 45 percent Tetonia silt loam, 25 percent Tineman gravelly loam, and 20 percent Greyback gravelly loam. The Tetonia soil occurs in the loess mantle on terraces. Areas of Tineman and Greyback soils are intermixed on the terraces.

Included in mapping are areas of Lantonia soils and a soil that is underlain by gravel but is otherwise similar to the Tetonia soil. These included soils make up about 10 percent of the unit.

The very deep, well drained Tetonia soil formed in loess. In a typical profile the surface layer is grayish brown silt loam 8 inches thick. The subsoil is grayish brown and pale brown silt loam 22 inches thick. The substratum is light gray silt loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Tineman soil formed in alluvium. In a typical profile of this soil the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The

substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow to rapid, and water collects in kettles. The erosion hazard is slight.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

These soils are used for irrigated and dryland hay and pasture, and they are also used as wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop when hay or pasture is established. If weather prevents maturing the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications of irrigation water are needed. Heavy applications result in excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to applications of phosphate.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of the range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide some food for antelope, elk, deer, small mammals, and birds.

The capability subclass is IVs irrigated and IVs dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

55—Tetonville gravelly loam. This very deep, somewhat poorly drained soil is along the Snake River and its tributaries. It formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

Included in mapping are Newfork and Tetonville soils. These soils make up about 15 percent of the unit.

In a typical profile the surface layer of this Tetonville soil is grayish brown gravelly loam 8 inches thick. The upper 9 inches of the underlying material is light brownish gray gravelly loam. The lower part to 60 inches or more is light brownish gray extremely gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. The seasonal high water table is at a depth of 1 to 3 feet during May to July. The soil is subject to occasional brief to long periods of flooding in May and June. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

This soil is used for irrigated hay and pasture and for homesites, recreation, and wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 3 1/2 animal units per month.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hay and pasture. The amount of red clover in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can either be cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Red clover responds to phosphate.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Wetness and flooding are hazards to dwellings and to onsite sewage disposal.

Campgrounds, picnic grounds, and trails are the main recreation facilities. Sometimes they are muddy.

This soil provides food and cover for moose, elk, deer, small mammals, and birds.

The capability subclass is IVws irrigated and IVws dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

56—Tetonville complex. These nearly level soils are on flood plains along the Snake River. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

This map unit is about 60 percent Tetonville very gravelly sandy loam and 30 percent Tetonville fine sandy loam. Tetonville very gravelly sandy loam is on the higher topographic positions. Tetonville fine sandy loam is in swales and old channels that have been filled. Areas of the soils are too intermixed to be mapped separately.

Wilsonville and Newfork soils are included in mapping. They make up 10 percent of the unit.

Tetonville very gravelly sandy loam is a very deep, somewhat poorly drained soil formed in alluvium. In a typical profile the surface layer is grayish brown very gravelly sandy loam 8 inches thick. The underlying material is light brownish gray extremely gravelly loamy sand to 60 inches or more.

Permeability is moderately rapid. The available water capacity is low. The seasonal high water table is at a depth of 1 to 3 feet during May to July. The soil is subject to occasional brief to long periods of flooding in May and June. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

Tetonville fine sandy loam is a very deep, somewhat poorly drained soil formed in alluvium. In a typical profile the surface layer is grayish brown fine sandy loam 8 inches thick. The upper 9 inches of the underlying material is light brownish gray fine sandy loam. The lower part to 60 inches or more is light brownish gray extremely gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight. The seasonal high water table is at a depth of 1 to 3 feet during May to July. This soil is subject to occasional brief to long periods of flooding in May and June.

Both soils are used for irrigated hay and pasture and for homesites, recreation, and wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 3 1/2 animal units per month.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hay and pasture. The amount of red clover in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can either be cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Red clover responds to phosphate.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Wetness and flooding are hazards to dwellings and to onsite sewage disposal.

Campgrounds, picnic grounds, and trails are the main recreation facilities. Sometimes they are muddy.

These soils provide food and cover for moose, elk, deer, small mammals, and birds.

The capability subclass is Vs irrigated and Vs dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

57—Tetonville-Riverwash complex. These nearly level soils and areas of Riverwash are on flood plains along the Snake and Gros Ventre Rivers. The soils formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

This map unit is about 40 percent Tetonville fine sandy loam and 40 percent Riverwash. There is no topographic relationship between Riverwash and the Tetonville soil. Tetonville soils are in areas of stabilized plant cover.

Included in mapping are areas of Wilsonville soils and a calcareous soil that is similar to the Tetonville soil on the Gros Ventre River. Included areas make up 20 percent of the unit.

The very deep, somewhat poorly drained Tetonville soil formed in alluvium. In a typical profile the surface layer is grayish brown fine sandy loam 8 inches thick. The upper 9 inches of the underlying material is light brownish gray fine sandy loam. The lower part to 60 inches or more is light brownish gray extremely gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. The seasonal high water table is at a

depth of 1 to 3 feet during May to July. The soil is subject to occasional brief to long periods of flooding in May and June. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

Riverwash consists of recent alluvial deposits of sand, pebbles, and cobbles.

The entire acreage is rangeland and is used for grazing and wildlife habitat.

The potential vegetation on the Tetonville soil is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

These soils provide food and cover for moose, elk, deer, small mammals, and birds.

The capability subclass is IVws dryland for Tetonville soil and VIIIs for Riverwash. The range site for Tetonville soil is Subirrigated, 15- to 19-inch precipitation zone.

58—Tetonville-Wilsonville fine sandy loams. These nearly level soils are in old braided stream channels in flood plains along the Snake River. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

This map unit is about 40 percent Tetonville fine sandy loam and 40 percent Wilsonville fine sandy loam. Areas of these soils are too intermixed to be mapped separately.

Tetonville very gravelly sandy loam and a soil that is poorly drained but is otherwise similar to the Tetonville soil are included in mapping. They make up 20 percent of the unit.

The very deep, somewhat poorly drained Tetonville soil formed in alluvium. In a typical profile the surface layer is grayish brown fine sandy loam 8 inches thick. The upper 9 inches of the underlying material is light brownish gray fine sandy loam. The lower part to 60 inches or more is light brownish gray extremely gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. The seasonal high water table is at a depth of 1 to 3 feet during May to July. The soil is subject to occasional brief to long periods of flooding in May and June. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, somewhat poorly drained Wilsonville soil formed in alluvium. In a typical profile the surface layer is grayish brown fine sandy loam 7 inches thick. The upper 22 inches of the underlying material is light brownish gray fine sandy loam and very fine sandy loam. The next 25 inches is light brownish gray loamy coarse sand. The lower part to 60 inches or more is light brownish gray extremely gravelly loamy coarse sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight. The seasonal high water table is at a depth of 1 to 3 feet during May to July. The soil is subject to rare flooding for brief periods during May and June.

Both soils are used for irrigated hay and pasture and for homesites, recreation, and wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support about 4 animal units per month.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hay and pasture. The amount of red clover in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Red clover responds to phosphate.

The potential vegetation of these soils is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Wetness is a hazard to basements in dwellings and to onsite sewage disposal. Flooding also is a hazard.

Campgrounds and trails are the main recreation facilities. Sometimes they are muddy.

These soils provide food and cover for moose, elk, deer, small mammals, and birds.

The capability subclass is IVws irrigated and IVws dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

59—Thayne-Adel complex, 30 to 60 percent slopes. These steep soils are on north- and east-facing

mountainsides, hills, and buttes in the southern part of the survey area. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 35 percent Thayne gravelly loam, 35 percent Adel loam, and 15 percent Greyback gravelly loam. Areas of the soils are too intermixed to be mapped separately.

Included in mapping are areas of Turnerville, Robana, Willow Creek, Tetonia, and Lantonia soils. Also included are soils that are similar to Thayne and Greyback soils but have a very thick, dark surface layer, carbonate zones at a greater depth than Thayne and Greyback soils, or both a thick surface layer and greater depth to carbonate zones. Included areas make up 15 percent of the map unit.

The very deep, well drained Thayne soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 6 inches thick. The subsoil is pale brown gravelly loam 28 inches thick. The substratum is light gray extremely gravelly sandy loam to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

The very deep, well drained Adel soil formed in alluvium. In a typical profile the surface layer is grayish brown loam 26 inches thick. The underlying material is light brownish gray loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid. The erosion hazard is high.

The very deep, somewhat excessively drained Greyback soil formed in gravelly alluvium. In a typical profile the surface layer is grayish brown gravelly loam 5 inches thick. The subsoil is grayish brown gravelly loam 8 inches thick. The upper 17 inches of the substratum is light grayish brown extremely gravelly sandy loam. The lower part to 60 inches or more is light grayish brown very gravelly loamy sand.

Permeability is moderately rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

The entire acreage is mixed rangeland and forest and is used for grazing, recreation, and wildlife habitat.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide food and cover for deer, elk, small mammals, and birds.

The capability subclass is VIe. The range site is Loamy, 15- to 19-inch precipitation zone.

60—Tineman gravelly loam. This very deep, well drained soil is along the Snake River throughout the central part of the survey area. It formed in gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent, but the slope is mainly about 2 percent.

Small areas of Bearmouth and Charlos soils are included in mapping.

In a typical profile the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

Most areas of this soil are rangeland and are used for recreation, wildlife habitat, and grazing. A small acreage is used for irrigated hay and pasture. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 3 1/2 animal units per month.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition.

Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

This soil provides some food for antelope, sage grouse, deer, elk, small mammals, and birds.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications of water are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate fertilizer.

The capability subclass is IVs irrigated and IVs dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

61—Tineman gravelly loam, wet. This very deep soil is along the Snake River and its tributaries. It formed in gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

Included in mapping are areas of Tineman, Wilsonville, and Tetonville soils. These areas make up about 20 percent of the map unit.

In a typical profile of this Tineman soil the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The seasonal high water table is within 3 to 4 feet of the surface throughout the irrigation season, May through July, as a result of ditch seepage and excessive irrigation losses. The available water capacity above the water table is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

This soil is used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces about 1 ton of hay per acre. Irrigated pasture produces enough forage per acre to support 2 animal units per month.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hayland or pasture. The amount of red clover in the seeding mixture should be increased if production of hay is the intended use. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Heavy applications of irrigation water cause excess seepage and loss of water and soil nutrients and raise the already high water table.

Grasses respond to nitrogen fertilizer. Red clover responds to phosphate.

The potential vegetation is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. When the water table is high, wetness may limit the use of trails.

This soil provides some food for antelope, elk, deer, small mammals, and birds.

The seasonal high water table is a hazard to homes with basements and to onsite sewage disposal.

The capability subclass is IVw irrigated and VIw dryland. The range site is Subirrigated, 15- to 19-inch precipitation zone.

62—Tineman-Bearmouth gravelly loams, 0 to 3 percent slopes. These nearly level to gently sloping soils are on stream terraces and alluvial fans along the Snake River and its major tributaries. They formed in gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

This map unit is about 40 percent Tineman gravelly loam and 40 percent Bearmouth gravelly loam. Tineman soils are in areas of big sagebrush. Bearmouth soils are in areas of low sagebrush. Areas of the soils are too intermixed to be mapped separately.

Included in mapping are areas of Tineman very gravelly loam, Tineman cobbly loam, and a soil that has about 30 inches of fine sandy loam over very gravelly sand but is otherwise similar to the Tineman soil. These areas make up 20 percent of the unit.

The very deep, well drained Tineman soil formed in alluvium. In a typical profile the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Bearmouth soil formed in alluvium. In a typical profile the surface layer is brown gravelly loam about 6 inches thick. The subsoil is brown very gravelly loam about 9 inches thick. The substratum is brown extremely gravelly loamy sand to 60 inches or more.

Permeability is rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The entire acreage is rangeland. It is used mainly for recreation and wildlife habitat.

The potential vegetation on the Tineman soil is dominantly spike-fescue, Columbia needlegrass, mountain

bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The potential vegetation on the Bearmouth soil is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and low sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, sage grouse, deer, elk, small mammals, and birds.

The capability subclass is IVs irrigated and IVs dryland. The range site for the Tineman soil is Loamy, 15- to 19-inch precipitation zone; for the Bearmouth soil, it is Gravelly, 15- to 19-inch precipitation zone.

63—Tineman-Bearmouth gravelly loams, 3 to 40 percent slopes. These gently sloping to steep soils are on glacial kettle landscapes in an area called "The Potholes" (fig. 8). They formed in gravelly glacial outwash at elevations of 6,700 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Figure 8.—Typical landscape of Tineman-Bearmouth gravelly loams, 3 to 40 percent slopes. This area is known as "The Potholes."

This map unit is about 55 percent Tineman gravelly loam and 35 percent Bearmouth gravelly loam. The Tineman soil is on low terrace remnants between the kettles. The Bearmouth soil is on side slopes of the kettles.

Included in mapping are areas of a soil that has a fine sandy loam or loam surface layer but is otherwise similar to the Tineman soil. It is on side slopes and bottoms of the kettles. It makes up about 10 percent of the unit.

The very deep, well drained Tineman soil formed in glacial outwash. In a typical profile the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow to rapid, and water collects in the kettles. The erosion hazard is slight to high.

The very deep, well drained gravelly Bearmouth soil formed in glacial outwash. In a typical profile the surface layer is brown very gravelly loam about 6 inches thick. The subsoil is brown very gravelly loam about 9 inches thick. The substratum is brown extremely gravelly loamy sand to 60 inches or more.

Permeability is rapid. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and water collects in the kettles. The erosion hazard is high.

The entire acreage is rangeland mixed with scattered patches of lodgepole pine. It is used mainly for wildlife habitat and recreation.

The potential vegetation on the Tineman soil is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The potential vegetation on the Bearmouth soil is dominantly western needlegrass, bluebunch wheatgrass, and antelope bitterbrush. If the vegetation deteriorates, thickspike wheatgrass and low sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 750 pounds of air dry herbage per acre. It ranges from 600 pounds in unfavorable years to 950 pounds in favorable years.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, sage grouse, deer, elk, small mammals, and birds.

The capability subclass is VIs dryland. The range site for the Tineman soil is Loamy, 15- to 19-inch precipitation zone; for the Bearmouth soil, it is Gravelly, 15- to 19-inch precipitation zone.

64—Tineman association. These nearly level to sloping soils are on stream terraces and alluvial fans along the Snake River and its major tributaries. They formed in gravelly alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 10 percent.

This map unit is about 40 percent Tineman gravelly loam and 25 percent Tineman gravelly loam, wet. Tineman gravelly loam is on the higher, grass-shrub covered positions. Tineman gravelly loam, wet, is in swales that have grass and scattered willows and cottonwoods.

Included in mapping are areas of Aquic Cryoborolls and soils that have a very gravelly or cobbly surface layer or about 30 inches of fine sandy loam over very gravelly sand but are otherwise similar to the Tineman soils. These soils make up about 35 percent of the unit.

The very deep, well drained Tineman soil formed in alluvium. In a typical profile the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow to medium, and the erosion hazard is slight to moderate.

The very deep, wet Tineman soil formed in alluvium. In a typical profile the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The seasonal high water table is within 3 to 4 feet of the surface from May through July because of ditch seepage and excessive irrigation losses. The available water capacity above the water table is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

These soils are used for irrigated hay and pasture and for recreation, wildlife habitat, and homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support about 3 1/2 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and red clover are suitable for hay or pasture on the Tineman soils. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended.

Garrison creeping foxtail, reed canarygrass, and red clover are suitable for hay and pasture on the Tineman wet soil. The amount of red clover in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in

establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Where the slope is more than 3 percent, contour ditches or sprinklers should be used. Ditches should be on the contour and lined or enclosed to prevent erosion. Because of the low available water capacity, frequent light applications of water are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa and red clover respond to phosphate.

The potential vegetation on the Tineman soil is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The potential vegetation on the Tineman wet soil is dominantly tufted hairgrass, Nebraska sedge, and slender wheatgrass. If the vegetation deteriorates, western wheatgrass, slim sedge, and willows increase. Under further deterioration of the plant cover, sedges, rushes, and Kentucky bluegrass invade. In an average year the yield is approximately 4,500 pounds of air dry herbage per acre. It ranges from 3,500 pounds in unfavorable years to 5,500 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, sage grouse, deer, elk, small mammals, and birds.

If these soils are used for homesites, care must be exercised in locating septic tank absorption fields to prevent ground water pollution.

The capability subclass for the Tineman soil is IVs irrigated and IVs dryland; for the Tineman wet soil, it is IVw irrigated and IVw dryland. The range site for the Tineman soil is Loamy, 15- to 19-inch precipitation zone; for the Tineman wet soil, it is Subirrigated, 15- to 19-inch precipitation zone.

65—Turnerville silt loam, 0 to 3 percent slopes. This very deep, well drained soil is along the mountain fronts surrounding the southern part of Jackson Hole. It formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Small areas of Tetonia, Lantonia, Robana, and Willow Creek soils are included in mapping.

In a typical profile of this Turnerville soil the surface is covered with 3 inches of organic mulch. The surface layer is grayish brown silt loam about 3 inches thick. The subsurface layer is light gray silt loam about 17 inches thick. Next is a layer of mixed subsurface and subsoil material. It is light gray and light yellowish brown silt loam about 26 inches thick. The subsoil is light yellowish brown silty clay loam about 12 inches thick. The substratum is pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

Most of the acreage is forest. The principal uses are recreation and wildlife habitat. Timber is harvested from some areas. Small areas have been cleared and are used for hay and pasture. Other areas are used for homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support about 4 animal units per month.

The potential native vegetation is dominantly lodgepole pine. Scattered Douglas-fir, alpine fir, and blue spruce occur. The understory is dominantly pinegrass, pine drops, lupine, snowberry, and buffaloberry.

Trails, picnic grounds, and campgrounds are the main recreation facilities. They should be designed to control the hazard of erosion.

This soil provides food and cover for deer, elk, small mammals, and birds.

The moderately slow permeability is a moderate limitation for septic tank absorption fields.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Heavy water applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The capability subclass is IIIc irrigated and IVc dryland.

66—Turnerville silt loam, 3 to 6 percent slopes. This very deep, well drained soil is along the mountain front surrounding the southern part of Jackson Hole. It formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Small areas of Tetonia, Lantonia, Robana, and Willow Creek soils are included in mapping.

In a typical profile of this Turnerville soil the surface is covered with about 4 inches of organic mulch. The surface layer is grayish brown silt loam about 3 inches thick.

The subsurface layer is light gray silt loam about 17 inches thick. Next is a layer of mixed subsurface and subsoil material. It is light gray and light yellowish brown silt loam about 26 inches thick. The subsoil is light yellowish brown silty clay loam about 12 inches thick. The substratum is pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

Most of the acreage is forest. The principal uses are recreation and wildlife habitat. Timber is harvested from some areas. Small areas have been cleared and are used for hay and pasture. Other areas are used for homesites. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 4 animal units per month.

The potential native vegetation is dominantly lodgepole pine. Scattered Douglas-fir, alpine fir, and blue spruce occur. The understory is dominantly pinegrass, pine drops, lupine, snowberry, and buffaloberry.

Trails, picnic grounds, and campgrounds are the main recreation facilities. They should be designed to control the hazard of erosion.

This soil provides food and cover for deer, elk, small mammals, and birds.

The moderately slow permeability is a moderate limitation for septic tank absorption fields.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Corrugations and borders should be placed on the contour to minimize soil losses. Heavy water applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be on the contour and lined or enclosed to prevent erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate.

The capability subclass is IIIe irrigated and IVe dryland.

67—Turnerville silt loam, 6 to 10 percent slopes. This very deep, well drained soil is along the mountain front surrounding the southern part of Jackson Hole. It formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Small areas of Tetonia, Lantonia, Robana, and Willow Creek soils are included in mapping.

In a typical profile of this Turnerville soil the surface is covered with about 4 inches of organic mulch. The surface layer is grayish brown silt loam about 3 inches thick. The subsurface layer is light gray silt loam about 17 inches thick. Next is a layer of mixed subsurface and subsoil material. It is light gray and light yellowish brown silt loam about 26 inches thick. The subsoil is light yellowish brown silty clay loam about 12 inches thick. The substratum is pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium, and the erosion hazard is moderate.

Most of the acreage is forest. The principal uses are recreation and wildlife habitat. Timber is harvested from some areas. Small areas have been cleared and are used for hay and pasture. Other areas are used for homesites. Irrigated hayland produces about 1 1/2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support 3 animal units per month.

The potential native vegetation is dominantly lodgepole pine. Scattered Douglas-fir, alpine fir, and blue spruce occur. The understory is lupine, snowberry, and buffaloberry.

Trails, picnic grounds, and campgrounds are the main recreation facilities. They should be designed to control the hazard of erosion.

This soil provides food and cover for deer, elk, small mammals, and birds.

The moderately slow permeability is a moderate limitation for septic tank absorption fields.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay and pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can be either cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or by sprinklers. Corrugations should be placed on the contour to minimize soil losses. Heavy water applications cause excess seepage and loss of water and soil nutrients. Irrigation ditches should be on the contour and lined or enclosed to prevent erosion.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate fertilizer.

The capability subclass is IVe irrigated and IVe dryland.

68—Turnerville silt loam, 10 to 20 percent slopes. This very deep, well drained soil is along the mountain front surrounding the southern part of Jackson Hole. It formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Small areas of Tetonia, Lantonia, Robana, and Willow Creek soils are included in mapping.

In a typical profile of this Turnerville soil the surface is covered with about 4 inches of organic mulch. The surface layer is grayish brown silt loam about 3 inches thick. The subsurface layer is light gray silt loam about 17 inches thick. Next is a layer of mixed subsurface and subsoil material. It is mixed light gray and light yellowish brown silt loam about 26 inches thick. The subsoil is light yellowish brown silty clay loam about 12 inches thick. The substratum is pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is rapid, and the erosion hazard is high.

Most of the acreage is forest. The principal uses are recreation and wildlife habitat. Timber is harvested from some areas. Small areas have been cleared and are used for hay and pasture. Other areas are used for homesites.

The potential native vegetation is dominantly lodgepole pine. Scattered Douglas-fir, alpine fir, and blue spruce occur. The understory is dominantly pinegrass, pine drops, lupine, snowberry, and buffaloberry.

Trails, picnic grounds, and campgrounds are the main recreation facilities. They should be designed to control the hazard of erosion.

This soil provides food and cover for deer, elk, small mammals, and birds.

Moderately slow permeability is a moderate limitation for septic tank absorption fields. Slope is a moderate to severe limitation for septic tank absorption fields and for dwellings.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crops can be either cut for hay or pastured.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate fertilizer.

The capability subclass is VIe dryland.

69—Turnerville silt loam, 0 to 30 percent slopes. This very deep, well drained soil is along the mountain front surrounding the southern part of Jackson Hole. It formed in loess at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Small areas of Tetonia, Lantonia, Robana, and Willow Creek soils are included in mapping.

In a typical profile of this Turnerville soil the surface is covered with about 3 inches of organic mulch. The surface layer is grayish brown silt loam about 3 inches thick. The subsurface layer is light gray silt loam about 17 inches thick. Next is a layer of mixed subsurface and subsoil material. It is light gray and light yellowish brown silt loam about 26 inches thick. The subsoil is light yellowish brown silty clay loam about 12 inches thick. The substratum is pale brown silt loam to 80 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow to rapid, and the erosion hazard is slight to high.

Most of the acreage is forest. The principal uses are recreation and wildlife habitat. Timber is harvested from some areas. Other areas are used for homesites.

The potential native vegetation is dominantly lodgepole pine. Scattered Douglas-fir, alpine fir, and blue spruce occur. The understory is dominantly pinegrass, pine drops, lupine, snowberry, and buffaloberry.

Trails, picnic grounds, and campgrounds are the main recreation facilities. They should be designed to control the hazard of erosion.

This soil provides some food and cover for deer, elk, small mammals, and birds.

Moderate permeability is a moderate limitation for septic tank absorption fields. Slope is a limitation in some areas. Onsite investigation of slope is needed.

The capability subclass is VIe dryland.

70—Uhl-Roxal association. These rolling to steep soils are on uplands. The drainage pattern is dendritic in the Uhl Hill area. The soils formed in residuum and alluvium at elevations of 6,500 to 7,500 feet. The mean annual precipitation is about 18 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 6 to 40 percent.

This map unit is about 50 percent Uhl loam and 20 percent Roxal loam. The Uhl soil is on north- and east-facing slopes and on the lower south- and west-facing slopes. The Roxal soil is on the steeper south- and west-facing slopes.

Included in mapping are a moderately deep soil similar to the Uhl soil, a sandy loam similar to the Uhl soil, and areas of Rock outcrop. Included areas make up 30 percent of the association.

The very deep, well drained Uhl soil formed in alluvium. In a typical profile the surface layer is brown loam about 13 inches thick. The underlying material is brown loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is medium to rapid, and the erosion hazard is moderate to high.

The shallow, well drained Roxal soil formed in residuum of interbedded sandstone and clay shale. In a typical profile the surface layer is light gray loam about 7 inches thick. The underlying material is pale olive loam 6 inches thick. Soft shale is at about 13 inches.

Permeability is moderate. The available water capacity is low. The root zone is 10 to 20 inches. Surface runoff is medium to rapid, and the erosion hazard is moderate to high.

If the plant cover on this unit is disturbed, landslides are a hazard.

The soils in this unit are rangeland and provide recreation and wildlife habitat. All areas occur within the National Park.

The potential vegetation on the Uhl soil is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

The potential vegetation on the Roxal soil is dominantly spike-fescue, bluebunch wheatgrass, and Idaho fescue. If the vegetation deteriorates, thickspike wheatgrass, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 1,400 pounds of air dry herbage per acre. It ranges from 1,000 pounds in unfavorable years to 1,700 pounds in favorable years.

Trails are the chief recreation facilities on these soils. They should be designed to control the hazard of erosion.

The soils in this unit provide some food for antelope, deer, and elk. Ground squirrel burrows occur in areas of the Uhl soil.

The capability subclass is VIe dryland. The range site for Uhl soil is Loamy, 15- to 19-inch precipitation zone; for Roxal soil it is Shallow Loamy, 15- to 19-inch precipitation zone.

71—Youga-Tineman complex. These nearly level soils are on alluvial fans northeast of Blacktail Butte in the central part of the survey area. They formed in alluvium at elevations of 6,000 to 7,000 feet. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F. The slope range is 0 to 3 percent.

This map unit is about 55 percent Youga silty clay loam and 35 percent Tineman gravelly loam. Areas of the soils are too intermixed to be mapped separately. Tineman soils are on old stream channels filled with gravelly alluvium.

Greyback, Leavitt, and Adel soils are included in mapping. These soils make up about 10 percent of the unit.

The very deep, well drained Youga soil formed in alluvium. In a typical profile the surface layer is very dark grayish brown silty clay loam about 6 inches thick. The subsoil is grayish brown clay loam about 9 inches thick. The substratum is grayish brown and light brownish gray clay loam and sandy clay loam to 60 inches or more.

Permeability is moderate. The available water capacity is high. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

The very deep, well drained Tineman soil formed in alluvium. In a typical profile the surface layer is brown gravelly loam about 7 inches thick. The upper 8 inches of the subsoil is brown gravelly loam, and the lower 12 inches is light brown very gravelly sandy loam. The substratum is light brown extremely gravelly sand to 60 inches or more.

Permeability is moderate. The available water capacity is low. Roots penetrate to a depth of 60 inches or more. Surface runoff is slow, and the erosion hazard is slight.

These soils are used for irrigated hay and pasture and for rangeland, recreation, and wildlife habitat. Irrigated hayland produces about 2 tons of hay per acre. Irrigated pasture produces enough forage per acre to support about 4 animal units per month.

Orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa are suitable for hay or pasture. The amount of alfalfa in the seeding mixture should be increased if production of hay is intended. The short growing season limits the production of grain crops. Oats is sometimes grown as a companion crop in establishing hay or pasture. If weather prevents maturing of the oats for grain, the crop can either be cut for hay or pastured.

To conserve soil and water and to prevent excessive seepage, irrigation water can be applied through corrugations or borders or by sprinklers. Because of the low available water capacity, frequent light applications of water are needed. Heavy applications cause excess seepage and loss of water and soil nutrients.

Grasses respond to nitrogen fertilizer. Alfalfa responds to phosphate fertilizer.

The potential vegetation is dominantly spike-fescue, Columbia needlegrass, mountain bromegrass, and antelope bitterbrush. If the vegetation deteriorates, Idaho fescue, prairie junegrass, and big sagebrush increase. Under further deterioration of the plant cover, forbs and annuals invade. In an average year the yield is approximately 2,000 pounds of air dry herbage per acre. It ranges from 1,400 pounds in unfavorable years to 2,400 pounds in favorable years.

Proper grazing use and a planned grazing system minimize deterioration of range condition. Cross fencing and water developments provide a more even distribution of livestock on the range.

Trails are the main recreation facilities. They should be designed to control the hazard of erosion.

These soils provide some food for antelope, deer, elk, small mammals, and birds.

The capability subclass is IVs irrigated and IVs dryland. The range site is Loamy, 15- to 19-inch precipitation zone.

Use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data

about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for hay and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Hay and pasture

General management needed for hay and pasture is suggested in this section. The hay or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified, and the system of land capability classification used by the Soil Conservation Service is explained.

Planners of management systems for individual fields or ranches should consider the detailed information given in the description of each soil under "Soil maps for detailed planning." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Acreage figures for hay and pasture for the survey area are not available. The available acreage figures are for all of Teton County.

The potential is poor for increased forage production because urban development is reducing the acreage used for forage crops. Using suitable plants and good management practices is the only way to increase forage production in the area.

Erosion is not a great problem on the soils used for hay and pasture. On the sloping Tetonia and associated soils formed in loess, the erosion hazard is moderate or high.

Soil blowing is not a hazard.

Drainage is a major need on soils on much of the flood plain along the Snake River and its tributaries. These are the somewhat poorly drained Tetonville and Wilsonville soils, the poorly drained Newfork soils, and the poorly drained and very poorly drained Cryaquolls and Cryofibrists. Drainage is generally difficult because locating available outlets is difficult. Locating outlets is easier on the wet soils on terraces. These are the somewhat poorly drained Adel Variant, Charlos Variant, Leavitt Variant, and Tineman wet soils.

Fertility is naturally moderate to high in most soils used for hay and pasture. It is high in soils such as Tetonia, Lantonia, Leavitt, and Tetonville. It is moderate in soils such as Tineman.

Nitrogen and phosphorus are needed for maximum production on most soils used for hay and pasture. Fertilizer should be applied according to the results of soil tests.

Tilth is important in the germination of seeds and in the infiltration of water. In soils formed in loess, such as Tetonia, the amount of organic matter in the surface layer is generally sufficient to prevent crusting. In other soils, such as Tineman, the amount of sand and gravel in the surface layer is sufficient to prevent crusting.

Grasses and legumes are seeded to improve hayland and pasture. On well-drained soils, such as Tetonia and Leavitt soils, orchardgrass, Regar bromegrass, smooth bromegrass, meadow fescue, and alfalfa should be planted. On somewhat poorly drained soils, such as Leavitt Variant and Tineman wet soils, Garrison creeping foxtail, reed canarygrass, and red clover should be planted.

Good management of irrigation water is needed to obtain maximum forage quality and yield. Help in planning irrigation water management can be obtained from the Soil Conservation Service office in Jackson.

Land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of forage crops. Crops that require special management are excluded. The soils are grouped according to their limitations for forage crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider 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 are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower

choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use. No class I soils occur in Teton County.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. No class II soils occur in Teton County.

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, IIe. The letter *e* shows that the main limitation is 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.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, 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.

Rangeland

Most rangeland in the survey area is in Grand Teton National Park. The privately-owned rangeland is mostly used for horses, and some is used for cow-calf operations.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to differences in the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

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 established 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.

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 in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, 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.

In Jackson Hole the soils on terraces are droughty gravelly loams that support grass-shrub vegetation. The loamy soils on the alluvial fans support a denser stand of grasses and shrubs. The gravelly and stony soils of the mountains support an even denser stand of grasses and shrubs.

Woodland management and productivity

The woodland is lodgepole pine on the lower mountain slopes and Engelmann spruce and alpine fir on the upper slopes. Most of the woodland is in Grand Teton National Park. The only privately-owned woodland is areas of Turnerville soils in the southern part of the survey area. Most of these areas are used for homesites.

Woodland understory vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Recreation

Recreation is the major land use of Grand Teton National Park. Much of the private land in the survey area is

used for guest ranches and other bases for visitors using the national park (fig. 9) or the nearby national forests.

The soils of the survey area are rated in table 4 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 4, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design,

Figure 9.—Riding trail through an area of Leavitt-Youga complex, 3 to 6 percent slopes.

or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 4 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 7 and interpretations for dwellings without basements and for local roads and streets in table 6.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Wildlife habitat

This survey area provides habitat for deer, elk, moose (fig. 10), bear, antelope, sage grouse, waterfowl, small mammals, and small birds.

Hunting is allowed in only a small part of the survey area. Elk hunting by special permit is allowed in part of Teton Park. No other hunting is allowed in the Park. No hunting is allowed on the Elk Refuge.

In addition to the National Elk Refuge, there is an elk refuge at South Park administered by the Wyoming Game and Fish Commission.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

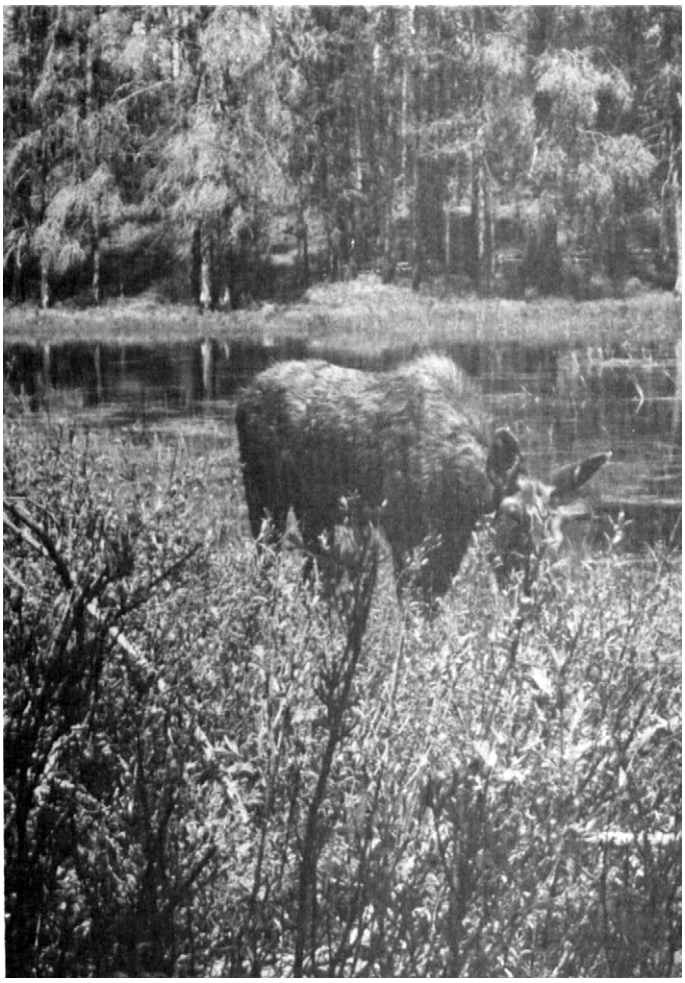

Figure 10.—Moose grazing. The pond is in an area of the Taglake-Sebud association.

In table 5, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or main-

tained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are needlegrass, goldenrod, lupine, wheatgrass, and fescue.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of hayland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include meadowlark, sparrow, cottontail, and fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include ruffed grouse, thrushes, woodpeckers, gray fox, raccoon, deer, elk, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this sec-

tion. Local ordinances and regulations need to 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 to 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 (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) 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 6 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Sanitary facilities

Table 7 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 are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 7 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site fea-

tures are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. 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 7 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 due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 7 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type 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 soil blowing.

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 8 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 these materials. 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 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, 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 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 the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 8 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 10.

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 water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water management

Table 9 gives information on the soil properties and site features that affect water management. The kinds of soil limitations are given for pond reservoir areas, embankments, dikes, and levees; drainage; and irrigation.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

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 potential 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.

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. 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.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, 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 10 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and 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 a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*3*) and the system adopted by the American Association of State Highway and Transportation Officials (*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.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 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 oven-dry 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 11 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and 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.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Soil and water features

Table 12 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake 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 inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes is not considered flooding.

Table 12 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 12 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 12.

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. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

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 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 (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classi-

fication is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 13, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten 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 Entisol.

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 Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

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 Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, mesic Typic Haplaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil series and morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*7*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series. The soils may vary slightly in color, texture, and other characteristics.

The map units of each soil series are described in the section "Soil maps for detailed planning."

Adel series

The Adel series consists of very deep, well drained soils formed in alluvium. These soils are on alluvial fans. The slope range is 20 to 60 percent. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

Adel soils are similar to Silas and Spearhead soils. They are geographically associated with Buffork, Thayne, Sebud, and Perceton soils. Silas soils are moderately well drained. Spearhead and Sebud soils are skeletal. Buffork and Perceton soils have an argillic horizon. Thayne soils have a B horizon and do not have a pachic horizon.

Typical pedon of Adel loam in an area of Buffork-Adel association, SE1/4SW1/4 sec 36, T. 46 N., R. 114 W.

A11—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; friable, sticky and plastic; mildly alkaline; abrupt smooth boundary.

A12—8 to 26 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; friable, sticky and plastic; mildly alkaline; gradual smooth boundary.

C—26 to 60 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure parting to moderate fine granular; friable, sticky and plastic; mildly alkaline.

Adel Variant

The Adel Variant consists of very deep, somewhat poorly drained soils formed in alluvium. These soils are on alluvial fans. Slopes are 0 to 3 percent. The mean

annual precipitation is about 20 inches, and the mean annual air temperature is about 35 degrees F.

Adel Variant soils are similar to Adel soils but differ in having a water table that fluctuates to within 12 inches of the surface during the growing season.

Typical pedon of Adel Variant loam, NE1/4NE1/4 sec. 2, T. 45 N., R. 114 W.

A11—0 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; friable, sticky and plastic; mildly alkaline; abrupt smooth boundary.

A12—8 to 26 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; friable, sticky and plastic; mildly alkaline; gradual smooth boundary.

C—26 to 60 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; few fine strong brown mottles; weak medium subangular blocky structure; friable, sticky and plastic; mildly alkaline.

Bearmouth series

The Bearmouth series consists of very deep, well drained soils formed in gravelly alluvium and glacial deposits. These soils are on alluvial fans and terraces. The slope range is 0 to 40 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Bearmouth soils are similar to Tineman soils. They are geographically associated with Tineman soils and Charlos soils. Tineman soils are loamy-skeletal. Charlos soils have an argillic horizon.

Typical pedon of Bearmouth gravelly loam in an area of Tineman-Bearmouth gravelly loams, NE1/4SW1/4 sec. 12, T. 43 N., R. 116 W.

A11—0 to 2 inches; brown (7.5YR 5/3) gravelly loam, dark brown (7.5YR 3/3) moist; weak fine and very fine crumb structure; soft, very friable; 20 percent gravel; slightly acid; clear smooth boundary.

A12—2 to 6 inches; brown (7.5YR 5/3) gravelly loam, dark brown (7.5YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 20 percent gravel; slightly acid; clear smooth boundary.

B2—6 to 15 inches; brown (7.5YR 5/4) very gravelly loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable; 45 percent gravel; neutral; gradual wavy boundary.

IIC—15 to 60 inches; brown (7.5YR 5/3) extremely gravelly loamy sand, dark brown (7.5YR 4/4) moist; single grain; loose; 75 percent gravel, 10 percent cobbles; neutral.

Depth to the IIC horizon ranges from 10 to 25 inches.

Buffork series

The Buffork series consists of moderately deep, well drained soils formed in residuum of sandstone. These undulating to steep soils occupy hillsides and mountainsides. The slope range is 3 to 60 percent. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

Buffork soils are similar to Charlos, Leavitt, Willow Creek, and Youga soils. They are geographically associated with Adel, Perceton, Clayburn, and Tongue River soils. Tongue River soils have an albic horizon and are less than 60 inches deep over bedrock. Perceton soils do not have a mollic epipedon. The other associated soils are more than 60 inches deep over bedrock.

Typical pedon of Buffork fine sandy loam in an area of Buffork-Adel association, NE1/4NE1/4 sec. 23, T. 45 N., R. 114 W.

A11—0 to 2 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure parting to moderate fine crumb; soft, very friable; many very fine, fine, and medium roots and common coarse roots; neutral; abrupt smooth boundary.

A12—2 to 9 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate fine and very fine subangular blocky structure; soft, very friable; many very fine, fine, and medium roots and common coarse roots; neutral; clear smooth boundary.

B1—9 to 15 inches; dark brown (10YR 4/3) fine sandy loam, brown (10YR 5/3) broken, pale brown (10YR 6/3) crushed, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky; patchy thin clay films on faces of peds; neutral; clear smooth boundary.

B2t—15 to 26 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky, slightly plastic; common very fine, fine, and medium roots and few coarse roots; thin nearly continuous clay films, thick patchy clay films on faces of peds; neutral; clear smooth boundary.

Cr—26 inches; soft, noncalcareous sandstone.

Depth to bedrock is 20 to 40 inches.

Charlos series

The Charlos series consists of very deep, well drained soils formed in alluvium. These soils are on alluvial fans and terraces. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Charlos soils are similar to Buffork, Leavitt, Sebud, Willow Creek, and Youga soils. They are geographically

associated with Bearmouth, Greyback, Leavitt, and Tineman soils. Buffork soils have a paralithic contact within a depth of 40 inches. Leavitt soils have a horizon of calcium carbonate accumulation. Willow Creek and Youga soils lack a skeletal substratum. Bearmouth, Greyback, Sebud, and Tineman soils have an argillic horizon.

Typical pedon of Charlos loam, SW1/4SW1/4 sec. 8, T. 42 N., R. 115 W.

A11—0 to 4 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium and thin platy structure; hard, friable, sticky and plastic; neutral; clear smooth boundary.

A12—4 to 9 inches; grayish brown (10YR 5/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to moderate fine crumb; hard, friable, sticky and plastic; neutral; clear smooth boundary.

B1—9 to 13 inches; brown (10YR 5/3) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; neutral; clear smooth boundary.

B2t—13 to 20 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; neutral; clear smooth boundary.

B3—20 to 28 inches; pale brown (10YR 6/3) sandy clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; neutral; gradual wavy boundary.

IIC—28 to 60 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; 55 percent pebbles, 15 percent cobbles; neutral.

Depth to extremely gravelly loamy sand is 20 to 40 inches.

Charlos Variant

The Charlos Variant consists of very deep, somewhat poorly drained soils formed in alluvium. These soils are on low terraces and bottom lands. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Charlos Variant soils are similar to Charlos soils but have a water table at a depth of 1 foot to 3 feet during the growing season.

Typical pedon of Charlos Variant loam, SE1/4NW1/4 sec. 1, T. 41 N., R. 117 W.

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; friable, sticky and plastic; neutral; clear smooth boundary.

B1—7 to 21 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure parting to moderate fine granular; friable, sticky and plastic; neutral; clear smooth boundary.

B2t—21 to 38 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; few fine faint mottles; moderate medium subangular blocky structure; firm, sticky and plastic; neutral; gradual wavy boundary.

IIC—38 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; 60 percent pebbles, 15 percent cobbles; neutral.

Depth to extremely gravelly loamy sand is 20 to 40 inches.

Clayburn series

The Clayburn series consists of very deep, well drained soils formed in glacial drift. These soils are on hills. The slope range is 3 to 40 percent. The mean annual precipitation is about 20 inches, and the mean annual temperature is about 36 degrees F.

Clayburn soils are similar to Robana soils and are geographically associated with Buffork and Tongue River soils. Robana soils have a fine-silty control section. Buffork soils have a paralithic contact within a depth of 40 inches. Tongue River soils have an albic horizon.

Typical pedon of Clayburn sandy loam in an area of Buffork-Tongue River-Clayburn association, SW1/4SE1/4 sec. 23, T. 45 N., R. 114 W.

A11—0 to 8 inches; very dark brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate fine crumb; soft, very friable; many very fine, fine, medium, and large roots; neutral; gradual smooth boundary.

A12—8 to 20 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable; many very fine, fine, medium, and large roots; neutral; gradual smooth boundary.

B1—20 to 26 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable; many fine, medium, and large roots; mildly alkaline; gradual smooth boundary.

B2t—26 to 36 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, very friable, sticky and slightly plastic; nearly continuous clay films on ped faces; clay bridging between sand grains and clay coatings on sand grains; common fine and medium roots and few large roots; neutral; gradual smooth boundary.

C—36 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable; mildly alkaline.

Crow Creek series

The Crow Creek series consists of very deep, well drained soils formed in loess. These soils are on hills. The slope range is 3 to 40 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Crow Creek soils are similar to Thayne soils and are geographically associated with Lantonia, Tetonia, Robana, Roxal, Starley, and Willow Creek soils. Thayne soils are fine-loamy. Lantonia soils have a calcium carbonate accumulation below 30 inches. Tetonia soils have a pachic horizon. Robana soils have an argillic horizon. Roxal and Starley soils are less than 20 inches deep over bedrock. Willow Creek soils have a fine-silty control section.

Typical pedon of Crow Creek silt loam in an area of Crow Creek silt loam, 3 to 10 percent slopes, NE1/4NW1/4 sec. 4, T. 41 N., R. 115 W.

A11—0 to 2 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine and very fine subangular blocky structure; soft, very friable, slightly sticky; many very fine and fine roots and common medium roots; mildly alkaline; abrupt smooth boundary.

A12—2 to 9 inches; dark grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse and medium subangular blocky structure; slightly hard, very friable, slightly sticky; many very fine and fine roots and common medium roots; mildly alkaline; clear smooth boundary.

B2—9 to 14 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate coarse and medium subangular blocky structure; slightly hard, very friable, slightly sticky; common fine and few medium roots; mildly alkaline; clear smooth boundary.

C1ca—14 to 20 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky; common fine roots and few medium roots; calcareous; moderately alkaline; gradual smooth boundary.

C2ca—20 to 24 inches; white (10YR 8/2) silt loam, light gray (10YR 7/2) moist; massive; hard, very friable, slightly sticky and slightly plastic; calcareous; moderately alkaline; gradual smooth boundary.

C3ca—24 to 60 inches; light gray (10YR 7/2) silt loam, light brownish gray (10YR 6/2) moist; massive; soft, very friable, slightly sticky; calcareous; moderately alkaline.

Greyback series

The Greyback series consists of very deep, somewhat excessively drained soils formed in alluvium. These soils are on alluvial fans and high terraces. The slope range is 0 to 60 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Greyback soils are similar to Midfork, Sebud, and Tineman soils and are geographically associated with Charlos, Grobutte, Tetonia, and Thayne soils. Midfork soils do not have B2 and Cca horizons. Sebud, Tineman, and Charlos soils are noncalcareous. Tetonia and Thayne soils do not have a loamy-skeletal control section. Grobutte soils do not have a B2 horizon.

Typical pedon of Greyback gravelly loam in an area of Greyback-Thayne complex, 20 to 30 percent slopes, NE1/4NW1/4 sec. 7, T. 41 N., R. 116 W.

A1—0 to 5 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine, common medium, and few coarse roots; 15 percent pebbles, 5 percent cobbles; mildly alkaline; clear smooth boundary.

B2—5 to 13 inches; grayish brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine, common medium, and few coarse roots; 15 percent pebbles, 5 percent cobbles; mildly alkaline; clear smooth boundary.

C1ca—13 to 30 inches; light grayish brown (10YR 6/2) extremely gravelly sandy loam, grayish brown (10YR 4/2) moist; massive; soft, very friable; common fine roots to a depth of 22 inches, few fine roots to a depth of 30 inches; 45 percent pebbles, 20 percent cobbles; calcareous; secondary lime mainly disseminated in the soil matrix and as pendants on the underside of rock fragments; moderately alkaline; gradual wavy boundary.

C2—30 to 60 inches; light grayish brown (10YR 6/2) very gravelly loamy sand, grayish brown (10YR 4/2) moist; single grain; loose; 45 percent pebbles, 20 percent cobbles; calcareous; moderately alkaline.

Depth to the extremely gravelly substratum is 10 to 26 inches.

Grobutte series

The Grobutte series consists of very deep, well drained soils formed in gravelly colluvium and alluvium. These soils are on south- and west-facing hillsides and mountainsides. The slope range is 30 to 60 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 37 degrees F.

Grobutte soils are not similar to any other soils in the survey area. They are geographically associated with Greyback and Thayne soils. Greyback and Thayne soils have a B2 horizon.

Typical pedon of Grobutte gravelly loam in an area of Grobutte-Thayne gravelly loams, 30 to 60 percent slopes, SW1/4 sec. 27, T. 40 N., R. 116 W.

A1—0 to 4 inches; light brownish gray (10YR 6/2) gravelly loam, dark brown (10YR 3/3) moist; moderate fine and very fine granular structure; soft, very friable, sticky and plastic; 15 percent pebbles; calcareous; moderately alkaline; clear smooth boundary.

C1—4 to 10 inches; light gray (10YR 7/2) gravelly loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure parting to moderate fine and very fine granular; slightly hard, friable, sticky and plastic; 15 percent pebbles; calcareous; lime disseminated; moderately alkaline; gradual wavy boundary.

C2—10 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure parting to moderate fine and very fine granular; slightly hard, friable, slightly sticky; 40 percent pebbles, 10 percent cobbles; calcareous; lime disseminated; moderately alkaline.

Hechtman series

The Hechtman series consists of shallow, well drained soils formed in residuum of rhyolite. These soils are on mountainsides. The slope range is 6 to 60 percent. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F.

Hechtman soils are not similar to any other soils in the survey area. They are geographically associated with Rock outcrop.

Typical pedon of Hechtman gravelly sandy loam in an area of Hechtman-Rock outcrop association in an unsectionized part of Grand Teton National Park, north of Berry Creek and west of the Snake River:

O1—1/2 inch to 0; forest duff, mainly needles.

A2—0 to 6 inches; light brownish gray (10YR 6/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; 20 percent gravel; strongly acid; clear smooth boundary.

B2—6 to 15 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; moderate medium and fine granular structure; slightly hard, very friable, slightly sticky; 60 percent gravel; patchy glossy coatings on rock fragments; medium acid; gradual smooth boundary.

R—15 inches; rhyolite bedrock, fractured in the upper part.

Depth to bedrock is 10 to 20 inches.

Lantonia series

The Lantonia series consists of very deep, well drained soils formed in loess. These soils are on upland hills. The slope range is 0 to 30 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Lantonia soils are similar to Spearhead and Tetonia soils and are geographically associated with Crow Creek and Tetonia soils. Tetonia soils and Crow Creek soils have a calcium carbonate accumulation within a depth of 35 inches. Spearhead soils are skeletal.

Typical pedon of Lantonia silt loam in an area of Tetonia-Lantonia silt loams, 3 to 6 percent slopes, SW1/4SW1/4 sec. 30, T. 41 N., R. 116 W.

A11—0 to 8 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; slightly hard, very friable; neutral; clear smooth boundary.

A12—8 to 16 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable; neutral; gradual smooth boundary.

B21—16 to 26 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable; very few thin coatings on ped faces and in pores; neutral; gradual smooth boundary.

B22—26 to 36 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable; very few thin coatings on ped faces and in pores; neutral; gradual smooth boundary.

B23—36 to 46 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak very coarse prismatic structure parting to moderate coarse subangular blocky; slightly hard, very friable; very few thin coatings on ped faces and in pores; neutral; diffuse wavy boundary.

B3ca—46 to 80 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak very coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, very friable; calcareous in spots; mildly alkaline.

Depth to calcareous material is 35 to 60 inches.

Leavitt series

The Leavitt series consists of very deep, well drained soils formed in alluvium. These soils are on stream terraces and alluvial fans. The slope range is 0 to 6 percent. The mean annual precipitation is about 17 inches,

and the mean annual air temperature is about 35 degrees F.

Leavitt soils are similar to Charlos soils and Youga soils. They are geographically associated with Youga and Buffork soils. Youga and Charlos soils do not have horizons of calcium carbonate accumulation. Buffork soils have a paralithic contact within a depth of 40 inches.

Typical pedon of Leavitt loam in an area of Leavitt-Youga complex, 0 to 3 percent slopes, NE1/4SE1/4 sec. 5, T. 42 N., R. 115 W.

A1—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; hard, friable, sticky and plastic; neutral; clear smooth boundary.

B21t—8 to 21 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; mildly alkaline; clear smooth boundary.

B22t—21 to 25 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, very sticky and very plastic; mildly alkaline; clear smooth boundary.

B23t—25 to 38 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; mildly alkaline; abrupt smooth boundary.

B3ca—38 to 52 inches; light gray (10YR 7/2) sandy clay loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; calcareous; moderately alkaline; gradual wavy boundary.

IICca—52 to 60 inches; light gray (10YR 7/2) extremely gravelly loamy sand, grayish brown (10YR 5/2) moist; single grain; loose; 65 percent pebbles, 15 percent cobbles; calcareous; moderately alkaline.

Depth to the extremely gravelly sand IIC horizon is more than 40 inches. Content of rock fragments in the IIC horizon is 70 to 90 percent; 45 to 80 percent is pebbles, and 10 to 25 percent is cobbles.

Leavitt Variant

The Leavitt Variant consists of very deep, somewhat poorly drained soils formed in alluvium. These soils are on stream terraces and bottom lands. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Leavitt Variant soils are similar to Leavitt soils but have a water table at a depth of 2 to 3 feet during the growing season.

Typical pedon of Leavitt Variant loam, SE1/4NW1/4 sec. 29, T. 41 N., R. 116 W.

A1—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; hard, friable, sticky and plastic; neutral; clear smooth boundary.

B21t—7 to 21 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; mildly alkaline; clear smooth boundary.

B22t—21 to 25 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, very sticky and very plastic; mildly alkaline; clear smooth boundary.

B23t—25 to 38 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; few fine distinct strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; mildly alkaline; abrupt smooth boundary.

B3ca—38 to 52 inches; light gray (10YR 7/2) sandy clay loam, grayish brown (10YR 5/2) moist; few fine distinct strong brown (7.5R 5/6) mottles; weak medium subangular blocky structure; hard, friable, sticky and plastic; calcareous; moderately alkaline; gradual wavy boundary.

IICca—52 to 60 inches; light gray (10YR 7/2) extremely gravelly loamy sand, grayish brown (10YR 5/2) moist; single grain; loose; 65 percent pebbles, 15 percent cobbles; calcareous; moderately alkaline.

Depth to the extremely gravelly loamy sand IIC horizon is more than 40 inches. Content of rock fragments in the IIC horizon is 70 to 90 percent; 45 to 80 percent is pebbles, and 10 to 25 percent cobbles.

Leighcan series

The Leighcan series consists of very deep, well drained soils formed in glacial till or colluvium of igneous rocks. These soils are on mountainsides. The slope range is 3 to 70 percent. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 35 degrees F.

Leighcan soils are not similar to any soil in the survey area. They are geographically associated with Moran, Teewinot, and Walcott soils. Leighcan soils do not have an umbric epipedon.

Typical pedon of Leighcan very stony sandy loam in an area of Leighcan-Moran-Walcott association in an unsectionized part of Grand Teton National Park, along Death Canyon-Alaska Basin trail:

O1—1 inch to 0; forest duff.

A2—0 to 7 inches; light brownish gray (10YR 6/2) very stony sandy loam, dark brown (10YR 4/3) moist;

weak fine granular structure; soft, very friable; many medium and coarse roots and few fine roots; 25 percent pebbles, 15 percent cobbles, 10 percent stones and boulders; strongly acid; clear smooth boundary.

B21—7 to 45 inches; pale brown (10YR 6/3) very stony sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine crumb structure; soft, very friable; many medium and coarse roots and few fine roots; 25 percent pebbles, 15 percent cobbles, 10 percent stones and boulders; medium acid; gradual wavy boundary.

B22—45 to 60 inches; light yellowish brown (10YR 6/4) very stony sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable; few large concretions of iron oxide with gley coatings; some remnant patches of reddish brown clay coatings on rock fragments; 25 percent pebbles, 15 percent cobbles; 10 percent stones and boulders; medium acid.

Midfork series

The Midfork series consists of very deep, well drained soils formed in calcareous alluvium, colluvium, and landslide deposits from sedimentary rock. These soils are on alluvial fans and mountainsides. The slope range is 15 to 70 percent. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F.

Midfork soils are similar to Greyback, Sebud, and Tineman soils and are geographically associated with Owlcan, Spearhead, and Starman soils. Greyback soils have B2 and Cca horizons. Sebud and Tineman soils are noncalcareous. Spearhead soils are pachic. Owlcan soils have an argillic horizon. Starman soils are shallow over limestone.

Typical pedon of Midfork very stony loam in an area of Midfork-Spearhead association in an unsectionized part of Grand Teton National Park, 200 feet east of Middlefork cutoff—Moose Creek trail junction:

A11—0 to 4 inches; brown (7.5YR 5/2) very stony loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; 20 percent pebbles, 10 percent cobbles, 10 percent stones; mildly alkaline; clear wavy boundary.

A12—4 to 10 inches; brown (7.5YR 5/2) very stony loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak medium and fine granular; soft, very friable, sticky and slightly plastic; common fine roots and many medium and coarse roots; 20 percent pebbles, 10 percent cobbles, 10 percent stones; mildly alkaline; gradual wavy boundary.

C1—10 to 15 inches; brown (7.5YR 5/3) very cobbly loam, dark brown (7.5YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common fine roots and many medium and coarse roots; 20 percent pebbles, 20 percent cobbles, 10 percent stones; mildly alkaline; gradual wavy boundary.

C2—15 to 60 inches; light brownish gray (10YR 6/2) very cobbly loam, grayish brown (10YR 5/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few medium and fine roots; 20 percent pebbles, 20 percent cobbles, 10 percent stones; calcareous; moderately alkaline.

Moran series

The Moran series consists of very deep, well drained soils formed in alluvium and colluvium. These soils are on mountainsides. The slope range is 3 to 70 percent. The mean annual precipitation is about 45 inches, and the mean annual air temperature is about 34 degrees F.

Moran soils are not similar to any other soil in the survey area. They are geographically associated with Leighcan, Teewinot, and Walcott soils. Leighcan soils do not have an umbric epipedon. Teewinot soils are shallow over bedrock. Walcott soils do not have a cambic horizon.

Typical pedon of Moran very stony sandy loam in an area of Leighcan-Moran-Walcott association in an unsectionized area of Grand Teton National Park, in the bottom of upper Death Canyon:

A1—0 to 6 inches; brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky; 20 percent pebbles, 15 percent cobbles, 15 percent stones and boulders; medium acid; clear wavy boundary.

B2—6 to 15 inches; brown (7.5YR 5/3) very stony sandy loam, dark brown (7.5YR 3/3) moist; moderate fine prismatic structure parting to moderate fine and very fine subangular blocky; soft, very friable, slightly sticky; 20 percent pebbles, 20 percent cobbles, 20 percent stones and boulders; medium acid; clear wavy boundary.

C—15 to 60 inches; light brown (7.5YR 6/3) very stony sandy loam, dark brown (7.5YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 20 percent pebbles, 20 percent cobbles, 20 percent stones and boulders; medium acid.

Newfork series

The Newfork series consists of very deep, poorly drained soils formed in noncalcareous alluvium. These soils are on bottom lands and terraces. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Newfork soils are not similar to any other soils in the survey area. They are geographically associated with Tetonville and Wilsonville soils. Those soils do not have an aquic moisture regime.

Typical pedon of Newfork fine sandy loam, NE1/4NW1/4 sec. 3, T. 40 N., R. 117 W.

A11—0 to 6 inches; very dark gray (10YR 3/1) fine sandy loam, black (10YR 2/1) moist; moderate fine and very fine granular structure; hard, very friable, slightly sticky and slightly plastic; 5 percent gravel; neutral; clear smooth boundary.

A12—6 to 10 inches; dark gray (10YR 4/1) fine sandy loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; 5 percent gravel; neutral; clear smooth boundary.

B2g—10 to 16 inches; light gray (10YR 6/1) fine sandy loam, gray (10YR 5/1) moist; common medium distinct strong brown mottles; (7.5YR 5/6) weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; 5 percent gravel; neutral; gradual wavy boundary.

IIC—16 to 60 inches; light gray (10YR 6/1) extremely gravelly loamy sand, gray (10YR 5/1) moist; single grain; loose, nonsticky and nonplastic; 80 percent gravel; neutral.

Depth to extremely gravelly loamy sand ranges from 10 to 20 inches.

Owlcan series

The Owlcan series consists of very deep, well drained soils formed in alluvium. These soils are on alluvial fans and mountainsides. The slope range is 30 to 70 percent. The mean annual precipitation is about 45 inches, and the mean annual air temperature is about 34 degrees F.

Owlcan soils are similar to Tongue River soils. They are geographically associated with Midfork, Sheege, and Starman soils. Tongue River soils have a fine-loamy control section. Midfork soils do not have an argillic horizon. Sheege and Starman soils are shallow over bedrock.

Typical pedon of Owlcan loam in an area of Starman-Owlcan association in an unsectionized part of Grand Teton National Park, on the Middle Fork of Granite Creek:

O1—1 inch to 0; forest duff.

A1—0 to 1 inch; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; neutral; abrupt smooth boundary.

A2—1 inch to 5 inches; pinkish gray (7.5YR 6/2) loam, dark brown (7.5YR 4/2) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky and plastic; medium acid; clear smooth boundary.

B1—5 to 11 inches; brown (7.5YR 5/2) clay loam, dark brown (7.5YR 3/2) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky and plastic; neutral; gradual wavy boundary.

B21—11 to 16 inches; brown (7.5YR 5/2) heavy clay loam, dark brown (7.5YR 3/2) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; hard, firm, very sticky and plastic; neutral; gradual wavy boundary.

B22t—16 to 23 inches; pinkish gray (7.5YR 6/2) channery clay loam, dark brown (7.5YR 4/2) moist; moderate medium and fine subangular blocky structure; hard, firm, very sticky and plastic; 30 percent channery fragments; neutral; clear wavy boundary.

Cca—23 to 60 inches; pinkish gray (7.5YR 7/2) very channery clay loam, pinkish gray (7.5YR 6/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 50 percent channery fragments; calcareous; secondary lime mainly disseminated in the soil mass; mildly alkaline.

Perceton series

The Perceton series consists of moderately deep, well drained soils formed in residuum of volcanic conglomerate. These soils are on mountain ridges and side slopes. The slope range is 15 to 60 percent. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

Perceton soils are similar to Tongue River soils and are geographically associated with Adel, Tongue River, and Buffork soils. Tongue River soils do not have gravel throughout the profile. Adel soils do not have an argillic horizon. Buffork soils have a mollic epipedon.

Typical pedon of Perceton gravelly sandy loam in an area of Perceton-Buffork association, NE1/4SW1/4 sec. 35, T. 46 N., R. 114 W.

O1—2 inches to 0; forest litter.

A2—0 to 7 inches; pinkish gray (7.5YR 6/2) gravelly sandy loam, dark brown (7.5YR 4/2) moist; moderate fine and very fine subangular blocky structure; soft, very friable; many fine, medium, and coarse roots; 25 percent gravel; neutral; clear smooth boundary.

A&B—7 to 16 inches; brown (7.5YR 5/2) gravelly sandy clay loam, dark brown (7.5YR 4/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; 25 percent gravel; neutral; clear smooth boundary.

B2t—16 to 25 inches; brown (7.5YR 5/3) gravelly sandy clay loam, dark brown (7.5YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common fine, medium, and coarse roots; 30 percent gravel; moderately thick clay films on faces of peds,

clay coatings on rock fragments; neutral; gradual smooth boundary.
C—25 to 35 inches; brown (7.5YR 5/3) very gravelly sandy loam, dark brown (7.5YR 4/3) moist; massive; soft, very friable, few fine and medium roots; clay coatings on some rock fragments; 55 percent gravel; neutral; diffuse irregular boundary.
Cr—35 inches; weathered volcanic conglomerate.

Depth to bedrock is 20 to 40 inches.

Robana series

The Robana series consists of very deep, well drained soils formed in loess. These soils are on hills. The slope range is 3 to 20 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Robana soils are similar to Clayburn soils and are geographically associated with Crow Creek and Willow Creek soils. Clayburn soils have a fine-loamy control section. Crow Creek soils do not have an argillic horizon. Willow Creek soils are not pachic.

Typical pedon of Robana silt loam in an area of Robana-Willow Creek silt loams, 3 to 6 percent slopes, SE1/4SW1/4 sec. 12, T. 39 N., R. 116 W.

A1—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine and very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; mildly alkaline; clear smooth boundary.
B1—7 to 21 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; mildly alkaline; clear smooth boundary.
B2t—21 to 39 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; hard, friable, sticky and plastic; common fine and very fine roots; mildly alkaline; clear smooth boundary.
B3—39 to 50 inches; very pale brown (10YR 7/3) silt loam, grayish brown (10YR 5/2) moist; weak medium and fine subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; mildly alkaline; abrupt smooth boundary.
C—50 to 60 inches; light gray (10YR 7/2) silt loam, brown (10YR 7/3) moist; massive; hard, friable, sticky and plastic; moderately alkaline.

Thickness of the mollic epipedon ranges from 16 to 36 inches. Depth to a calcareous horizon exceeds 60 inches.

Roxal series

The Roxal series consists of shallow, well drained soils formed in residuum of interbedded sandstone and clay shale. These soils are on bedrock-controlled upland slopes and buttes. The slope range is 6 to 40 percent. The mean annual precipitation is about 18 inches, and the mean annual air temperature is about 35 degrees F.

Roxal soils are similar to Starman soils and are geographically associated with Crow Creek and Starley soils. Starman soils have a lithic contact. Crow Creek soils do not have bedrock above 60 inches. Starley soils have a mollic epipedon.

Typical pedon of Roxal loam in an area of Uhl-Roxal association, SW1/4NE1/4 sec. 12, T. 44 N., R. 114 W.

A1—0 to 7 inches; light gray (5Y 7/2) loam, olive gray (5Y 5/2) moist; weak very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; calcareous; moderately alkaline; gradual wavy boundary.
C—7 to 13 inches; pale olive (5Y 6/3) loam, olive (5Y 4/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; calcareous; moderately alkaline; gradual wavy boundary.
Cr—13 inches; brownish gray, soft, platy shale.

Depth to clay shale ranges from 10 to 20 inches.

Sebud series

The Sebud series consists of very deep, well drained soils formed in glacial till and alluvium. These soils are on moraines, alluvial fans, and colluvial foot slopes. The slope range is 3 to 20 percent. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

Sebud soils are similar to Charlos, Greyback, Midfork, and Tineman soils. They are geographically associated with Adel, Charlos, and Taglake soils. Charlos soils have an argillic horizon. Greyback soils have a Cca horizon. Midfork soils are calcareous in the lower part of the substratum. Tineman soils have a horizon of extremely gravelly sand or loamy sand in the lower part of the control section. Adel soils do not have rock fragments. Taglake soils do not have a mollic epipedon.

Typical pedon of Sebud stony sandy loam in an area of Sebud complex, 3 to 6 percent slopes, NE1/4NW1/4 sec. 17, T. 42 N., R. 116 W.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) stony sandy loam, very dark brown (10YR 2/2) moist; moderate very fine crumb structure; soft, very friable, slightly sticky and slightly plastic; many coarse, medium, and fine roots; 20 percent stones and cobbles, 15 percent pebbles; neutral; clear smooth boundary.
B1—6 to 11 inches; grayish brown (10YR 5/2) stony sandy loam, very dark grayish brown (10YR 3/2)

moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common coarse and medium roots and many fine roots; 20 percent stones and cobbles, 15 percent pebbles; neutral; clear smooth boundary.

B2—11 to 17 inches; brown (10YR 5/3) very stony sandy clay loam, dark brown (10YR 3/3) moist; moderate coarse and medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common fine roots and few coarse roots; 30 percent stones and cobbles, 15 percent pebbles; neutral; gradual wavy boundary.

C—17 to 60 inches; pale brown (10YR 6/3) very stony sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, sticky and slightly plastic; few coarse, medium, and fine roots to a depth of 28 inches; 35 percent stones and cobbles, 15 percent pebbles; slightly acid.

The A horizon is stony sandy loam or gravelly loam.

Sheege series

The Sheege series consists of shallow, well drained soils formed in residuum of limestone. These soils are on mountainsides. The slope range is 3 to 30 percent. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F.

Sheege soils are similar to Starman soils and are geographically associated with Owlcan and Starman soils. Starman soils have mixed mineralogy. Owlcan soils are very deep.

Typical pedon of Sheege extremely channery loam in an area of Rock outcrop-Sheege-Starman association in an unsectionized part of Grand Teton National Park, on the east flank of Bannon Mountain:

A11—0 to 5 inches; grayish brown (10YR 5/2) extremely channery loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; 70 percent channery fragments; channery fragments cover 70 percent of surface; strongly calcareous; moderately alkaline; clear smooth boundary.

A12—5 to 12 inches; brown (10YR 5/3) extremely channery loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky and plastic; 70 percent channery fragments; strongly calcareous; moderately alkaline; abrupt wavy boundary.

R—12 inches; gray, hard, fractured limestone.

Depth to limestone is 10 to 20 inches.

Silas series

The Silas series consists of very deep, moderately well drained soils formed in alluvium. These soils are on alluvial fans and stream terraces. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Silas soils are similar to Adel soils and are geographically associated with Slocum soils. Adel soils are well drained. Slocum soils are not cumulic.

Typical pedon of Silas loam in an area of Slocum-Silas loams, NE1/4SE1/4 sec. 4, T. 44 N., R. 114 W.

A1—0 to 26 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; moderate fine and very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; moderately alkaline; abrupt wavy boundary.

C—26 to 60 inches; gray (10YR 6/1) loam, gray (10YR 5/1) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots to a depth of 30 inches; few thin strata of very fine sandy loam and clay loam; mildly alkaline.

Slocum series

The Slocum series consists of very deep, somewhat poorly drained soils formed in alluvium. These soils are on bottom lands and stream terraces. The slope range is 0 to 6 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Slocum soils are not similar to any other soils in the survey area. They are geographically associated with Silas soils. Silas soils are cumulic.

Typical pedon of Slocum loam in an area of Slocum-Silas loams, SW1/4SE1/4 sec. 25, T. 45 N., R. 114 W.

A1—0 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; slightly hard, friable, sticky and plastic; neutral; clear wavy boundary.

B21—8 to 15 inches; light brownish gray (10YR 6/2) silty clay loam stratified with grayish brown (10YR 5/2), grayish brown (10YR 5/2) stratified with very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; mildly alkaline; clear wavy boundary.

B22—15 to 27 inches; light brownish gray (10YR 6/2) silty clay loam, grayish brown (10YR 5/2) moist; few fine faint mottles; moderate medium subangular blocky structure; hard, friable, sticky and plastic, mildly alkaline; clear wavy boundary.

C1—27 to 32 inches; light brownish gray (10YR 6/2) silty clay loam, grayish brown (10YR 5/2) moist; common medium distinct mottles; massive; hard, friable, sticky and plastic; mildly alkaline; clear wavy boundary.

11C2—32 to 60 inches; light brownish gray (10YR 6/2) very fine sandy loam; massive; slightly hard, very

friable, slightly sticky and slightly plastic; calcareous in spots; mildly alkaline.

Spearhead series

The Spearhead series consists of very deep, well drained soils formed in colluvium, alluvium, and glacial till. These soils are on mountainsides. The slope range is 3 to 70 percent. The mean annual precipitation is about 45 inches, and the mean annual air temperature is about 34 degrees F.

Spearhead soils are similar to Adel, Lantonia, and Tetonia soils. They are geographically associated with Midfork and Starman soils. Adel, Lantonia, and Tetonia soils are not skeletal. Midfork soils are not pachic. Starman soils are lithic.

Typical pedon of Spearhead very gravelly loam in an area of Midfork-Spearhead association in an unsectionized area of Grand Teton National Park, on north-facing slope along Owl Creek:

A1—0 to 36 inches; dark brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; 40 percent pebbles, 10 percent cobbles; mildly alkaline; gradual wavy boundary.

C—36 to 60 inches; very pale brown (10YR 7/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky; 45 percent pebbles, 30 percent cobbles; strongly calcareous; moderately alkaline.

Starley series

The Starley series consists of shallow, well drained soils formed in residuum of welded tuff. These soils are on hillsides and mountainsides. The slope range is 15 to 40 percent. The mean annual precipitation is about 18 inches, and the mean annual air temperature is about 35 degrees F.

Starley soils are similar to Starman and Teewinot soils and are geographically associated with Crow Creek, Roxal, and Tetonia soils. Starman and Roxal soils do not have a mollic epipedon. Crow Creek and Tetonia soils are very deep. Teewinot soils are noncalcareous.

Typical pedon of Starley gravelly loam in an area of Starley-Tetonia association, SE1/4NW1/4 sec. 30, T. 42 N., R. 115 W.

A11—0 to 2 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine crumb; slightly hard, very friable, slightly sticky; many very fine, fine, and medium roots; 15 percent gravel; calcareous; moderately alkaline; clear smooth boundary.

A12—2 to 8 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and very fine subangular blocky structure; hard, very friable, sticky and slightly plastic; many very fine, fine, and medium roots; 20 percent gravel; calcareous; moderately alkaline; clear smooth boundary.

C—8 to 15 inches; light gray (10YR 6/2) very gravelly loam, grayish brown (10YR 4/2) moist; massive; soft, very friable, slightly sticky; common fine and medium roots; 40 percent gravel; calcareous; moderately alkaline; abrupt wavy boundary.

R—15 inches; hard, white, welded tuff; strongly calcareous.

Depth to bedrock ranges from 10 to 20 inches. Bedrock is welded tuff or limestone.

Starman series

The Starman series consists of very shallow, well drained soils formed in residuum of limestone. Starman soils are on hillsides and mountainsides. The slope range is 3 to 70 percent. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F.

Starman soils are similar to Starley soils and are geographically associated with Midfork, Owlcan, Roxal, Spearhead, and Sheege soils. Starley soils are shallow and have a mollic epipedon. Owlcan soils have an albic horizon and a fine textured control section. Roxal soils are underlain by soft bedrock. Sheege soils have carbonatic mineralogy. Midfork and Spearhead soils are very deep.

Typical pedon of Starman very stony loam in an area of Starman-Owlcan association in an unsectionized area of Grand Teton National Park, on the west side of upper Death Canyon:

A1—0 to 4 inches; pale brown (10YR 6/3) very stony loam, dark brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable, sticky and slightly plastic; common medium and fine roots; 25 percent pebbles, 20 percent cobbles and stones; slightly calcareous; moderately alkaline; clear wavy boundary.

C—4 to 8 inches; pale brown (10YR 6/3) very stony clay loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; common medium and fine roots; 25 percent gravel, 35 percent cobbles and stones; slightly calcareous; moderately alkaline; abrupt wavy boundary.

R—8 inches; hard, fractured limestone.

Depth to bedrock ranges from 3 to 10 inches.

Taglake series

The Taglake series consists of very deep, well drained soils formed in glacial till. These soils are on glacial

moraines. The slope range is 3 to 60 percent. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

Taglake soils are not similar to any other soils in the survey area. They are geographically associated with Sebud and Tineman soils. The associated soils have a mollic epipedon.

Typical pedon of Taglake very stony sandy loam in an area of Taglake-Sebud association, NE1/4NW1/4 sec. 36, T. 45 N., R. 115 W.

O1—1 inch to 0; forest duff.
A2—0 to 4 inches; light gray (10YR 7/2) very stony sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and very fine granular structure; slightly hard, very friable, slightly sticky; 10 percent pebbles, 15 percent cobbles and stones; medium acid; clear wavy boundary.
B1—4 to 19 inches; pale brown (10YR 6/3) very stony sandy loam, brown (10YR 5/3) moist, light gray coatings (A2) on faces of peds; weak medium subangular blocky structure parting to moderate fine and very fine granular; hard, friable, sticky and slightly plastic; 20 percent pebbles, 25 percent cobbles and stones; slightly acid; gradual wavy boundary.
B2—19 to 24 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; 20 percent pebbles, 20 percent cobbles, 5 percent stones; slightly acid; gradual wavy boundary.
B3—24 to 60 inches; light gray (10YR 7/2) very stony sandy loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; hard, friable, sticky; 15 percent pebbles, 30 percent cobbles and stones; slightly acid; gradual wavy boundary.

Teewinot series

The Teewinot series consists of shallow, well drained soils formed in residuum of granite. These soils are on mountainsides. The slope range is 20 to 70 percent. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 34 degrees F.

Teewinot soils are similar to Starley soils and are geographically associated with Leighcan and Moran soils. Starley soils are calcareous. Leighcan and Moran soils are very deep.

Typical pedon of Teewinot very cobbly sandy loam in an area of Rock outcrop-Teewinot-Moran association in an unsectionized part of Grand Teton National Park, on the north slope of Moran Canyon:

A1—0 to 15 inches; grayish brown (10YR 5/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable; 25 percent pebbles, 10 percent cobbles, 5 percent stones; medium acid; abrupt wavy boundary.
R—15 inches; granite.

Depth to bedrock is 10 to 20 inches.

Tetonia series

The Tetonia series consists of very deep, well drained soils formed in loess. These soils are on hills and buttes. The slope range is 0 to 30 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Tetonia soils are similar to Lantonia and Spearhead soils and are geographically associated with Crow Creek, Greyback, Lantonia, Starley, Thayne, and Tineman soils. Lantonia soils are more than 35 inches deep over calcareous material. Spearhead, Greyback, and Tineman soils are skeletal. Crow Creek and Thayne soils are not pachic. Starley soils are shallow over bedrock.

Typical pedon of Tetonia silt loam in an area of Tetonia-Lantonia silt loams, 3 to 6 percent slopes, SW1/4SW1/4 sec. 30, T. 41 N., R. 116 W.

A1—0 to 8 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to moderate fine and very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.
B21—8 to 21 inches; grayish brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky; many fine and very fine roots; neutral; clear smooth boundary.
B22—21 to 30 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; neutral; abrupt smooth boundary.
Cca—30 to 60 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; calcareous; strongly alkaline.

Thickness of the mollic epipedon ranges from 20 to 25 inches. Depth to the Cca horizon is 20 to 35 inches.

Tetonville series

The Tetonville series consists of very deep, somewhat poorly drained soils formed in alluvium. These soils are on bottom lands and terraces. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Tetonville soils are similar to Wilsonville soils and are geographically associated with Newfork and Wilsonville soils. Wilsonville soils are not sandy-skeletal. Newfork soils have an aquic moisture regime.

Typical pedon of Tetonville fine sandy loam in an area of Tetonville-Riverwash complex, NE1/4NW1/4 sec. 13, T. 41 N., R. 117 W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

C1—8 to 17 inches; light brownish gray (10YR 6/2) fine sandy loam stratified with thin lenses of loamy sand, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; mildly alkaline; gradual wavy boundary.

11C2—17 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose; 50 percent pebbles and 15 percent cobbles; mildly alkaline.

The surface layer is fine sandy loam, gravelly loam, or very gravelly sandy loam.

Thayne series

The Thayne series consists of very deep, well drained soils formed in gravelly alluvium. These soils are on alluvial fans and valley side slopes. The slope range is 3 to 60 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Thayne soils are similar to Crow Creek and Uhl soils and are geographically associated with Adel, Greyback, Grobutte, and Tetonia soils. Crow Creek soils are coarse-silty. Uhl soils do not have a horizon of calcium carbonate accumulation. Adel and Tetonia soils have a pachic horizon. Greyback and Grobutte soils are skeletal.

Typical pedon of Thayne gravelly loam in an area of Greyback-Thayne complex, 10 to 20 percent slopes, NW1/4SE1/4 sec. 5, T. 42 N., R. 115 W.

A1—0 to 6 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; 15 percent gravel; mildly alkaline; clear smooth boundary.

B2—6 to 34 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to moderate fine granular; hard, friable, sticky and plastic; 20 percent gravel; calcareous; moderately alkaline; gradual wavy boundary.

Cca—34 to 60 inches; light gray (10YR 7/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 55 percent pebbles and 10 percent cobbles; calcareous; moderately alkaline.

Tineman series

The Tineman series consists of very deep, well drained and somewhat poorly drained soils formed in gravelly alluvium and glacial deposits. These soils are on alluvial fans and terraces. The slope range is 0 to 40 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Tineman soils are similar to Greyback, Midfork, and Sebud soils. They are geographically associated with Bearmouth, Charlos, Taglake, and Tetonia soils. Greyback and Midfork soils formed in calcareous alluvium. Sebud soils do not have an extremely gravelly sand IIC horizon. Bearmouth soils are sandy-skeletal. Charlos soils have an argillic horizon. Taglake soils do not have a mollic epipedon. Tetonia soils are nonskeletal.

Typical pedon of Tineman gravelly loam, 0 to 3 percent slopes, in an area of Tineman-Bearmouth gravelly loams, 0 to 3 percent slopes, SW1/4NE1/4 sec. 29, T. 44 N., R. 115 W.

A1—0 to 7 inches; brown (7.5YR 5/3) gravelly loam, dark brown (7.5YR 3/3) moist; moderate fine subangular blocky structure parting to moderate fine crumb; soft, very friable, slightly sticky; many very fine and fine, common medium, and few coarse roots; 20 percent gravel; slightly acid; clear smooth boundary.

B21—7 to 15 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/4) moist; moderate fine and very fine blocky structure; soft, very friable, slightly sticky; many very fine and fine, common medium, and few coarse roots; 25 percent pebbles, 5 percent cobbles; slightly acid; clear smooth boundary.

B22—15 to 27 inches; light brown (7.5YR 6/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; weak fine subangular blocky structure; soft, very friable; many very fine and fine, common medium, and few coarse roots; 45 percent pebbles, 10 percent cobbles; neutral; gradual smooth boundary.

IIC—27 to 60 inches; light brown (7.5YR 6/3) extremely gravelly sand, brown (7.5YR 5/3) moist; single grain; loose; common very fine and fine roots; 65 percent pebbles, 20 percent cobbles; neutral.

The depth to the extremely gravelly sand IIC horizon ranges from 26 to 35 inches. A water table may occur at a depth of more than 36 inches.

Tongue River series

The Tongue River series consists of moderately deep, well drained soils formed in residuum of sandstone.

These soils are on hillsides and mountainsides. The slope range is 3 to 40 percent. The mean annual precipitation is about 20 inches, and the mean annual air temperature is about 36 degrees F.

Tongue River soils are similar to Owlcan, Perceton, and Turnerville soils. They are geographically associated with Buffork and Clayburn soils. Owlcan soils have a fine textured control section. Turnerville soils have a fine-silty control section. Buffork and Clayburn soils do not have an albic horizon. Perceton soils are gravelly throughout.

Typical pedon of Tongue River very fine sandy loam in an area of Buffork-Tongue River association SW1/4SW1/4 sec. 6, T. 45 N., R. 113 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable; many fine and medium roots and common coarse roots; neutral; abrupt smooth boundary.

A2—2 to 8 inches; light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate thin platy structure parting to moderate fine granular; soft, very friable; many fine and medium roots and common coarse roots; neutral; clear smooth boundary.

B&A—8 to 20 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; 30 percent A2 horizon material; moderate medium and fine subangular blocky structure; slightly hard, very friable; neutral; clear smooth boundary.

B2t—20 to 36 inches; brown (10YR 5/3) sandy clay loam, dark brown (7.5YR 4/3 and 10YR 4/3) broken, moist; moderate medium and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; thin continuous and thick patchy clay films on ped faces; few fine and medium roots; neutral; gradual wavy boundary.

Cr—36 inches; light gray sandstone.

Depth to bedrock ranges from 20 to 40 inches.

Turnerville series

The Turnerville series consists of very deep, well drained soils formed in loess. These soils are on hills, buttes, and mountain foot slopes. The slope range is 0 to 30 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Turnerville soils are similar to Tongue River soils but have a fine-loamy control section.

Typical pedon of Turnerville silt loam in an area of Turnerville silt loam, 0 to 30 percent slopes, NW1/4 sec. 1, T. 43 N., R. 116 W.

O1—3 to 2 inches; undecomposed organic matter consisting of needles, twigs, and grass.

O2—2 inches to 0; partly decomposed organic matter.

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

A2—3 to 20 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; weak very thick platy and very coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; neutral; gradual wavy boundary.

A&B—20 to 38 inches; mixed light gray (10YR 7/2) and light yellowish brown (10YR 6/4) silt loam, pale brown (10YR 6/3) and yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; neutral; gradual wavy boundary.

B&A—38 to 46 inches; mixed light yellowish brown (10YR 6/4) and light gray (10YR 7/2) silt loam, yellowish brown (10YR 5/4) and pale brown (10YR 6/3) moist; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; neutral; gradual wavy boundary.

B2t—46 to 58 inches; light yellowish brown (10YR 6/4) silty clay loam, brown (10YR 5/3) moist; moderate coarse subangular blocky structure parting to moderate medium subangular; hard, very friable, sticky and plastic; noncalcareous; neutral; gradual wavy boundary.

B3—58 to 64 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; hard, very friable, sticky and plastic; neutral; gradual wavy boundary.

C—64 to 80 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; massive; hard, very friable, sticky and plastic; neutral.

The soil is neutral or slightly acid. The B2t horizon is silty clay loam or silt loam.

Uhl series

The Uhl series consists of very deep, well drained soils formed in alluvium derived from glacial till and sedimentary bedrock. These soils are on alluvial fans and foot slopes. The slope range is 6 to 40 percent. The mean annual precipitation is about 18 inches, and the mean annual air temperature is about 35 degrees F.

Uhl soils are similar to Thayne soils, except that Thayne soils have horizons of carbonate accumulation.

Typical pedon of Uhl loam in an area of Uhl-Roxal association SW1/4NW1/4 sec. 2, T. 44 N., R. 114 W.

A1—0 to 13 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; neutral; gradual wavy boundary.

C—13 to 60 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, sticky and plastic; common very fine and fine roots; neutral.

Walcott series

The Walcott series consists of very deep, well drained soils formed in alluvium, colluvium, and glacial till. These soils are on the sides and tops of mountains. The slope range is 3 to 70 percent. The mean annual precipitation is about 40 inches, and the mean annual air temperature is about 33 degrees F.

Walcott soils are not similar to any other soil in the survey area. They are geographically associated with Leighcan and Moran soils. Leighcan soils do not have an umbric epipedon. Moran soils have a cambric horizon.

Typical pedon of Walcott gravelly sandy loam in an area of Rubble land-Walcott-Leighcan association in an unsectionized part of Grand Teton National Park, on a northeast-facing slope below Doane Peak:

A1—0 to 8 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky; 20 percent pebbles, 5 percent cobbles; very strongly acid; clear smooth boundary.

C—8 to 60 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine crumb structure; soft, very friable; 35 percent pebbles, 5 percent cobbles; strongly acid.

Willow Creek series

The Willow Creek series consists of very deep, well drained soils formed in loess. These soils are on uplands. The slope range is 3 to 20 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Willow Creek soils are similar to Buffork, Charlos, and Youga soils and are geographically associated with Crow Creek and Robana soils. Buffork soils are moderately deep over a paralithic contact. Charlos soils do not have a horizon of calcium carbonate accumulation. Youga soils are fine-loamy. Robana soils are pachic. Crow Creek soils are coarse-silty.

Typical profile of Willow Creek silt loam in an area of Robana-Willow Creek silt loams, 6 to 10 percent slopes, NE1/4NW1/4 sec. 13, T. 39 N., R. 116 W.

A1—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; mildly alkaline; clear smooth boundary.

B1—7 to 13 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine roots; mildly alkaline; clear smooth boundary.

B2t—13 to 29 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; hard, friable, sticky and plastic; common fine and very fine roots; neutral; clear smooth boundary.

B3—29 to 35 inches; very pale brown (10YR 7/3) silt loam, grayish brown (10YR 5/2) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; mildly alkaline; abrupt smooth boundary.

Cca—35 to 60 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; massive; hard, friable, sticky and plastic; calcareous; secondary carbonate as seams, streaks, and rounded bodies; moderately alkaline.

Wilsonville series

The Wilsonville series consists of very deep, somewhat poorly drained soils formed in alluvium. These soils are on bottom lands and terraces. The slope range is 0 to 3 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Wilsonville soils are similar to Tetonville soils and are geographically associated with Tetonville and Newfork soils. Tetonville soils are sandy-skeletal. Newfork soils have an aquic moisture regime.

Typical pedon of Wilsonville fine sandy loam in an area of Tetonville-Wilsonville fine sandy loams, NE1/4SW1/4 sec. 13, T. 41 N., R. 117 W.

Ap—0 to 7 inches; grayish brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

C1—7 to 23 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable; mildly alkaline; clear smooth boundary.

C2—23 to 29 inches; light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; common medium distinct mottles of reddish brown (5YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; mildly alkaline; clear smooth boundary.

IIC3—29 to 54 inches; light brownish gray (10YR 6/2) loamy coarse sand, dark grayish brown (10YR 4/2) moist; common medium distinct mottles of reddish brown (5YR 5/4) moist; single grain; loose; mildly alkaline; gradual wavy boundary.

IIIC4—54 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy coarse sand, dark grayish

brown (10YR 4/2) moist; common medium distinct mottles of reddish brown (10YR 5/4) moist; single grain; loose; 70 percent pebbles and 10 percent cobbles; mildly alkaline.

Youga series

The Youga series consists of very deep, well drained soils formed in alluvium. These soils are on alluvial fans. The slope range is 0 to 6 percent. The mean annual precipitation is about 17 inches, and the mean annual air temperature is about 35 degrees F.

Youga soils are similar to Leavitt, Buffork, Charlos, and Willow Creek soils. They are geographically associated with Leavitt soils. Buffork soils have a paralithic contact at a depth of less than 40 inches. Leavitt soils have horizons of calcium carbonate accumulation at a depth of less than 40 inches. Charlos soils have a skeletal substratum. Willow Creek soils are fine-silty.

Typical pedon of Youga silty clay loam in an area of Leavitt-Youga complex, 0 to 3 percent slopes, SE1/4NE1/4 sec. 29, T. 43 N., R. 115 W.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark brown (10YR 2/2) moist; strong fine and very fine angular blocky structure; hard, firm, sticky and plastic; neutral; clear smooth boundary.

B2t—6 to 15 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong medium angular blocky; very hard, very firm, very sticky and plastic; neutral; clear smooth boundary.

C1—15 to 29 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; mildly alkaline; gradual wavy boundary.

C2—29 to 60 inches; light brownish gray (10YR 6/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; mildly alkaline.

The content of coarse fragments ranges from 0 to 15 percent in the B and C horizons but generally is 10 percent or less.

Formation of the soils

William R. Glenn, soil scientist, Forest Service, helped prepare this section.

Soil is a natural body on the surface of the earth in which plants grow. It consists of mineral and organic matter, soil air, and soil water. Soils differ in appearance, composition, productivity, and management requirements within short distances. The properties of the soil at any given place result from the integrated effects of five factors: parent material, living matter, climate, relief, and time (*5*). No single factor is responsible for all soil characteristics. All of the factors act together, but at different rates, to form each individual soil. The relative importance of the factors varies.

The landscape

The history of the formation of the landscape provides some insight into the reasons for the variations in soils. Landscape formation can be divided into internal and external processes. The internal processes, which arise within the earth's crust, are faulting and volcanism. The external forces, which act outside the earth's crust, are erosion and deposition by water, ice, wind, or gravity (*6*).

The survey area was a plain in the late Cretaceous or early Tertiary age. Diastrophism uplifted fault block mountains. Large rivers transported quartzite gravel, cobbles, and boulders from mountains to the north and deposited this gravelly alluvium on the terraces and flood plains of Jackson Hole.

Late in the Tertiary age, faulting along the east side and to the east of the survey area uplifted the mountains on the east side of Jackson Hole. The first freshwater lake in the area, Teewinot Lake, was formed at this time. Intense volcanic activity in the northern part of the survey area and to the north and northeast filled Teewinot Lake with volcanic debris that settled to form volcanic conglomerate, tuff, and welded tuff. Starley soils formed in welded tuff in the eastern part of the area. Rhyolite flows from the Yellowstone area covered the northern part of the survey area. It is the parent material of Hechtman soils.

One of the last events of diastrophism was the faulting and uplift of the Teton Mountains and the down dropping of the Jackson Hole valley floor. This large vertical displacement exposed granite, gneiss, and schist, which are some of the oldest rocks of the earth. Teewinot soils formed in residuum of these rocks.

With the uplift of the mountains, the external process of erosion accelerated. In the central part of the Teton Range, the sedimentary rock has all been removed by erosion. At the north and south ends of the range and in the northeast corner of the survey area, soils such as Starman and Tongue River formed in residuum of sedimentary rocks.

At least three periods of glaciation, the Buffalo, the Bull Lake, and the Pinedale were active in shaping the landscape. The Buffalo glaciation was the earliest. Practically all surface evidence of its activity has been removed. The Bull Lake glacial moraines and outwash deposits in the southern part of Jackson Hole have been covered with loess deposits. The Pinedale glaciers advanced down Cascade, Garnet, Avalanche, and Death Canyons and spilled out on the valley floor where their terminal moraines now encircle Leigh, Jenny, Bradley, Taggert, and Phelps Lakes. The glaciers of Moran Canyon and other canyons to the north combined to

form a large glacier in about the present position of Jackson Lake. This glacier moved south to form the Burnt Ridge moraines and the "Potholes." Taglake and Sebud soils are on the moraines. Outwash from these glaciers is the source of the gravelly alluvium that is the parent material of Tineman and Bearmouth soils.

In the southern part of the valley, loess covers much of the surface of the mountain foothills. Tetonia and Turnerville soils are in loess deposits.

Parent material

Many of the physical and chemical properties of soils are strongly influenced by the parent material. Many of the soils of this area are young. They are influenced more by parent material than by climate or living matter.

The parent material of this survey area is residuum and transported materials. The residuum is three broad groups—residuum of igneous and metamorphic rocks, of sedimentary rocks, and of volcanic rocks.

The igneous and metamorphic rocks, in the central part of the Teton Range, are granite, gneiss, and schist. Leighcan and Teewinot soils formed in this parent material.

The sedimentary rocks are mainly limestone, sandstone, and clay shale. Starman soils formed in residuum of limestone. Tongue River soils formed in material weathered from sandstone. Roxal soils formed in material weathered from clay shale or from clay shale interbedded with sandstone.

The volcanic rocks are mainly rhyolite and welded tuff. Rhyolite, in the northern part of the survey area, is the parent material of Hechtman soils. Welded tuff, in the eastern part, mainly on the Elk Refuge, is the parent material of Starley soils.

Some parent material was transported by ice, water, or wind.

Ice transported the parent material in the glacial moraines along the Teton Mountain front, south of Jackson Lake, and in the northeastern part of the survey area. Taglake and Sebud soils are on the moraines.

The gravelly alluvium of the Snake River terraces and flood plains was transported by water as outwash from glaciers and glacial moraines. Tineman soils on the terraces and Tetonville soils on the flood plains formed in alluvium.

Material transported by wind is the parent material of the silty soils in the southern part of the survey area, for example, Tetonia and Turnerville soils.

Living matter

Living matter is considered one of the two active factors of soil formation; the other is climate. The active factors influence soil characteristics over wide areas. The term "living matter" refers to all forms of life that live on or in the soil, from microscopic bacteria to trees and mammals, including man. Living matter provides the biological community that is essential in changing inert rock material into soil.

The first stage of soil formation is the addition of organic matter. Under grass-shrub vegetation, as in the valley, the accumulations of organic matter in the surface layer tend to give the soil a dark color. A soil having a dark colored surface layer is a Mollisol. Tetonia and Tineman soils are examples. Under trees, a layer of forest litter or duff accumulates. The Taglake and Turnerville soils have this type of accumulation. Very wet soils that develop a horizon of organic matter or peat at the surface are the Cryofibrists.

Grass-shrub soils show a marked difference from forest soils in development. Tetonia and Turnerville soils formed in loess parent material. The Tetonia soil, a grass-shrub soil, has a dark colored mineral surface horizon over a well developed subsoil. The Turnerville soil, a forest soil, has a layer of forest litter over a leached mineral horizon and a well developed subsoil.

Some soils of the valley show the influence of man. By cultivating and leveling the soil, man has altered the natural soil horizons. Excessive irrigation has made normally dry soils wet and has lowered the water table. If the soil is saturated, air is excluded, chemical reduction takes place, and the soil develops mottles and gley. Examples of this process are the Adel Variant and Leavitt Variant soils.

Climate

Climate has both a direct and an indirect effect on soil formation (*1*). The chief components of climate are precipitation, temperature, humidity, wind, and sunshine.

Precipitation promotes leaching and physical, chemical, and biological activity. Leaching is the downward movement of soluble compounds by percolating water. The Teewinot soil, for example, is a Cryumbrept, a soil that exhibits an advanced stage of leaching. Physical activity is the shrinking and swelling that occurs along with changes in moisture content. Moisture and temperature promote frost action. Moisture affects the soil indirectly by its effect on vegetation.

Temperature affects exposed bedrock directly by causing expansion, contraction, and frost action. It affects soil formation indirectly by determining the length of the growing season.

Humidity affects the soil mainly through its effect on plant growth.

Sunshine promotes plant growth and warms the soil surface. For example, the Grobutte soil, which is on sun-warmed south- and west-facing slopes, is warmer than other soils of the area. Grobutte soils are classified in the frigid temperature regime. The others are in the Cryic temperature regime.

Wind deposited loess in this area. Turnerville and Tetonia soils are examples of soils developing in loess.

In addition to the climate and its influence on vegetation, the physical characteristics of the parent material must be considered in determining the impact of climate on the formation of a particular soil. Water intake is

determined by the texture and structure of the parent material.

Relief

This survey area is a structural basin with mountains on one side and mountain foothills on the other. The basin slopes generally to the south and is drained by the Snake River. There are several isolated bedrock buttes on the floor of the valley. The soils on these buttes are similar to the soils of the mountain foothills.

Relief influences soil formation through its effect on microclimate and runoff. The effect of microclimate on the Grobutte series was discussed under "Climate." Runoff and relief are interrelated—the steeper the slope, the more the runoff and the greater the erosion.

Different kinds of rock erode at different rates and in different configurations, resulting in varying topography. The jagged peaks of the Teton Mountains are characteristic of the way granite, gneiss, and schist erode in a cold moist climate. The rounded ledgy topography of Uhl Hill is characteristic of the erosion of interbedded clay, shale, and sandstone. The ledgy topography in the upper part of Death Canyon is characteristic of the erosion of limestone.

The steepness of slopes influences the rate as well as the amount of erosion. On very steep slopes erosion carries soil material away almost as rapidly as it forms. Cryorthents are examples. In depressional areas organic material accumulates into a thick, dark surface horizon and sometimes into a peat horizon. Cryofibrists and Cryaquolls are examples of depressional soils. Within a soil series, the thickness of soil horizons generally increases as the slope decreases.

Slope aspect is also a factor. At lower elevations in the foothills, south- and west-facing slopes are typically warmer and have grass-shrub vegetation. North- and east-facing slopes are cooler and have forest vegetation. Tetonia soils are on south- and west-facing slopes. Turnerville soils are on north- and east-facing slopes.

Time

The length of time required for soil formation depends largely on the other factors of soil formation. The "age" of a soil is its relative stage of formation. A mature, or normal, soil is in equilibrium with its environment. A young soil has little horizon development and is still tending toward equilibrium.

Some soils forming in alluvium, such as Tetonville, are receiving fresh parent material almost every year.

Some soils on the more stable landscapes of the survey area are beginning to develop horizons that indicate aging. Humus is accumulating in the A horizon. Clay is accumulating in the B2 horizon. Bases leached from the A horizon and the upper part of the B horizon are accumulating in the lower part of the B horizon or upper part of the C horizon. Tetonia and Robana soils, which formed in similar parent material, are in this stage of formation. Close examination of these soils shows that the movement of bases is more advanced in Robana soils than in Tetonia soils. Robana soils also have more clay in the B2 horizon. These differences indicate that Robana soils are older than Tetonia soils.

Formation of horizons

The first stage in the formation of soil horizons under grass-shrub vegetation is the accumulation of humus and the formation of the A horizon. Soils of the Tetonville, Uhl, and Walcott series are at this stage of development.

As horizon formation continues, carbonates and other bases are leached from the solum and the formation and translocation of silicate clay begins. Base accumulations in the lower part of the B horizon and upper part of the C horizon can be detected in some soils of this area. In these soils, the soil structure and an increase in chroma indicate that a cambric horizon is developing. Tetonia and Tineman soils are at this stage of development.

As formation continues, the profile is leached of carbonates, silicate clays accumulate in the B2 horizon, as evidenced by clay films and an increase in total clay, and an argillic horizon is formed. Soils representative of this stage of development are those of the Robana, Buffork, and Leavitt series.

In very wet soils air is excluded, which causes the reduction of iron. This process, called gleying, results in a gray or blue-gray color in the soil. Newfork soils have gleyed horizons.

The first stage in the formation of horizons under forest is the accumulation of forest duff on the surface of the mineral soil. It is followed by the leaching of the mineral soil and the formation of an albic horizon. The Leighcan soil has an albic horizon. As the leaching process continues, an argillic horizon is formed. The Turnerville soil is at this stage of development.

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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.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month. The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Low	Less than 5
Moderate	5 to 7.5
High	More than 7.5

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.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

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.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock. Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Evapotranspiration. The combined processes of evaporation and transpiration by which water is transferred from the earth's surface to the atmosphere.

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.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

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 upper case letter represents the major horizons. Numbers or lower case 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 at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the

overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

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 A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

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.

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.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing 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.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Mass wasting. Masses of earth material are moved downslope by gravity.

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.

Miscellaneous areas. Areas that have little or no natural soil and support little or no vegetation.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

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).

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

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.

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 0.20 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, differences in 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.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

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 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.

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 degree of acidity or alkalinity is expressed as—

	pH
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.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts 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.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

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 underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in

a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Small stones (in tables). Rock fragments less than 3 inches (7.5 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 creep. The slow and imperceptible downslope movement of soil material.

Solifluction. The slow viscous downslope flow of water-saturated regolith; especially the mass-wasting process occurring in areas of frozen ground with alternate freezing and thawing of surficial materials.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

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).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

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."

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

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, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

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.

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 low lands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1931-60 at Jackson, Wyoming]

Month	Temperature							Precipitation				
	Means			Extremes		Mean number of days with minimum of--		Mean	Greatest daily	Snow, Sleet		Average number of days with 0.10 inch or more
	Daily maximum	Daily minimum	Monthly	Record highest	Record lowest	32° F and below	0° F and below			Mean	Greatest daily	
	°F	°F	°F	°F	°F			In	In	In	In	
January---	25.5	2.9	14.2	55	-44	31	14	1.43	1.15	15.7	10.0	5
February--	31.1	5.9	18.5	58	-48	28	11	1.32	0.80	15.2	9.3	5
March-----	38.9	13.3	26.1	63	-29	30	6	1.20	0.75	11.7	8.3	4
April-----	52.5	24.3	38.4	76	-5	26	*	1.20	1.05	4.0	7.0	4
May-------	63.2	30.4	46.8	86	13	20	0	1.50	0.88	1.2	7.0	5
June------	71.8	36.1	54.0	94	18	8	0	1.51	0.95	**	0.6	5
July------	81.7	40.1	60.9	101	24	3	0	0.75	0.60	0.0	0.0	2
August----	80.1	37.8	59.0	95	18	7	0	1.12	1.13	0.0	0.0	3
September-	72.0	31.0	51.5	93	13	19	0	1.04	0.92	0.5	3.0	3
October---	60.0	23.6	41.8	79	1	26	0	1.11	0.84	2.1	11.0	3
November--	39.8	14.0	26.9	65	-27	28	6	1.11	1.12	9.2	12.0	4
December--	29.3	6.9	18.1	58	-36	30	11	1.54	1.17	16.0	19.0	5
Year-----	53.8	22.2	38.0	101	-48	256	48	14.83	1.17	75.6	19.0	48

* Less than one half.
** Trace, an amount too small to measure.

TABLE 2.--POTENTIAL AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP

Map unit	Extent of area	Homesites	Recreation	Wildlife habitat[1/]	Irrigated hay and pasture	Local roads
	Pct					
Starman-Rubble land-Midfork	11	[2/]	Good: slope, depth to rock.	Good	[2/]	Poor: slope, depth to rock, slippage.
Rock outcrop-Rubble land-Leighcan	25	[2/]	Good: slope, depth to rock, large stones.	Fair: slope, depth to rock.	[2/]	Poor: slope, depth to rock, large stones.
Buffork-Perceton-Tongue River	3	[2/]	Good: slope, slippage.	Good	[2/]	Poor: slope, slippage.
Hechtman-Rock outcrop	1	[2/]	Good: slope, depth to rock.	Good	[2/]	Poor: slope, depth to rock, slippage.
Turnerville-Tetonia-Greyback	10	Good: slope, low strength, percs slowly.	Good: slope.	Good	Fair: [3/] slope.	Fair: slope, slippage, low strength.
Taglake-Sebud	11	Good	Good: slope, large stones.	Good	Poor: slope, large stones.	Fair: slope, large stones.
Uhl-Roxal	2	[2/]	Good: slope, slippage.	Good	[2/]	Poor: slippage.
Tineman-Bearmouth-Greyback	21	Good: potential pollution of groundwater.	Good: potential pollution of groundwater; droughty.	Good	Fair: droughty.	Good.
Tetonville-Wilsonville-Tineman	8	Poor: wetness.	Fair: wetness.	Fair: wetness.	Fair: wetness.	Poor: wetness, frost action.
Cryaquolls-Cryafibrists	4	Poor: wetness.	Poor: wetness.	Good	Poor: wetness.	Poor: wetness, frost action.
Tetonville-Riverwash	4	Poor: floods, wetness.	Poor: floods, wetness.	Fair: wetness.	Poor: floods, wetness.	Poor: wetness, low strength, frost action.

[1/] Ratings are for unit and may not apply to all soils. Onsite investigation is necessary.

[2/] Map units that are all within the National Park or Elk Refuge are not rated for homesites.

[3/] Contains small areas of soils rated good or poor.

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Adel Variant loam	521	0.1
2	Aquic Cryoborolls-Aquic Cryoboralfs complex, 30 to 70 percent slopes	1,477	0.4
3	Bearmouth gravelly loam	1,274	0.3
4	Buffork-Adel association	960	0.2
5	Buffork-Tongue River association	1,824	0.4
6	Buffork-Tongue River-Clayburn association	841	0.2
7	Charlos loam	1,776	0.4
8	Charlos Variant loam	1,101	0.3
9	Crow Creek silt loam, 3 to 10 percent slopes	1,304	0.3
10	Crow Creek silt loam, 10 to 20 percent slopes	527	0.1
11	Crow Creek-Starley association	840	0.2
12	Cryaquolls-Cryofibrists complex	13,760	3.3
13	Cryorthents-Cryoborolls complex, 60 to 90 percent slopes	1,644	0.4
14	Greyback gravelly loam, 0 to 3 percent slopes	6,439	1.6
15	Greyback gravelly loam, 3 to 6 percent slopes	513	0.1
16	Greyback-Charlos complex	669	0.2
17	Greyback-Thayne complex, 3 to 6 percent slopes	562	0.1
18	Greyback-Thayne complex, 6 to 10 percent slopes	855	0.2
19	Greyback-Thayne complex, 10 to 20 percent slopes	2,459	0.6
20	Greyback-Thayne complex, 20 to 30 percent slopes	1,959	0.5
21	Grobutte-Thayne gravelly loams, 30 to 60 percent slopes	6,655	1.6
22	Hechtman-Rock outcrop association	5,678	1.4
23	Leavitt-Youga complex, 0 to 3 percent slopes	2,628	0.6
24	Leavitt-Youga complex, 3 to 6 percent slopes	866	0.2
25	Leavitt Variant loam	1,602	0.4
26	Leighcan-Moran-Walcott association	12,894	3.1
27	Leighcan-Rock outcrop-Walcott association	20,459	5.0
28	Midfork-Spearhead association	4,693	1.1
29	Newfork fine sandy loam	2,951	0.7
30	Perceton-Buffork association	3,719	0.9
31	Robana-Willow Creek silt loams, 3 to 6 percent slopes	815	0.2
32	Robana-Willow Creek silt loams, 6 to 10 percent slopes	469	0.1
33	Robana-Willow Creek silt loams, 10 to 20 percent slopes	846	0.2
34	Rock outcrop	14,624	3.6
35	Rock outcrop-Sheege-Starman association	5,833	1.4
36	Rock outcrop-Teewinot-Moran association	31,828	7.7
37	Roxal-Starley association	1,390	0.3
38	Rubble land	10,577	2.6
39	Rubble land-Midfork-Starman association	15,663	3.8
40	Rubble land-Walcott-Leighcan association	10,890	2.7
41	Sebud complex, 3 to 6 percent slopes	899	0.2
42	Sebud complex, 6 to 10 percent slopes	489	0.1
43	Sebud complex, 10 to 20 percent slopes	784	0.2
44	Slocum-Silas loams	3,480	0.9
45	Starley-Tetonia association	4,077	1.0
46	Starman-Owlcan association	11,791	2.9
47	Taglake-Sebud association	34,945	8.5
48	Taglake-Sebud association, steep	7,984	1.9
49	Tetonia-Lantonia silt loams, 0 to 3 percent slopes	1,783	0.4
50	Tetonia-Lantonia silt loams, 3 to 6 percent slopes	1,543	0.4
51	Tetonia-Lantonia silt loams, 6 to 10 percent slopes	2,653	0.6
52	Tetonia-Lantonia silt loams, 10 to 20 percent slopes	2,529	0.6
53	Tetonia-Lantonia silt loams, 20 to 30 percent slopes	784	0.2
54	Tetonia-Tineman complex	2,183	0.5
55	Tetonville gravelly loam	7,697	1.9
56	Tetonville complex	2,349	0.6
57	Tetonville-Riverwash complex	9,396	2.3
58	Tetonville-Wilsonville fine sandy loams	14,297	3.5
59	Thayne-Adel complex, 30 to 60 percent slopes	3,251	0.8
60	Tineman gravelly loam	25,341	6.2
61	Tineman gravelly loam, wet	4,331	1.1
62	Tineman-Bearmouth gravelly loams, 0 to 3 percent slopes	16,732	4.1
63	Tineman-Bearmouth gravelly loams, 3 to 40 percent slopes	5,030	1.2
64	Tineman association	947	0.2
65	Turnerville silt loam, 0 to 3 percent slopes	492	0.1
66	Turnerville silt loam, 3 to 6 percent slopes	433	0.1
67	Turnerville silt loam, 6 to 10 percent slopes	739	0.2
68	Turnerville silt loam, 10 to 20 percent slopes	2,275	0.6
69	Turnerville silt loam, 0 to 30 percent slopes	3,490	0.9

TABLE 3.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
70	Uhl-Roxal association	9,323	2.3
71	Youga-Tineman complex	955	0.2
	Water	32,148	7.8
	Total	411,535	100.0

TABLE 4.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1---------- Adel Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
2*: Aquic Cryoborolls.				
Aquic Cryoboralfs.				
3---------- Bearmouth	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
4*: Buffork----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Adel----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Perceton----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
5*: Buffork----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tongue River---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Clayburn----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
6*: Buffork----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Tongue River---------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Clayburn----------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
7---------- Charlos	Slight----------	Slight----------	Moderate: small stones.	Slight.
8---------- Charlos Variant	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
9---------- Crow Creek	Slight----------	Slight----------	Severe: slope.	Slight.
10---------- Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
11*: Crow Creek----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Starley----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope.

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
11*:				
Roxal	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
12*:				
Cryaquolls.				
Cryofibrists.				
13*:				
Cryorthents.				
Cryoborolls.				
14, 15 Greyback	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
16*:				
Greyback	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
Charlos	Slight	Slight	Moderate: small stones.	Slight.
17*:				
Greyback	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
Thayne	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
Tetonia	Slight	Slight	Moderate: slope.	Slight.
18*:				
Greyback	Moderate: slope, small stones.	Moderate: slope, small stones.	Slope, small stones.	Moderate: small stones.
Thayne	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.
Tetonia	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
19*:				
Greyback	Severe: slope.	Severe: slope.	Slope, small stones.	Moderate: slope, small stones.
Thayne	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
20*:				
Greyback	Severe: slope.	Severe: slope.	Slope, small stones.	Severe: slope.
Thayne	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
20*:				
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
21*:				
Grobutte	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Thayne	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Greyback	Severe: slope.	Severe: slope.	Slope, small stones.	Severe: slope.
22*:				
Hechtman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Rock outcrop.				
23*:				
Leavitt	Slight	Slight	Slight	Slight.
Youga	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey.
24*:				
Leavitt	Slight	Slight	Moderate: slope.	Slight.
Youga	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
25--- Leavitt Variant	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
26*:				
Leighcan	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.
Moran	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.
Walcott	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.
27*:				
Leighcan	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Rock outcrop.				
Walcott	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
28*:				
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.
Spearhead	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Owlcan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
29--- Newfork	Severe: wetness, floods.	Severe: wetness.	Severe: wetness.	Severe: wetness.
30*:				
Perceton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Buffork	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
31*:				
Robana	Slight	Slight	Moderate: slope.	Slight.
Willow Creek	Slight	Slight	Moderate: slope.	Slight.
32*:				
Robana	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Willow Creek	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
33*:				
Robana	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Willow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
34*. Rock outcrop*				
35*: Rock outcrop.				
Sheege	Severe: small stones, depth to rock, slope.	Severe: slope, small stones, depth to rock.	Severe: small stones, slope, depth to rock.	Severe: small stones.
Starman	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: large stones.
36*: Rock outcrop.				

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
36*:				
Teewinot	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: slope, depth to rock, large stones.	Severe: slope, large stones.
Moran	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
37*:				
Roxal	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
Starley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope.
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
38*. Rubble land*				
39*: Rubble land.				
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Starman	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: large stones, slope.
40*: Rubble land.				
Walcott	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Leighcan	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
41*:				
Sebud	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
Sebud	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
42*:				
Sebud	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.
Sebud	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
43*:				
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.
Sebud	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.
44*:				
Slocum	Severe: floods.	Moderate: wetness.	Moderate: wetness, floods.	Moderate: wetness.
Silas	Severe: floods.	Slight	Slight	Slight.
45*:				
Starley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roxal	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
46*:				
Starman	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: large stones, slope.
Owlcan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
47*:				
Taglake	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: large stones.
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.
48*:				
Taglake	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: slope, large stones.
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
49*:				
Tetonia	Slight	Slight	Slight	Slight.
Lantonia	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
50*:				
Tetonia	Slight	Slight	Moderate: slope.	Slight.
Lantonia	Slight	Slight	Moderate: slope.	Slight.
51*:				
Tetonia	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Lantonia	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
52*:				
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Lantonia	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
53*:				
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lantonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
54*:				
Tetonia	Slight	Slight	Slight	Slight.
Tineman	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
Greyback	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
55--- Tetonville	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
56*:				
Tetonville	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
Tetonville	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
57*:				
Tetonville	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.
Riverwash.				
58*:				
Tetonville	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
58*:				
Wilsonville	Severe: floods, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
59*:				
Thayne	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Adel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Greyback	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
60, 61--- Tineman	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
62*:				
Tineman	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
Bearmouth	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
63*:				
Tineman	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.
Bearmouth	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, small stones.
64*:				
Tineman	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
Tineman	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
65, 66--- Turnerville	Slight	Slight	Moderate: slope.	Slight.
67--- Turnerville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
68, 69--- Turnerville	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
70*:				
Uhl	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Roxal	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.
71*:				
Youga	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey.	Moderate: too clayey.
Tineman	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 5.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
1---------- Adel Variant	Poor	Fair	Good	---	Good	Good	Good	Fair	---	Good	Good.
2*: Aquic Cryoborolls.											
Aquic Cryoboralfs.											
3---------- Bearmouth	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
4*: Buffork----------	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Adel----------	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Perceton----------	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
5*: Buffork----------	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Tongue River------	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
Clayburn----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.	Good.
6*: Buffork----------	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Tongue River------	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
Clayburn----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.	Good.
7---------- Charlos	Poor	Fair	Good	---	Good	Fair	Very poor.	Fair	---	Poor	Good.
8---------- Charlos Variant	Poor	Fair	Good	---	Good	Good	Good	Poor	---	Good	Good.
9, 10---------- Crow Creek	Fair	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
11*: Crow Creek--------	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Starley----------	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Roxal----------	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.

See footnote at end of table.

TABLE 5.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
12*:											
Cryaquolls.											
Cryofibrists.											
13*:											
Cryorthents.											
Cryoborolls.											
14, 15--Greyback	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
16*:											
Greyback	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Charlos	Poor	Fair	Good	---	Good	Fair	Very poor.	Fair	---	Poor	Good.
17*:											
Greyback	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Thayne	Fair	Fair	Good	---	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
Tetonia	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
18*:											
Greyback	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Thayne	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Tetonia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
19*, 20*:											
Greyback	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Thayne	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Tetonia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
21*:											
Grobutte	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Thayne	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Greyback	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
22*:											
Hechtman	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---
Rock outcrop.											

See footnote at end of table.

TABLE 5.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
23*:											
Leavitt	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Youga	Very poor.	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
24*:											
Leavitt	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Youga	Very poor.	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
25--- Leavitt Variant	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
26*:											
Leighcan	Poor	Poor	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	---
Moran	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Walcott	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
27*:											
Leighcan	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	---
Rock outcrop.											
Walcott	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
28*:											
Midfork	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Spearhead	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Owlcan	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
29--- Newfork	Very poor.	Poor	Good	---	Good	Good	Good	Poor	---	Good	Good.
30*:											
Perceton	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Buffork	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
31*:											
Robana	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Willow Creek	Fair	Fair	Good	---	Good	Poor	Very poor.	Fair	---	Very poor.	Good.

See footnote at end of table.

TABLE 5.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
32*, 33*:											
Robana	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Willow Creek	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
34*. Rock outcrop*											
35*: Rock outcrop.											
Sheege	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Starman	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
36*: Rock outcrop.											
Teewinot	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Moran	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
37*:											
Roxal	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Starley	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Crow Creek	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
38*. Rubble land*											
39*: Rubble land.											
Midfork	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Starman	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
40*: Rubble land.											
Walcott	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Leighcan	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	---
41*, 42*:											
Sebud	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Sebud	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.

See footnote at end of table.

TABLE 5.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
43*:											
Sebud	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Sebud	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
44*:											
Slocum	Fair	Fair	Good	---	Good	Good	Fair	Fair	---	Fair	Good.
Silas	Poor	Poor	Good	---	Good	Poor	Very poor.	Poor	---	Very poor.	Good.
45*:											
Starley	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Tetonia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Roxal	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
46*:											
Starman	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Owlcan	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Midfork	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
47*:											
Taglake	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
Sebud	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
48*:											
Taglake	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	---
Sebud	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.	---
49*, 50*:											
Tetonia	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
Lantonia	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
51*:											
Tetonia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Lantonia	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.

See footnote at end of table.

TABLE 5.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
52*:											
Tetonia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Lantonia	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Crow Creek	Fair	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
53*:											
Tetonia	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Lantonia	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Crow Creek	Fair	Fair	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
54*:											
Tetonia	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
Tineman	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Greyback	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
55--Tetonville	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
56*:											
Tetonville	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
Tetonville	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
57*:											
Tetonville	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
Riverwash.											
58*:											
Tetonville	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
Wilsonville	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
59*:											
Thayne	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Adel	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Greyback	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
60--Tineman	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
61--Tineman	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.

See footnote at end of table.

TABLE 5.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
62*, 63*:											
Tineman	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Bearmouth	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
64*:											
Tineman	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Tineman	Fair	Fair	Good	---	Good	Fair	Poor	Fair	---	Poor	Good.
65, 66, 67 Turnerville	Fair	Fair	---	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.	---
68, 69 Turnerville	Fair	Fair	---	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.	---
70*:											
Uhl	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Roxal	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
71*:											
Youga	Very poor.	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Tineman	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1---------- Adel Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
2*: Aquic Cryoborolls.					
Aquic Cryoboralfs.					
3---------- Bearmouth	Severe: large stones, cutbanks cave.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
4*: Buffork----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Adel----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Perceton---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
5*: Buffork----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tongue River-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Clayburn---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
6*: Buffork----------	Moderate: slope, depth to rock.	Moderate: slope, shrink-swell.	Moderate: slope, depth to rock, shrink-swell.	Severe: slope.	Moderate: slope, low strength, frost action.
Tongue River-----	Moderate: depth to rock, slope.	Moderate: low strength, slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: low strength, slope.
Clayburn---------	Moderate: slope.	Severe: slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: low strength, slope, frost action.
7---------- Charlos	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, low strength, shrink-swell.
8---------- Charlos Variant	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
9---------- Crow Creek	Slight----------	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength, frost action.
10---------- Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
11*:					
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Starley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Roxal	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
12*:					
Cryaquolls.					
Cryofibrists.					
13*:					
Cryorthents.					
Cryoborolls.					
14 Greyback	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
15 Greyback	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
16*:					
Greyback	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Charlos	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, low strength, shrink-swell.
17*:					
Greyback	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
Thayne	Slight	Slight	Slight	Moderate: slope.	Slight.
Tetonia	Slight	Slight	Slight	Moderate: slope.	Severe: frost action.
18*:					
Greyback	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Thayne	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Tetonia	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.
19*, 20*:					
Greyback	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Thayne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
21*:					
Grobutte	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Thayne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Greyback	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
22*:					
Hechtman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Rock outcrop.					
23*:					
Leavitt	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength, frost action.
Youga	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
24*:					
Leavitt	Slight	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Moderate: shrink-swell, low strength, frost action.
Youga	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.
25 Leavitt Variant	Severe: wetness.	Moderate: low strength, wetness, shrink-swell.	Severe: wetness.	Moderate: low strength, wetness, shrink-swell.	Moderate: low strength, wetness, shrink-swell.
26*:					
Leighcan	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Moran	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.
Walcott	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.
27*:					
Leighcan	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Rock outcrop.					
Walcott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
28*:					
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Spearhead	Severe: slope, large stones, cutbanks cave.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.
Owlcan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.
29--- Newfork	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
30*:					
Perceton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Buffork	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
31*:					
Robana	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Moderate: low strength, shrink-swell, frost action.
Willow Creek	Slight	Moderate: shrink-swell, low strength.	Moderate: low strength, shrink-swell.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.
32*:					
Robana	Moderate: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, frost action.
Willow Creek	Moderate: slope.	Moderate: slope, shrink-swell, low strength.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Severe: low strength.
33*:					
Robana	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Willow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.
34*. Rock outcrop*					
35*: Rock outcrop.					
Sheege	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
35*:					
Starman	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.
36*:					
Rock outcrop.					
Teewinot	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Moran	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
37*:					
Roxal	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
Starley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
38*.					
Rubble land*					
39*:					
Rubble land.					
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.
Starman	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.
40*:					
Rubble land.					
Walcott	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Leighcan	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
41*:					
Sebud	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
Sebud	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
42*:					
Sebud	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
42*:					
Sebud	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.
43*:					
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
44*:					
Slocum	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: floods, frost action, low strength.
Silas	Moderate: wetness, floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: low strength, frost action, shrink-swell.
45*:					
Starley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.
Roxal	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
46*:					
Starman	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.
Owlcan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
47*, 48*:					
Taglake	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
49*:					
Tetonia	Slight	Slight	Slight	Slight	Severe: frost action.
Lantonia	Slight	Slight	Slight	Slight	Moderate: low strength, frost action.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
50*:					
Tetonia	Slight	Slight	Slight	Moderate: slope.	Severe: frost action.
Lantonia	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.
51*:					
Tetonia	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.
Lantonia	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength, frost action.
52*, 53*:					
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.
Lantonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
54*:					
Tetonia	Slight	Slight	Slight	Slight	Severe: frost action.
Tineman	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Greyback	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
55--- Tetonville	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
56*:					
Tetonville	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
Tetonville	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
57*:					
Tetonville	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
Riverwash.					
58*:					
Tetonville	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
Wilsonville	Severe: wetness, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Moderate: low strength, wetness, frost action.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
59*:					
Thayne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Adel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Greyback	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
60 Tineman	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
61 Tineman	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight.
62*:					
Tineman	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Bearmouth	Severe: large stones, cutbanks cave.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
63*:					
Tineman	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Bearmouth	Severe: large stones, cutbanks cave, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
64*:					
Tineman	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
Tineman	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Slight.
65 Turnerville	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, frost action, shrink-swell.
66 Turnerville	Slight	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Moderate: low strength, frost action, shrink-swell.
67 Turnerville	Moderate: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, frost action.
68, 69 Turnerville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
70*:					
Uhl	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Roxal	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
71*:					
Youga	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
Tineman	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1--- Adel Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
2*: Aquic Cryoborolls.					
Aquic Cryoboralfs.					
3--- Bearmouth	Severe: large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: seepage, large stones, too sandy.
4*: Buffork---	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Adel---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Perceton---	Severe: depth to rock, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope, thin layer, area reclaim.
5*: Buffork---	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Tongue River---	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: thin layer, slope, area reclaim.
Clayburn---	Severe: slope.	Severe: slope.	Severe: seepage, slope.	Severe: slope, seepage.	Poor: slope.
6*: Buffork---	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer, area reclaim.
Tongue River---	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer, area reclaim.
Clayburn---	Moderate: percs slowly, slope.	Severe: slope.	Severe: seepage.	Severe: seepage.	Fair: slope, too clayey.
7--- Charlos	Moderate: large stones.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, too sandy, seepage.
8--- Charlos Variant	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, seepage.	Severe: wetness.	Poor: wetness, seepage.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
9--- Crow Creek	Moderate: percs slowly.	Moderate: slope, seepage.	Slight---	Slight---	Good.
10--- Crow Creek	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
11*: Crow Creek---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Starley---	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Roxal---	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
12*: Cryaquolls. Cryofibrists.					
13*: Cryorthents. Cryoborolls.					
14, 15--- Greyback	Slight---	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
16*: Greyback---	Slight---	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
Charlos---	Moderate: large stones.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, too sandy, seepage.
17*: Greyback---	Slight---	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
Thayne---	Slight---	Moderate: slope, seepage.	Slight---	Slight---	Poor: small stones.
Tetonia---	Moderate: percs slowly.	Moderate: seepage, slope.	Slight---	Slight---	Good.
18*: Greyback---	Moderate: slope.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
Thayne---	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.	Poor: small stones.
Tetonia---	Moderate: percs slowly, slope.	Severe: slope.	Slight---	Moderate: slope.	Fair: slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
19*:					
Greyback	Severe: slope.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
Thayne	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope, small stones.
Tetonia	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
20*:					
Greyback	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
Thayne	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope, small stones.
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
21*:					
Grobutte	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
Thayne	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope, small stones.
Greyback	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
22*:					
Hechtman	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones, thin layer.
Rock outcrop.					
23*:					
Leavitt	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
Youga	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
24*:					
Leavitt	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
Youga	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
25 Leavitt Variant	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
26*:					
Leighcan	Severe: slope, large stones.	Severe: slope, seepage, large stones.	Severe: seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones.
Moran	Severe: large stones.	Severe: slope, seepage, small stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: large stones.
Walcott	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
27*:					
Leighcan	Severe: slope, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones.
Rock outcrop.					
Walcott	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
28*:					
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: slope.	Poor: slope, large stones.
Spearhead	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones.
Owlcan	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, small stones.
29 Newfork	Severe: wetness, floods.	Severe: wetness, seepage, floods.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: small stones, wetness.
30*:					
Perceton	Severe: depth to rock, slope.	Severe: seepage, slope, depth to rock.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope, thin layer, area reclaim.
Buffork	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
31*:					
Robana	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
Willow Creek	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
32*:					
Robana	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Willow Creek	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
33*:					
Robana	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope.
Willow Creek	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope.
34*.					
Rock outcrop*					
35*:					
Rock outcrop.					
Sheege	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Starman	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: slope.	Poor: thin layer, slope, large stones.
36*:					
Rock outcrop.					
Teewinot	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, thin layer, area reclaim.
Moran	Severe: slope, large stones.	Severe: slope, seepage, small stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones.
37*:					
Roxal	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Starley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, small stones.
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
38*.					
Rubble land*					
39*:					
Rubble land.					

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
39*:					
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope, large stones.
Starman	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: thin layer, slope, large stones.
40*:					
Rubble land.					
Walcott	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
Leighcan	Severe: slope, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones.
41*:					
Sebud	Moderate: large stones, percs slowly.	Moderate: large stones, seepage.	Severe: large stones.	Slight	Poor: large stones.
Sebud	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight	Poor: large stones.
42*:					
Sebud	Moderate: slope, large stones, percs slowly.	Severe: slope.	Severe: large stones.	Moderate: slope.	Poor: large stones.
Sebud	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: large stones.
43*:					
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: slope.	Poor: slope, large stones.
Sebud	Severe: slope.	Severe: slope.	Severe: large stones.	Severe: slope.	Poor: slope, large stones.
44*:					
Slocum	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Fair: too clayey, wetness.
Silas	Moderate: wetness, floods.	Severe: floods.	Severe: wetness.	Moderate: floods, wetness.	Good.
45*:					
Starley	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, small stones.
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
45*:					
Roxal	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
46*:					
Starman	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: thin layer, slope, large stones.
Owlcan	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, small stones.
Midfork	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope, large stones.
47*:					
Taglake	Severe: slope, large stones.	Severe: slope, seepage, large stones.	Severe: seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones.
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: slope.	Poor: slope, large stones.
48*:					
Taglake	Severe: slope, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, large stones.
Sebud	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope, large stones.
49*:					
Tetonia	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
Lantonia	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
50*:					
Tetonia	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Lantonia	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Slight	Good.
51*:					
Tetonia	Moderate: percs slowly, slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
Lantonia	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
52*:					
Tetonia	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Lantonia	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Crow Creek	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
53*:					
Tetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Lantonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Crow Creek	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
54*:					
Tetonia	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
Tineman	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
Greyback	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
55 Tetonville	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: small stones, seepage, too sandy.
56*:					
Tetonville	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: small stones, seepage, too sandy.
Tetonville	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: small stones, seepage, too sandy.
57*:					
Tetonville	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: small stones, seepage, too sandy.
Riverwash.					
58*:					
Tetonville	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: small stones, seepage, too sandy.
Wilsonville	Severe: wetness.	Severe: wetness, floods, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
59*:					
Thayne	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope, small stones.
Adel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Greyback	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
60 Tineman	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
61 Tineman	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: small stones, seepage.
62*:					
Tineman	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
Bearmouth	Severe: large stones.	Severe: seepage, large stones.	Severe: seepage.	Severe: seepage.	Poor: seepage, large stones, too sandy.
63*:					
Tineman	Severe: slope.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
Bearmouth	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope, large stones.
64*:					
Tineman	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.
Tineman	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: small stones, seepage.
65 Turnerville	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
66 Turnerville	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Slight	Good.
67 Turnerville	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
68, 69 Turnerville	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
70*:					
Uhl	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Roxal	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
71*:					
Youga	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: small stones.
Tineman	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: small stones, seepage.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1---------- Adel Variant	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
2*: Aquic Cryoborolls.				
Aquic Cryoboralfs.				
3---------- Bearmouth	Poor: large stones.	Unsuited: large stones.	Poor: large stones.	Poor: large stones, too sandy, area reclaim.
4*: Buffork----------	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Adel----------	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Perceton----------	Poor: thin layer, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope.
5*: Buffork----------	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Tongue River----------	Poor: thin layer, slope, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Clayburn----------	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
6*: Buffork----------	Poor: thin layer, area reclaim, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, area reclaim, thin layer.
Tongue River----------	Poor: thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, area reclaim, slope.
Clayburn----------	Fair: low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, small stones.
7---------- Charlos	Fair: large stones.	Fair: large stones.	Fair: large stones.	Fair: small stones, too clayey, area reclaim.
8---------- Charlos Variant	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
9---------- Crow Creek	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
10---------- Crow Creek	Fair: slope, low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
11*: Crow Creek----------	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Starley----------	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer.	Unsuited: thin layer.	Poor: slope, small stones, area reclaim.
Roxal----------	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Unsuited: thin layer, excess fines.	Poor: slope, thin layer, area reclaim.
12*: Cryaquolls.				
Cryofibrists.				
13*: Cryorthents.				
Cryoborolls.				
14, 15---------- Greyback	Good----------	Fair: excess fines.	Fair: excess fines.	Poor: small stones.
16*: Greyback----------	Good----------	Fair: excess fines.	Fair: excess fines.	Poor: small stones.
Charlos----------	Fair: large stones.	Fair: large stones.	Fair: large stones.	Fair: small stones, too clayey, area reclaim.
17*: Greyback----------	Good----------	Fair: excess fines.	Fair: excess fines.	Poor: small stones.
Thayne----------	Good----------	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
Tetonia----------	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
18*: Greyback----------	Good----------	Fair: excess fines.	Fair: excess fines.	Poor: small stones.
Thayne----------	Good----------	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
Tetonia----------	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
19*:				
Greyback	Fair: slope.	Fair: excess fines.	Fair: excess fines.	Poor: slope, small stones.
Thayne	Fair: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Tetonia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
20*:				
Greyback	Poor: slope.	Fair: excess fines.	Fair: excess fines.	Poor: slope, small stones.
Thayne	Fair: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Tetonia	Poor: slope, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
21*:				
Grobutte	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Thayne	Fair: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Greyback	Poor: slope.	Fair: excess fines.	Fair: excess fines.	Poor: slope, small stones.
22*:				
Hechtman	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines.	Poor: thin layer, excess fines.	Poor: slope, small stones, area reclaim.
Rock outcrop.				
23*, 24*:				
Leavitt	Fair: shrink-swell, low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Youga	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones, too clayey.
25, Leavitt Variant	Fair: low strength, wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: wetness.
26*:				
Leighcan	Poor: large stones.	Poor: excess fines, large stones.	Unsuited: large stones.	Poor: slope, large stones.
Moran	Poor: large stones.	Poor: excess fines.	Unsuited: excess fines, large stones.	Poor: large stones.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
26*:				
Walcott	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
27*:				
Leighcan	Poor: slope, large stones.	Poor: excess fines, large stones.	Unsuited: large stones.	Poor: slope, large stones.
Rock outcrop.				
Walcott	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.
28*:				
Midfork	Fair: slope, low strength, large stones.	Unsuited: excess fines.	Fair: excess fines.	Poor: slope, large stones.
Spearhead	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.
Owlcan	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
29 Newfork	Poor: wetness.	Good	Good	Poor: wetness, small stones.
30*:				
Perceton	Poor: thin layer, slope, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope.
Buffork	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
31*:				
Robana	Fair: low strength, frost action, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Willow Creek	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
32*:				
Robana	Fair: low strength, frost action, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
Willow Creek	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
33*:				
Robana	Fair: slope, low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
33*:				
Willow Creek	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
34*.				
Rock outcrop*				
35*:				
Rock outcrop.				
Sheege	Poor: thin layer, area reclaim.	Unsuited: thin layer.	Unsuited: thin layer.	Poor: large stones, small stones, slope.
Starman	Poor: thin layer, area reclaim, large stones.	Unsuited: large stones, excess fines.	Unsuited: large stones, excess fines.	Poor: thin layer, large stones, slope.
36*:				
Rock outcrop.				
Teewinot	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones, area reclaim.
Moran	Poor: slope, large stones.	Poor: excess fines.	Unsuited: excess fines, large stones.	Poor: slope, large stones.
37*:				
Roxal	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Unsuited: thin layer, excess fines.	Poor: slope, thin layer, area reclaim.
Starley	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer.	Unsuited: thin layer.	Poor: slope, small stones, area reclaim.
Crow Creek	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
38*.				
Rubble land*				
39*:				
Rubble land.				
Midfork	Poor: slope.	Unsuited: excess fines.	Fair: excess fines.	Poor: slope, large stones.
Starman	Poor: large stones, thin layer, slope.	Unsuited: large stones, excess fines.	Unsuited: large stones, excess fines.	Poor: thin layer, large stones, slope.
40*:				
Rubble land.				
Walcott	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
40*:				
Leighcan	Poor: slope, large stones.	Poor: excess fines, large stones.	Unsuited: large stones.	Poor: slope, large stones.
41*, 42*:				
Sebud	Poor: large stones.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: large stones, area reclaim.
Sebud	Poor: large stones.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: large stones, area reclaim.
43*:				
Sebud	Poor: large stones.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: slope, large stones, area reclaim.
Sebud	Poor: large stones.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: large stones, area reclaim, slope.
44*:				
Slocum	Poor: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: wetness.
Silas	Fair: low strength, frost action, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
45*:				
Starley	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer.	Unsuited: thin layer.	Poor: slope, small stones, area reclaim.
Tetonia	Poor: slope, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Roxal	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Unsuited: thin layer, excess fines.	Poor: slope, thin layer, area reclaim.
46*:				
Starman	Poor: large stones, thin layer, slope.	Unsuited: large stones, excess fines.	Unsuited: large stones, excess fines.	Poor: thin layer, large stones, slope.
Owlcan	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Midfork	Poor: slope.	Unsuited: excess fines.	Fair: excess fines.	Poor: slope, large stones.
47*:				
Taglake	Poor: large stones.	Poor: excess fines, large stones.	Unsuited: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
47*:				
Sebud	Poor: large stones.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: slope, large stones, area reclaim.
48*:				
Taglake	Poor: slope, large stones.	Poor: excess fines, large stones.	Unsuited: excess fines.	Poor: slope, large stones.
Sebud	Poor: slope, large stones.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: slope, large stones, area reclaim.
49*, 50*:				
Tetonia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Lantonia	Fair: low strength.	Unsuited	Unsuited	Good.
51*:				
Tetonia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
Lantonia	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
52*:				
Tetonia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Lantonia	Fair: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Crow Creek	Fair: slope, low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
53*:				
Tetonia	Poor: slope, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Lantonia	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Crow Creek	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
54*:				
Tetonia	Poor: frost action.	Unsuited: excess fines.	Unsuited	Good.
Tineman	Good	Unsuited: excess fines.	Good	Poor: small stones.
Greyback	Good	Fair: excess fines.	Fair: excess fines.	Poor: small stones.
55--- Tetonville	Poor: wetness.	Unsuited: small stones.	Good	Poor: small stones.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
56*:				
Tetonville	Poor: wetness.	Unsuited: small stones.	Good	Poor: small stones, too sandy.
Tetonville	Poor: wetness.	Unsuited: small stones.	Good	Poor: small stones, too sandy.
57*:				
Tetonville	Poor: wetness.	Unsuited: small stones.	Good	Poor: small stones, too sandy.
Riverwash.				
58*:				
Tetonville	Poor: wetness.	Unsuited	Good	Poor: small stones, too sandy.
Wilsonville	Fair: low strength, wetness, frost action.	Poor: excess fines.	Good	Good.
59*:				
Thayne	Fair: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Adel	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Greyback	Poor: slope.	Fair: excess fines.	Fair: excess fines.	Poor: slope, small stones.
60--- Tineman	Good	Unsuited: excess fines.	Good	Poor: small stones.
61--- Tineman	Good	Poor: small stones.	Good	Poor: small stones.
62*:				
Tineman	Good	Unsuited: excess fines.	Good	Poor: small stones.
Bearmouth	Poor: large stones.	Unsuited: large stones.	Poor: large stones.	Poor: large stones, too sandy, area reclaim.
63*:				
Tineman	Fair: slope.	Unsuited: excess fines.	Good	Poor: slope, small stones.
Bearmouth	Poor: large stones.	Unsuited: large stones.	Poor: large stones.	Poor: large stones, too sandy, slope.
64*:				
Tineman	Good	Unsuited: excess fines.	Good	Poor: small stones.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
64*:				
Tineman	Good	Poor: small stones.	Good	Poor: small stones.
65, 66--- Turnerville	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
67--- Turnerville	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
68, 69--- Turnerville	Fair: slope, low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
70*:				
Uhl	Fair: slope, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Roxal	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Unsuited: thin layer, excess fines.	Poor: slope, area reclaim.
71*:				
Youga	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
Tineman	Good	Unsuited: excess fines.	Good	Poor: small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
1---------- Adel Variant	Favorable----------	Wetness----------	Wetness----------	Wetness.
2*: Aquic Cryoborolls.				
Aquic Cryoboralfs.				
3---------- Bearmouth	Seepage----------	Large stones, seepage.	Large stones, cutbanks cave.	Droughty, large stones, seepage.
4*: Buffork----------	Slope, depth to rock.	Thin layer----------	Slope----------	Slope.
Adel----------	Slope, seepage.	Favorable----------	Slope----------	Slope.
Perceton---------	Seepage, depth to rock, slope.	Thin layer----------	Depth to rock, slope.	Droughty, rooting depth.
5*: Buffork----------	Slope, depth to rock.	Thin layer----------	Slope----------	Slope.
Tongue River-----	Depth to rock, slope.	Thin layer----------	Depth to rock, slope.	Slope, rooting depth, erodes easily.
Clayburn---------	Seepage, slope.	Favorable----------	Slope----------	Slope.
6*: Buffork----------	Slope, depth to rock.	Thin layer----------	Slope----------	Slope.
Tongue River-----	Depth to rock, slope.	Thin layer----------	Depth to rock, slope.	Slope, rooting depth, erodes easily.
Clayburn---------	Seepage, slope.	Favorable----------	Slope----------	Slope.
7---------- Charlos	Seepage----------	Seepage----------	Cutbanks cave---------	Droughty.
8---------- Charlos Variant	Seepage----------	Seepage----------	Wetness, cutbanks cave.	Wetness.
9, 10---------- Crow Creek	Slope----------	Piping----------	Slope----------	Slope, erodes easily.
11*: Crow Creek-------	Slope----------	Piping----------	Slope----------	Slope, erodes easily.
Starley----------	Slope, depth to rock.	Thin layer.		

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
11*:				
Roxal	Slope, depth to rock.	Thin layer	Depth to rock	Slope, rooting depth, droughty.
12*:				
Cryaquolls.				
Cryofibrists.				
13*:				
Cryorthents.				
Cryoborolls.				
14 Greyback	Seepage	Seepage	Cutbanks cave	Seepage, droughty.
15 Greyback	Slope, seepage.	Seepage	Slope, cutbanks cave.	Slope, seepage, droughty.
16*:				
Greyback	Seepage	Seepage	Cutbanks cave	Seepage, droughty.
Charlos	Seepage	Seepage	Cutbanks cave	Droughty.
17*, 18*, 19*, 20*:				
Greyback	Slope, seepage.	Seepage	Slope, cutbanks cave.	Slope, seepage, droughty.
Thayne	Slope, seepage.	Favorable	Slope	Slope, droughty.
Tetonia	Slope, seepage.	Piping	Slope, frost action.	Slope, erodes easily.
21*:				
Grobutte	Slope, seepage.	Seepage.		
Thayne	Slope, seepage.	Favorable	Slope	Slope, droughty.
Greyback	Slope, seepage.	Seepage	Slope, cutbanks cave.	Slope, seepage, droughty.
22*:				
Hechtman	Slope, depth to rock, seepage.	Thin layer.		
Rock outcrop.				
23*:				
Leavitt	Seepage	Piping	Favorable	Favorable.
Youga	Seepage	Favorable	Favorable	Favorable.
24*:				
Leavitt	Slope, seepage.	Piping	Slope	Slope, erodes easily.
Youga		Favorable	Slope	Slope.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
25---------- Leavitt Variant	Favorable----------	Wetness----------	Wetness----------	Wetness.
26*: Leighcan----------	Slope, seepage.	Large stones, seepage.	Large stones----------	Slope, large stones, droughty.
Moran----------	Slope, seepage.	Large stones.		
Walcott----------	Slope, seepage.	Seepage.		
27*: Leighcan----------	Slope, seepage.	Large stones, seepage.	Large stones----------	Slope, large stones, droughty.
Rock outcrop.				
Walcott----------	Slope, seepage.	Seepage.		
28*: Midfork----------	Slope----------	Large stones.		
Spearhead---------	Slope, seepage.	Large stones.		
Owlcan----------	Slope----------	Favorable.		
29---------- Newfork	Seepage----------	Seepage, wetness.	Poor outlets, wetness, floods.	Wetness, floods, droughty.
30*: Perceton---------	Seepage, depth to rock, slope.	Thin layer----------	Depth to rock, slope.	Droughty, soil blowing, rooting depth.
Buffork----------	Slope, depth to rock.	Thin layer----------	Slope----------	Slope.
31*, 32*, 33*: Robana----------	Slope, seepage.	Piping----------	Slope----------	Slope, erodes easily.
Willow Creek-----	Slope, seepage.	Piping----------	Slope----------	Slope.
34*. Rock outcrop*				
35*: Rock outcrop.				
Sheege----------	Depth to rock, slope.	Large stones, thin layer.		
Starman----------	Slope, depth to rock.	Large stones, thin layer.		
36*: Rock outcrop.				
Teewinot---------	Depth to rock, seepage.	Thin layer.		

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
36*:				
Moran	Slope, seepage.	Large stones.		
37*:				
Roxal	Slope, depth to rock.	Thin layer	Depth to rock	Slope, rooting depth, droughty.
Starley	Slope, depth to rock.	Thin layer.		
Crow Creek	Slope	Piping	Slope	Slope, erodes easily.
38*.				
Rubble land*				
39*:				
Rubble land.				
Midfork	Slope	Large stones.		
Starman	Slope, depth to rock.	Large stones, thin layer.		
40*:				
Rubble land.				
Walcott	Slope, seepage.	Seepage.		
Leighcan	Slope, seepage.	Large stones, seepage.	Large stones	Slope, large stones, droughty.
41*:				
Sebud	Seepage	Large stones	Slope, large stones.	Large stones, droughty, slope.
Sebud	Seepage	Large stones	Slope	Large stones, droughty, slope.
42*:				
Sebud	Slope	Large stones	Slope, large stones.	Large stones, droughty, slope.
Sebud	Slope, seepage.	Large stones	Slope	Large stones, droughty, slope.
43*:				
Sebud	Slope, seepage.	Large stones	Slope	Large stones, droughty, slope.
Sebud	Slope	Large stones	Slope, large stones.	Large stones, droughty, slope.
44*:				
Slocum	Seepage	Wetness	Frost action, floods, wetness.	Wetness, floods.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
44*:				
Silas	Seepage	Piping.		
45*:				
Starley	Slope, depth to rock.	Thin layer.		
Tetonia	Slope, seepage.	Piping	Slope, frost action.	Slope, erodes easily.
Roxal	Slope, depth to rock.	Thin layer.		
46*:				
Starman	Slope, depth to rock.	Large stones, thin layer.		
Owlcan	Slope	Favorable.		
Midfork	Slope	Large stones.		
47*, 48*:				
Taglake	Slope, seepage.	Large stones, seepage.		
Sebud	Slope, seepage.	Large stones	Slope	Large stones, droughty, slope.
49*:				
Tetonia	Seepage	Piping	Frost action	Favorable.
Lantonia	Seepage	Piping	Favorable	Favorable.
50*, 51*:				
Tetonia	Slope, seepage.	Piping	Slope, frost action.	Slope, erodes easily.
Lantonia	Slope, seepage.	Piping	Slope	Slope.
52*, 53*:				
Tetonia	Slope, seepage.	Piping	Slope, frost action.	Slope, erodes easily.
Lantonia	Slope, seepage.	Piping	Slope	Slope.
Crow Creek	Slope	Piping	Slope	Slope, erodes easily.
54*:				
Tetonia	Seepage	Piping	Frost action	Favorable.
Tineman	Seepage	Seepage	Cutbanks cave	Droughty.
Greyback	Seepage	Seepage	Cutbanks cave	Seepage, droughty.
55--- Tetonville	Seepage	Wetness, seepage.	Wetness, floods, cutbanks cave.	Wetness, floods, seepage.
56*:				
Tetonville	Seepage	Wetness, seepage.	Wetness, floods, cutbanks cave.	Wetness, floods, seepage.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
56*:				
Tetonville	Seepage	Wetness, seepage.	Wetness, floods, cutbanks cave.	Wetness, floods.
57*:				
Tetonville	Seepage	Wetness, seepage.	Wetness, floods, cutbanks cave.	Wetness, floods.
Riverwash.				
58*:				
Tetonville	Seepage	Wetness, seepage.	Wetness, floods, cutbanks cave.	Wetness, floods.
Wilsonville	Seepage	Wetness	Wetness, cutbanks cave.	Wetness.
59*:				
Thayne	Slope, seepage.	Favorable	Slope	Slope, droughty.
Adel	Slope, seepage.	Favorable	Slope	Slope.
Greyback	Slope, seepage.	Seepage	Slope, cutbanks cave.	Slope, seepage, droughty.
60--- Tineman	Seepage	Seepage	Cutbanks cave	Droughty.
61--- Tineman	Seepage	Seepage	Wetness	Wetness.
62*:				
Tineman	Seepage	Seepage	Cutbanks cave	Droughty.
Bearmouth	Seepage	Large stones, seepage.	Large stones, cutbanks cave.	Droughty, large stones, seepage.
63*:				
Tineman	Slope, seepage.	Seepage	Slope, cutbanks cave.	Slope, droughty.
Bearmouth	Slope, seepage.	Large stones, seepage.	Slope, large stones, cutbanks cave.	Slope, droughty, large stones.
64*:				
Tineman	Slope, seepage.	Seepage	Slope, cutbanks cave.	Slope, droughty.
Tineman	Slope, seepage.	Seepage	Wetness	Wetness.
65--- Turnerville	Seepage	Piping	Slope	Favorable.
66--- Turnerville	Seepage	Piping	Slope	Slope, erodes easily.
67, 68, 69--- Turnerville	Slope, seepage.	Piping	Slope	Slope, erodes easily.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
70*:				
Uhl	Slope	Favorable	Slope	Slope.
Roxal	Slope, depth to rock.	Thin layer	Depth to rock	Slope, rooting depth, droughty.
71*:				
Youga	Seepage	Favorable	Favorable	Favorable.
Tineman	Seepage	Seepage	Cutbanks cave	Droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1----------	0-26	Loam----------	CL-ML	A-4	0-10	85-100	85-100	80-95	65-80	25-30	5-10
Adel Variant	26-60	Loam----------	CL-ML	A-4	0-10	85-100	85-100	80-95	65-80	25-30	5-10
2*:											
Aquic Cryoborolls.											
Aquic Cryoboralfs.											
3----------	0-6	Gravelly loam---	ML, SM	A-4	10-15	70-90	60-85	50-70	35-55	25-30	NP-5
Bearmouth	6-15	Very gravelly sandy loam, very gravelly loam, very cobbly loam.	GM, SM	A-1, A-2	25-45	45-70	40-60	25-50	10-35	---	NP
	15-60	Very cobbly sand, very gravelly sand, very gravelly loamy sand.	GP, GP-GM, GM	A-1	40-65	20-50	10-40	5-30	0-20	---	NP
4*:											
Buffork----------	0-9	Fine sandy loam	SM, ML	A-4	0	90-100	90-100	70-85	40-55	15-25	NP-5
	9-15	Fine sandy loam, sandy loam.	SM-SC, CL-ML	A-4	0	90-100	90-100	70-85	45-55	15-25	5-10
	15-26	Sandy clay loam	CL, SC	A-6	0	90-100	90-100	80-90	35-55	30-40	10-15
	26	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Adel----------	0-26	Loam----------	CL-ML	A-4	0-10	85-100	85-100	80-95	65-85	25-30	5-10
	26-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-10	85-100	85-100	80-95	65-80	25-35	5-15
Perceton----------	0-7	Gravelly sandy loam.	GM-GC, SM-SC	A-2	0-5	50-70	50-70	30-55	15-35	15-25	5-10
	7-25	Gravelly sandy clay loam.	GC, CL	A-6	0-5	50-70	50-70	45-65	40-55	20-30	10-15
	25-35	Gravelly sandy loam, very gravelly sandy loam.	GM-GC, SM-SC	A-4, A-2	0-5	40-70	40-70	30-60	25-50	15-25	5-10
	35	Weathered bedrock.	---	---	---	---	---	---	---	---	---
5*:											
Buffork----------	0-9	Fine sandy loam	SM, ML	A-4	0	90-100	90-100	70-85	40-55	15-25	NP-5
	9-15	Fine sandy loam, sandy loam.	SM-SC, CL-ML	A-4	0	90-100	90-100	70-85	45-55	15-25	5-10
	15-26	Sandy clay loam	CL, SC	A-6	0	90-100	90-100	80-90	35-55	30-40	10-15
	26	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Tongue River------	0-20	Very fine sandy loam.	CL-ML	A-4	0	100	100	85-100	50-70	15-25	5-10
	20-36	Sandy clay loam	SM-SC, SC, CL-ML, CL	A-4, A-6	0	100	100	60-80	45-55	15-30	5-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clayburn----------	0-26	Sandy loam------	SM	A-2, A-4	0-5	90-100	80-95	50-65	30-40	15-25	NP-5
	26-36	Sandy clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	10-20	90-100	85-100	75-90	55-70	25-35	5-15
	36-60	Sandy loam------	SM	A-2, A-4	0-5	90-100	80-95	50-65	30-40	15-25	NP-5

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
6*:											
Buffork	0-9	Fine sandy loam	SM, ML	A-4	0	90-100	90-100	70-85	40-55	15-25	NP-5
	9-15	Fine sandy loam, sandy loam.	SM-SC, CL-ML	A-4	0	90-100	90-100	70-85	45-55	15-25	5-10
	15-26	Sandy clay loam	CL, SC	A-6	0	90-100	90-100	80-90	35-55	30-40	10-15
	26	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Tongue River	0-20	Very fine sandy loam.	CL-ML	A-4	0	100	100	85-100	50-70	15-25	5-10
	20-36	Sandy clay loam	SM-SC, SC, CL-ML, CL	A-4, A-6	0	100	100	60-80	45-55	15-30	5-15
	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Clayburn	0-26	Sandy loam	SM	A-2, A-4	0-5	90-100	80-95	50-65	30-40	15-25	NP-5
	26-36	Sandy clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	10-20	90-100	85-100	75-90	55-70	25-35	5-15
	36-60	Sandy loam	SM	A-2, A-4	0-5	90-100	80-95	50-65	30-40	15-25	NP-5
7	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	90-95	85-95	60-75	20-30	NP-10
Charlos	4-28	Clay loam, sandy clay loam.	CL-ML, CL	A-4, A-6	0-5	90-100	90-95	80-95	50-75	25-35	5-15
	28-60	Very gravelly sand, very gravelly loamy sand.	GP, GP-GM, SP, SP-SM	A-1	15-30	50-70	35-60	25-40	0-10	---	NP
8	0-7	Loam	ML, CL-ML	A-4	0-5	90-100	90-95	85-95	60-75	20-30	NP-10
Charlos Variant	7-38	Clay loam	CL-ML, CL	A-4	0-5	90-100	90-95	80-95	50-75	25-35	5-15
	38-60	Very gravelly loamy sand.	GP, GP-GM SP, SP-SM	A-1	15-35	50-70	45-60	25-40	0-10	---	NP
9, 10	0-9	Silt loam	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
Crow Creek	9-14	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	14-60	Silt loam, very fine sandy loam.	CL-ML	A-4	0	100	100	90-100	70-90	20-30	5-10
11*:											
Crow Creek	0-9	Silt loam	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	9-14	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	14-60	Silt loam, very fine sandy loam.	CL-ML	A-4	0	100	100	90-100	70-90	20-30	5-10
Starley	0-8	Gravelly loam	GM-GC, SM, SM-SC, GM	A-4	15-20	70-75	70-75	50-70	35-50	25-35	5-10
	8-15	Very cobbly loam, very gravelly loam, very gravelly clay loam.	GM-GC, GM	A-2, A-4	20-50	40-60	40-60	25-45	20-40	25-35	5-10
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
11*:											
Roxal	0-7	Loam	CL-ML, ML	A-4	0	75-100	75-100	70-90	50-70	25-35	5-10
	7-13	Clay loam, loam	CL	A-6	0	80-100	75-100	70-95	60-75	20-35	10-15
	13	Weathered bedrock.	---	---	---	---	---	---	---	---	---
12*:											
Cryaquolls.											
Cryofibrists.											
13*:											
Cryorthents.											
Cryoborolls.											
14, 15	0-5	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
Greyback	5-13	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	13-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0-15	20-50	20-50	15-35	10-30	---	NP
	30-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	0-15	20-50	20-50	10-30	0-10	---	NP
16*:											
Greyback	0-5	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	5-13	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	13-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0-15	20-50	20-50	15-35	10-30	---	NP
	30-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	0-15	20-50	20-50	10-30	0-10	---	NP
Charlos	0-4	Loam	ML, CL-ML	A-4	0-5	90-100	90-95	85-95	60-75	20-30	NP-10
	4-28	Clay loam, sandy clay loam.	CL-ML, CL	A-4, A-6	0-5	90-100	90-95	80-95	50-75	25-35	5-15
	28-60	Very gravelly sand, very gravelly loamy sand.	GP, GP-GM, SP, SP-SM	A-1	15-30	50-70	35-60	25-40	0-10	---	NP
17*, 18*, 19*, 20*:											
Greyback	0-5	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	5-13	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	13-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0-15	20-50	20-50	15-35	10-30	---	NP
	30-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	0-15	20-50	20-50	10-30	0-10	---	NP

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
17*, 18*, 19*, 20*:											
Thayne	0-6	Gravelly loam	GM-GC, GM, SM-SC, SM	A-4	0-10	55-75	55-75	50-70	35-50	25-35	5-10
	6-34	Gravelly loam	GM-GC, GM-SM, SM	A-4	0-10	55-75	55-75	50-70	35-50	25-35	5-10
	34-60	Very gravelly loam, very gravelly sandy loam.	GM-GC, GM	A-2	10-20	20-55	20-50	20-45	15-30	20-35	5-10
Tetonia	0-8	Silt loam	ML	A-4	0	100	100	100	90-100	20-30	NP-5
	8-60	Silt loam	CL-ML, ML	A-4	0	100	100	100	90-100	20-30	NP-10
21*:											
Grobutte	0-4	Gravelly loam	GM-GC, CL-ML	A-4	0-5	50-75	50-75	45-65	35-55	15-25	5-10
	4-10	Gravelly loam	GM-GC, CL-ML	A-4	0-5	50-75	50-75	45-65	35-55	15-25	5-10
	10-60	Very gravelly sandy loam.	GM	A-1	5-10	30-50	30-50	20-40	10-20	---	NP
Thayne	0-6	Gravelly loam	GM-GC, GM, SM-SC, SM	A-4	0-10	55-75	55-75	50-70	35-50	25-35	5-10
	6-34	Gravelly loam	GM-GC, GM-SM, SM	A-4	0-10	55-75	55-75	50-70	35-50	25-35	5-10
	34-60	Very gravelly loam, very gravelly sandy loam.	GM-GC, GM	A-2	10-20	20-55	20-50	20-45	15-30	20-35	5-10
Greyback	0-5	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	5-13	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	13-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0-15	20-50	20-50	15-35	10-30	---	NP
	30-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	0-15	20-50	20-50	10-30	0-10	---	NP
22*:											
Hechtman	0-6	Gravelly sandy loam.	SM-SC	A-2	0	65-75	65-75	40-50	20-30	15-25	5-10
	6-15	Very gravelly sandy loam.	GP-GC	A-2	0	20-30	20-30	10-20	5-10	15-25	5-10
	15	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
23*, 24*:											
Leavitt	0-8	Loam	ML	A-4	0	75-100	75-100	70-100	60-80	25-35	NP-5
	8-38	Clay loam, loam	CL	A-6	0	75-100	75-100	70-100	55-80	25-40	NP-15
	38-52	Loam, sandy clay loam, clay loam.	CL-ML	A-4	0	75-100	75-100	65-90	50-70	25-40	5-10
	52-60	Very gravelly loamy sand.	GP, GP-GM	A-1	20-40	10-40	10-40	5-20	5-15	---	NP

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
23*, 24*:											
Youga	0-6	Silty clay loam	ML, SM, CL-ML, SM-SC	A-4, A-5	0-15	75-95	75-90	60-80	40-60	25-45	5-10
	6-15	Clay loam, sandy clay loam.	CL, SC	A-6, A-7	0-25	75-90	65-90	60-75	45-65	30-50	10-25
	15-60	Sandy clay loam, clay loam.	SC	A-2, A-6	0-5	80-100	75-100	40-70	30-50	25-35	10-15
25	0-7	Loam	ML	A-4	0	75-100	75-100	70-100	60-80	25-35	NP-5
Leavitt Variant	7-38	Clay loam	CL	A-6	0	75-100	75-100	70-100	55-80	25-35	10-15
	38-52	Sandy clay loam	ML	A-4	0	75-100	75-100	65-90	50-70	30-40	5-10
	52-60	Very gravelly loamy sand.	GP, GP-GM	A-1	20-40	10-40	10-40	5-25	5-15	---	NP
26*:											
Leighcan	0-7	Very stony sandy loam.	GM	A-2	35-45	55-70	55-70	40-55	15-30	15-25	NP-5
	7-45	Very stony sandy loam.	GM	A-2	25-45	55-70	55-70	40-55	15-30	15-25	NP-5
	45-60	Very stony sandy loam.	GM	A-2	25-45	55-70	55-70	40-55	15-30	---	NP
Moran	0-6	Very stony sandy loam.	SM	A-2	30-50	70-75	70-75	45-55	25-35	---	NP
	6-15	Very stony sandy loam.	SM	A-1, A-2	40-60	70-80	70-80	40-50	20-30	---	NP
	15-60	Very stony sandy loam.	SM	A-1, A-2	40-60	70-80	70-80	40-50	20-30	---	NP
Walcott	0-8	Gravelly sandy loam.	SM, GM	A-1, A-2	5-10	60-75	60-75	35-50	20-30	15-25	NP-5
	8-60	Very gravelly sandy loam.	GM	A-1	5-10	40-60	35-55	30-50	15-25	---	NP
27*:											
Leighcan	0-7	Very stony sandy loam.	GM	A-2	35-45	55-70	55-70	40-55	15-30	15-25	NP-5
	7-45	Very stony sandy loam.	GM	A-2	25-45	55-70	55-70	40-55	15-30	15-25	NP-5
	45-60	Very stony sandy loam.	GM	A-2	25-45	55-70	55-70	40-55	15-30	---	NP
Rock outcrop.											
Walcott	0-8	Gravelly sandy loam.	SM, GM	A-1, A-2	5-10	60-75	60-75	35-50	20-30	15-25	NP-5
	8-60	Very gravelly sandy loam.	GM	A-1	5-10	40-60	35-55	30-50	15-25	---	NP
28*:											
Midfork	0-10	Very stony loam	CL-ML	A-4	30-60	70-75	70-75	55-75	55-70	15-25	5-10
	10-60	Very cobbly loam, very cobbly clay loam.	CL-ML	A-4	30-60	60-70	50-60	40-50	35-45	15-25	5-10
Spearhead	0-36	Very gravelly loam.	GM	A-4, A-2	5-15	40-50	40-50	25-45	25-40	15-25	NP-5
	36-60	Very cobbly sandy loam.	GM	A-1	25-45	40-50	40-50	25-35	10-20	10-20	NP-5

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
28*											
Owlcan	0-5	Loam	CL-ML	A-4	0-5	90-100	90-100	85-95	55-70	15-25	5-10
	5-11	Clay loam	CL	A-6	0-5	90-100	90-100	85-95	65-75	30-40	10-15
	11-16	Clay loam	CL	A-6	0-5	90-100	90-100	85-95	65-75	30-40	15-20
	16-23	Channery clay loam.	CL, GC	A-6	0-5	50-75	50-75	45-65	40-55	30-40	15-20
	23-60	Very channery clay loam.	GC	A-2, A-6	5-10	30-50	30-50	25-45	20-40	30-40	10-15
29	0-10	Fine sandy loam	SM, ML	A-4	0-10	85-100	75-100	55-70	40-55	---	NP
Newfork	10-16	Fine sandy loam	SM, ML	A-4	0-10	85-100	75-100	55-70	40-55	---	NP
	16-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	0-25	25-40	25-40	15-30	5-15	---	NP
30*:											
Perceton	0-7	Gravelly sandy loam.	GM-GC, SM-SC	A-2	0-5	50-70	50-70	30-55	15-35	15-25	5-10
	7-25	Gravelly sandy clay loam.	GC, CL	A-6	0-5	50-70	50-70	45-65	40-55	20-30	10-15
	25-35	Gravelly sandy loam, very gravelly sandy loam.	GM-GC, SM-SC	A-4, A-2	0-5	40-70	40-70	30-60	25-50	15-25	5-10
	35	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Buffork	0-9	Fine sandy loam	SM, ML	A-4	0	90-100	90-100	70-85	40-55	15-25	NP-5
	9-15	Fine sandy loam, sandy loam.	SM-SC, CL-ML	A-4	0	90-100	90-100	70-85	45-55	15-25	5-10
	15-26	Sandy clay loam	CL, SC	A-6	0	90-100	90-100	80-90	35-55	30-40	10-15
	26	Weathered bedrock.	---	---	---	---	---	---	---	---	---
31*, 32*, 33*:											
Robana	0-7	Silt loam	CL-ML, ML	A-4	0	90-100	90-100	85-100	85-100	25-35	5-10
	7-50	Silty clay loam, silt loam.	CL	A-6	0	90-100	90-100	90-100	85-100	30-40	10-15
	50-60	Silt loam	CL-ML, ML	A-4	0	90-100	90-100	85-100	85-100	25-35	5-10
Willow Creek	0-7	Silt loam	CL-ML, ML	A-4	0	100	100	90-100	70-90	25-35	5-10
	7-29	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	85-95	35-40	15-20
	29	Silt loam	CL-ML, ML	A-4	0	100	100	90-100	70-90	25-35	5-10
34*.											
Rock outcrop*											
35*:											
Rock outcrop.											
Sheege	0-12	Very channery loam.	GM	A-1, A-2	10-15	35-50	35-50	20-45	15-30	20-35	NP-10
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Starman	0-4	Very stony loam	GM-GC	A-4	30-50	55-65	55-65	40-55	35-50	15-25	5-10
	4-8	Very stony loam, very stony clay loam.	GM-GC, GC	A-4, A-6	30-50	55-65	55-65	40-55	35-50	15-30	5-15
	8	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
36*: Rock outcrop.											
Teewinot	0-15	Very cobbly sandy loam.	SM, GM	A-1, A-2	25-40	45-60	35-55	30-50	20-30	15-25	NP-5
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Moran	0-6	Very stony sandy loam.	SM	A-2	30-50	70-75	70-75	45-55	25-35	---	NP
	6-15	Very stony sandy loam.	SM	A-1, A-2	40-60	70-80	70-80	40-50	20-30	---	NP
	15-60	Very stony sandy loam.	SM	A-1, A-2	40-60	70-80	70-80	40-50	20-30	---	NP
37*:											
Roxal	0-13	Loam	CL-ML, ML	A-4	0	75-100	75-100	70-90	50-70	25-35	5-10
	13	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Starley	0-8	Gravelly loam	GM-GC, SM, SM-SC, GM	A-4	15-20	70-75	70-75	50-70	35-50	25-35	5-10
	8-15	Very cobbly loam, very gravelly loam, very gravelly clay loam.	GM-GC, GM	A-2, A-4	20-50	40-60	40-60	25-45	20-40	25-35	5-10
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Crow Creek	0-9	Silt loam	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	9-14	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	14-60	Silt loam, very fine sandy loam.	CL-ML	A-4	0	100	100	90-100	70-90	20-30	5-10
38*. Rubble land*											
39*: Rubble land.											
Midfork	0-10	Very stony loam	CL-ML	A-4	30-60	70-75	70-75	55-75	55-70	15-25	5-10
	10-60	Very cobbly loam, very cobbly clay loam.	CL-ML	A-4	30-60	60-70	50-60	40-50	35-45	15-25	5-10
Starman	0-4	Very stony loam	GM-GC	A-4	30-50	55-65	55-65	40-55	35-50	15-25	5-10
	4-8	Very stony loam, very stony clay loam.	GM-GC, GC	A-4, A-6	30-50	55-65	55-65	40-55	35-50	15-30	5-15
	8	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
40*: Rubble land.											
Walcott	0-8	Gravelly sandy loam.	SM, GM	A-1, A-2	5-10	60-75	60-75	35-50	20-30	15-25	NP-5
	8-60	Very gravelly sandy loam.	GM	A-1	5-10	40-60	35-55	30-50	15-25	---	NP

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
40*:											
Leighcan	0-7	Very stony sandy loam.	GM	A-2	35-45	55-70	55-70	40-55	15-30	15-25	NP-5
	7-45	Very stony sandy loam.	GM	A-2	25-45	55-70	55-70	40-55	15-30	15-25	NP-5
	45-60	Very stony sandy loam.	GM	A-2	25-45	55-70	55-70	40-55	15-30	---	NP
41*, 42*:											
Sebud	0-11	Gravelly loam	ML, SM	A-4	0-10	65-85	55-75	45-70	35-55	25-35	NP-10
	11-17	Very stony sandy clay loam.	CL, SC	A-6	25-40	75-95	60-85	50-85	40-70	30-40	10-20
	17-60	Very stony sandy clay loam, very stony sandy loam.	SC, SM-SC	A-2, A-4, A-6	25-40	75-95	60-85	45-75	20-60	25-35	5-15
Sebud	0-11	Stony sandy loam	SM, SM-SC	A-2, A-4, A-1	25-40	75-95	60-85	40-65	20-45	20-30	NP-10
	11-17	Very stony clay loam, very stony sandy clay loam.	CL, SC	A-6	40-60	75-95	60-85	50-85	40-70	30-40	10-15
	17-60	Very stony sandy clay loam, very stony sandy loam.	SC, SM-SC	A-2, A-4, A-6	40-60	75-95	60-85	45-75	20-45	25-35	5-15
43*:											
Sebud	0-11	Stony sandy loam	SM, SM-SC	A-2, A-4, A-1	25-40	75-95	60-85	40-65	20-45	20-30	NP-10
	11-17	Very stony clay loam, very stony sandy clay loam.	CL, SC	A-6	40-60	75-95	60-85	50-85	40-70	30-40	10-15
	17-60	Very stony sandy clay loam, very stony sandy loam.	SC, SM-SC	A-2, A-4, A-6	40-60	75-95	60-85	45-75	20-45	25-35	5-15
Sebud	0-11	Gravelly loam	ML, SM	A-4	0-10	65-85	55-75	45-70	35-55	25-35	NP-10
	11-17	Very stony sandy clay loam.	CL, SC	A-6	25-40	75-95	60-85	50-85	40-70	30-40	10-20
	17-60	Very stony sandy clay loam, very stony sandy loam.	SC, SM-SC	A-2, A-4, A-6	25-40	75-95	60-85	45-75	20-60	25-35	5-15
44*:											
Slocum	0-8	Loam	CL-ML	A-4	0	100	100	85-95	60-75	20-30	5-10
	8-32	Silty clay loam, clay loam.	CL	A-6	0	100	100	90-95	70-90	30-40	10-20
	32-60	Very fine sandy loam.	ML, SM	A-4	0	100	100	85-95	40-60	20-25	NP-5
Silas	0-26	Loam	ML	A-4	0-10	90-100	90-100	80-95	60-85	15-25	NP-5
	26-60	Stratified loam to clay loam.	ML	A-4	0-10	90-100	90-100	80-95	60-85	15-25	NP-5

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
45*:											
Starley	0-8	Gravelly loam	GM-GC, SM, SM-SC, GM	A-4	0-10	70-75	70-75	50-70	35-50	25-35	5-10
	8-15	Very cobbly loam, very gravelly loam, very gravelly clay loam.	GM-GC, GM	A-2, A-4	20-50	40-60	40-60	25-45	20-40	25-35	5-10
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tetonia	0-8	Silt loam	ML	A-4	0	100	100	100	90-100	20-30	NP-5
	8-60	Silt loam	CL-ML, ML	A-4	0	100	100	100	90-100	20-30	NP-10
Roxal	0-7	Loam	CL-ML, ML	A-4	0	75-100	75-100	70-90	50-70	25-35	5-10
	7-13	Clay loam, loam	CL	A-6	0	80-100	75-100	70-95	60-75	20-35	10-15
	13	Weathered bedrock.	---	---	---	---	---	---	---	---	---
46*:											
Starman	0-4	Very stony loam	GM-GC	A-4	30-50	55-65	55-65	40-55	35-50	15-25	5-10
	4-8	Very stony loam, very stony clay loam.	GM-GC, GC	A-4, A-6	30-50	55-65	55-65	40-55	35-50	15-30	5-15
	8	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Owlcan	0-5	Loam	CL-ML	A-4	0-5	90-100	90-100	85-95	55-70	15-25	5-10
	5-11	Clay loam	CL	A-6	0-5	90-100	90-100	85-95	65-75	30-40	10-15
	11-16	Clay loam	CL	A-6	0-5	90-100	90-100	85-95	65-75	30-40	15-20
	16-23	Channery clay loam.	CL, GC	A-6	0-5	50-75	50-75	45-65	40-55	30-40	15-20
	23-60	Very channery clay loam.	GC	A-2, A-6	5-10	30-50	30-50	25-45	20-40	30-40	10-15
Midfork	0-10	Very stony loam	CL-ML	A-4	30-60	70-75	70-75	55-75	55-70	15-25	5-10
	10-60	Very cobbly loam, very cobbly clay loam.	CL-ML	A-4	30-60	60-70	50-60	40-50	35-45	15-25	5-10
47*:											
Taglake	0-4	Very stony sandy loam.	SM	A-2	20-30	80-90	80-90	50-60	25-35	15-25	NP-5
	4-60	Very cobbly sandy loam, very stony sandy loam.	SM	A-2, A-1	35-50	70-80	65-75	45-60	20-30	---	NP
Sebud	0-11	Stony sandy loam	SM, SM-SC	A-2, A-4, A-1	25-40	75-95	60-85	40-65	20-45	20-30	NP-10
	11-17	Very stony clay loam, very stony sandy clay loam.	CL, SC	A-6	40-60	75-95	60-85	50-85	40-70	30-40	10-15
	17-60	Very stony sandy clay loam, very stony sandy loam.	SC, SM-SC	A-2, A-4, A-6	40-60	75-95	60-85	45-75	20-45	25-35	5-15

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
48*:											
Taglake	0-4	Very stony sandy loam.	SM	A-2	20-30	80-90	80-90	50-60	25-35	15-25	NP-5
	4-60	Very cobbly sandy loam, very stony sandy loam.	SM	A-2, A-1	35-50	70-80	65-75	45-60	20-30	---	NP
Sebud	0-11	Stony sandy loam	SM, SM-SC	A-2, A-4, A-1	25-40	75-95	60-85	40-65	20-45	20-30	NP-10
	11-17	Very stony clay loam, very stony sandy clay loam.	CL, SC	A-6	40-60	75-95	60-85	50-85	40-70	30-40	10-15
	17-60	Very stony sandy clay loam, very stony sandy loam.	SC, SM-SC	A-2, A-4, A-6	40-60	75-95	60-85	45-75	20-45	25-35	5-15
49*, 50*, 51*:											
Tetonia	0-8	Silt loam	ML	A-4	0	100	100	100	90-100	20-30	NP-5
	8-60	Silt loam	CL-ML, ML	A-4	0	100	100	100	90-100	20-30	NP-10
Lantonia	0-80	Silt loam	ML, CL-ML	A-4	0	100	100	100	90-100	20-30	NP-10
52*, 53*:											
Tetonia	0-8	Silt loam	ML	A-4	0	100	100	100	90-100	20-30	NP-5
	8-60	Silt loam	CL-ML, ML	A-4	0	100	100	100	90-100	20-30	NP-10
Lantonia	0-80	Silt loam	ML, CL-ML	A-4	0	100	100	100	90-100	20-30	NP-10
Crow Creek	0-9	Silt loam	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	9-14	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	90-100	70-90	20-30	NP-5
	14-60	Silt loam, very fine sandy loam.	CL-ML	A-4	0	100	100	90-100	70-90	20-30	5-10
54*:											
Tetonia	0-8	Silt loam	ML	A-4	0	100	100	100	90-100	20-30	NP-5
	8-60	Silt loam	CL-ML, ML	A-4	0	100	100	100	90-100	20-30	NP-10
Tineman	0-7	Gravelly loam	GM-GC	A-4	0	50-75	50-75	45-65	35-50	15-25	5-10
	7-15	Gravelly loam	GM-GC	A-4	0-5	55-75	55-75	50-65	40-50	15-25	5-10
	15-27	Very gravelly sandy loam.	GM	A-1	5-10	30-45	30-45	20-30	10-15	10-20	NP-5
	27-60	Very gravelly sand.	GP	A-1	15-25	30-45	30-45	15-25	0-5	---	NP
Greyback	0-5	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	5-13	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	13-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0-15	20-50	20-50	15-35	10-30	---	NP
	30-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	0-15	20-50	20-50	10-30	0-10	---	NP
55----------Tetonville	0-17	Gravelly loam	CL-ML, SM-SC	A-4	0-5	60-80	60-75	55-70	45-60	15-25	5-10
	17-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	10-25	20-55	20-55	5-30	0-10	---	NP

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
56*:											
Tetonville	0-8	Very gravelly sandy loam.	GP-GM, GM	A-1	0-5	20-50	20-50	15-30	5-15	---	NP
	8-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	10-25	20-55	20-55	5-30	0-10	---	NP
Tetonville	0-8	Fine sandy loam	SM	A-2	0	80-100	80-100	50-65	25-35	15-25	NP-5
	8-17	Fine sandy loam	SM	A-2, A-4	0-5	75-100	75-100	45-60	30-40	15-25	NP-5
	17-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	10-25	20-55	20-55	5-30	0-10	---	NP
57*:											
Tetonville	0-8	Fine sandy loam	SM	A-2	0	80-100	80-100	50-65	25-35	15-25	NP-5
	8-17	Fine sandy loam	SM	A-2, A-4	0-5	75-100	75-100	45-60	30-40	15-25	NP-5
	17-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	10-25	20-55	20-55	5-30	0-10	---	NP
Riverwash.											
58*:											
Tetonville	0-8	Fine sandy loam	SM	A-2	0	80-100	80-100	50-65	25-35	15-25	NP-5
	8-17	Fine sandy loam	SM	A-2, A-4	0-5	75-100	75-100	45-60	30-40	15-25	NP-5
	17-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	10-25	20-55	20-55	5-30	0-10	---	NP
Wilsonville	0-7	Fine sandy loam	SM	A-4	0	90-100	90-100	70-85	40-50	15-25	NP-5
	7-29	Fine sandy loam, very fine sandy loam.	SM, ML	A-4	0	90-100	90-100	75-90	40-55	15-25	NP-5
	29-54	Loamy coarse sand, loamy sand.	SM	A-2	0	85-100	85-100	50-75	15-30	---	NP
	54-60	Very gravelly loamy coarse sand.	GP, GP-GM	A-1	10-25	20-55	20-55	5-30	0-10	---	NP
59*:											
Thayne	0-6	Gravelly loam---	GM-GC, GM, SM-SC, SM	A-4	0-10	55-75	55-75	50-70	35-50	25-35	5-10
	6-34	Gravelly loam---	GM-GC, GM-SM, SM	A-4	0-10	55-75	55-75	50-70	35-50	25-35	5-10
	34-60	Very gravelly loam, very gravelly sandy loam.	GM-GC, GM	A-2	10-20	20-55	20-50	20-45	15-30	20-35	5-10
Adel	0-26	Loam---	CL, CL-ML	A-4	0-10	85-100	85-100	80-95	65-85	25-30	5-10
	26-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-10	85-100	85-100	80-95	65-80	25-35	5-15

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
59*:											
Greyback	0-5	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	5-13	Gravelly loam	GM-GC, GM	A-2, A-4	0-15	50-75	50-75	45-65	30-50	25-35	5-10
	13-30	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0-15	20-50	20-50	15-35	10-30	---	NP
	30-60	Very gravelly loamy sand, very gravelly sand.	GP, GP-GM	A-1	0-15	20-50	20-50	10-30	0-10	---	NP
60	0-7	Gravelly loam	GM-GC	A-4	0	50-75	50-75	45-65	35-50	15-25	5-10
Tineman	7-15	Gravelly loam	GM-GC	A-4	0-5	55-75	55-75	50-65	40-50	15-25	5-10
	15-27	Very gravelly sandy loam.	GM	A-1	5-10	30-45	30-45	20-30	10-15	10-20	NP-5
	27-60	Very gravelly sand.	GP	A-1	15-25	30-45	30-45	15-25	0-5	---	NP
61	0-7	Gravelly loam	GM-GC, SM-SC	A-4	0	50-75	50-75	45-65	35-50	15-25	5-10
Tineman	7-15	Gravelly loam	GM-GC, SM-SC	A-4	0-5	55-75	55-75	50-65	40-50	15-25	5-10
	15-27	Very gravelly sandy loam.	GM, GP-GM	A-1	5-10	30-45	30-45	20-30	10-15	10-20	NP-5
	27-60	Very gravelly sand.	GP	A-1	15-25	30-45	30-45	15-25	0-5	---	NP
62*, 63*:											
Tineman	0-7	Gravelly loam	GM-GC	A-4	0	50-75	50-75	45-65	35-50	15-25	5-10
	7-15	Gravelly loam	GM-GC	A-4	0-5	55-75	55-75	50-65	40-50	15-25	5-10
	15-27	Very gravelly sandy loam.	GM	A-1	5-10	30-45	30-45	20-30	10-15	10-20	NP-5
	27-60	Very gravelly sand.	GP	A-1	15-25	30-45	30-45	15-25	0-5	---	NP
Bearmouth	0-6	Gravelly loam	ML, SM	A-4	10-15	70-90	60-85	50-70	35-55	25-30	NP-5
	6-15	Very gravelly sandy loam, very gravelly loam, very cobbly loam.	GM, SM	A-1, A-2	25-45	45-70	40-60	25-50	10-35	---	NP
	15-60	Very cobbly sand, very gravelly sand, very gravelly loamy sand.	GP, GP-GM, GM	A-1	40-65	20-50	10-40	5-30	0-20	---	NP
64*:											
Tineman	0-7	Gravelly loam	GM-GC	A-4	0	50-75	50-75	45-65	35-50	15-25	5-10
	7-15	Gravelly loam	GM-GC	A-4	0-5	55-75	55-75	50-65	40-50	15-25	5-10
	15-27	Very gravelly sandy loam.	GM	A-1	5-10	30-45	30-45	20-30	10-15	10-20	NP-5
	27-60	Very gravelly sand.	GP	A-1	15-25	30-45	30-45	15-25	0-5	---	NP
Tineman	0-7	Gravelly loam	GM-GC, SM-SC	A-4	0	50-75	50-75	45-65	35-50	15-25	5-10
	7-15	Gravelly loam	GM-GC, SM-SC	A-4	0-5	55-75	55-75	50-65	40-50	15-25	5-10
	15-27	Very gravelly sandy loam.	GM, GP-GM	A-1	5-10	30-45	30-45	20-30	10-15	10-20	NP-5
	27-60	Very gravelly sand.	GP	A-1	15-25	30-45	30-45	15-25	0-5	---	NP

See footnote at end of table.

TABLE 10.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
65, 66, 67, 68, 69--Turnerville	0-46	Silt loam-------	CL-ML, ML	A-4	0	85-100	85-100	85-100	75-90	25-35	5-10
	46-58	Silty clay loam, silt loam.	CL-ML, CL	A-4, A-6	0	85-100	85-100	85-100	85-100	25-40	5-15
	58-80	Silt loam-------	CL-ML, ML	A-4	0	85-100	85-100	85-100	75-90	25-35	5-10
70*:											
Uhl----------	0-13	Loam----------	CL-ML	A-4	0-5	95-100	95-100	85-95	60-75	15-25	5-10
	13-60	Loam, clay loam	CL	A-6	0-5	95-100	95-100	85-95	60-75	20-30	10-15
Roxal----------	0-7	Loam----------	CL-ML, ML	A-4	0	75-100	75-100	70-90	50-70	25-35	5-10
	7-13	Clay loam, loam	CL	A-6	0	80-100	75-100	70-95	60-75	20-35	10-15
	13	Weathered bedrock.	---	---	---	---	---	---	---	---	---
71*:											
Youga----------	0-6	Silty clay loam	ML, SM, CL-ML, SM-SC	A-4, A-5	0-5	75-95	75-90	70-85	60-75	25-45	5-10
	6-15	Clay loam, sandy clay loam.	CL, SC	A-6, A-7	0-5	75-90	75-90	60-75	45-65	30-50	10-25
	15-60	Sandy clay loam, clay loam.	SC	A-2, A-6	0-5	80-100	75-100	40-70	30-50	25-35	10-15
Tineman----------	0-7	Gravelly loam---	GM-GC	A-4	0	50-75	50-75	45-65	35-50	15-25	5-10
	7-15	Gravelly loam---	GM-GC	A-4	0-5	55-75	55-75	50-65	40-50	15-25	5-10
	15-27	Very gravelly sandy loam.	GM	A-1	5-10	30-45	30-45	20-30	10-15	10-20	NP-5
	27-60	Very gravelly sand.	GP	A-1	15-25	30-45	30-45	15-25	0-5	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
1----------	0-26	20-27	0.6-2.0	0.18-0.20	6.6-7.8	Low----------	0.28	5
Adel Variant	26-60	20-27	0.6-2.0	0.14-0.18	6.6-7.8	Low----------	0.43	
2*:								
Aquic Cryoborolls.								
Aquic Cryoboralfs.								
3----------	0-6	10-25	2.0-6.0	0.14-0.18	6.1-6.5	Low----------	0.28	2
Bearmouth	6-15	10-25	2.0-6.0	0.06-0.10	6.6-7.8	Low----------	0.24	
	15-60	0-10	6.0-20.0	0.02-0.04	7.4-7.8	Low----------	0.10	
4*:								
Buffork---------	0-9	10-15	0.6-6.0	0.13-0.15	6.1-7.3	Low----------	0.32	3
	9-15	10-15	0.6-2.0	0.13-0.15	6.1-7.8	Low----------	0.37	
	15-26	20-35	0.6-2.0	0.14-0.16	6.1-7.8	Moderate-----	0.28	
	26	---	---	---	---	----------	----	
Adel----------	0-26	20-27	0.6-2.0	0.16-0.20	6.1-7.8	Low----------	0.28	5
	26-60	20-30	0.6-2.0	0.14-0.20	6.1-7.8	Low----------	0.43	
Perceton--------	0-7	8-16	2.0-6.0	0.07-0.09	5.6-7.3	Low----------	0.10	3
	7-25	20-25	0.6-2.0	0.08-0.11	5.6-7.3	Moderate-----	0.15	
	25-35	8-16	2.0-6.0	0.06-0.08	5.6-7.3	Low----------	0.10	
	35	---	---	---	---	----------	----	
5*:								
Buffork---------	0-9	10-15	0.6-6.0	0.13-0.15	6.1-7.3	Low----------	0.32	3
	9-15	10-15	0.6-2.0	0.13-0.15	6.1-7.8	Low----------	0.37	
	15-26	20-35	0.6-2.0	0.14-0.16	6.1-7.8	Moderate-----	0.28	
	26	---	---	---	---	----------	----	
Tongue River----	0-20	10-20	0.6-2.0	0.15-0.17	5.6-7.3	Low----------	0.37	2
	20-36	20-30	0.6-2.0	0.14-0.16	5.6-7.3	Low----------	0.28	
	36	---	---	---	---	----------	----	
Clayburn--------	0-26	5-15	0.6-2.0	0.09-0.11	6.1-7.8	Low----------	0.20	4
	26-36	25-35	0.6-2.0	0.15-0.17	6.1-7.3	Moderate-----	0.28	
	36-60	5-15	2.0-6.0	0.09-0.11	7.4-7.8	Low----------	0.24	
6*:								
Buffork---------	0-9	10-15	0.6-6.0	0.13-0.15	6.1-7.3	Low----------	0.32	3
	9-15	10-15	0.6-2.0	0.13-0.15	6.1-7.8	Low----------	0.37	
	15-26	20-35	0.6-2.0	0.14-0.16	6.1-7.8	Moderate-----	0.28	
	26	---	---	---	---	----------	----	
Tongue River----	0-20	10-20	0.6-2.0	0.15-0.17	5.6-7.3	Low----------	0.37	2
	20-36	20-30	0.6-2.0	0.14-0.16	5.6-7.3	Low----------	0.28	
	36	---	---	---	---	----------	----	
Clayburn--------	0-26	5-15	0.6-2.0	0.09-0.11	6.1-7.8	Low----------	0.20	4
	26-36	25-35	0.6-2.0	0.15-0.17	6.1-7.3	Moderate-----	0.28	
	36-60	5-15	2.0-6.0	0.09-0.11	7.4-7.8	Low----------	0.24	
7----------	0-4	10-20	0.6-2.0	0.14-0.20	5.6-7.3	Low----------	0.37	3
Charlos	4-28	20-30	0.6-2.0	0.12-0.18	5.6-7.3	Moderate-----	0.32	
	28-60	0-5	>20	0.02-0.04	6.1-7.3	Low----------	0.10	
8----------	0-7	15-25	0.6-2.0	0.14-0.20	5.6-7.3	Low----------	0.37	3
Charlos Variant	7-38	27-35	0.6-2.0	0.18-0.20	5.6-7.3	Low----------	0.32	
	38-60	3-8	>20	0.02-0.04	6.1-7.3	Low----------	0.10	

See footnote at end of table.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
9, 10----------	0-9	15-20	0.6-2.0	0.19-0.21	6.6-7.8	Low----------	0.37	5
Crow Creek	9-14	20-27	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.49	
	14-60	15-25	0.6-2.0	0.19-0.21	7.9-9.0	Low----------	0.49	
11*:								
Crow Creek------	0-9	15-20	0.6-2.0	0.19-0.21	6.6-7.8	Low----------	0.37	5
	9-14	20-27	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.49	
	14-60	15-25	0.6-2.0	0.19-0.21	7.9-9.0	Low----------	0.49	
Starley---------	0-8	15-20	0.6-2.0	0.09-0.12	6.6-8.4	Low----------	0.24	1
	8-15	15-30	0.6-2.0	0.05-0.12	7.9-9.0	Low----------	0.20	
	15	---	---	---	---	----------	----	
Roxal----------	0-7	15-27	0.6-2.0	0.16-0.18	7.4-8.4	Low----------	0.28	2
	7-13	20-35	0.6-2.0	0.15-0.17	7.9-9.0	Low----------	0.32	
	13	---	---	---	---	----------	----	
12*:								
Cryaquolls.								
Cryofibrists.								
13*:								
Cryorthents.								
Cryoborolls.								
14, 15----------	0-5	15-25	0.6-2.0	0.09-0.14	6.6-8.4	Low----------	0.24	3
Greyback	5-13	15-25	2.0-6.0	0.09-0.14	6.6-8.4	Low----------	0.24	
	13-30	10-20	2.0-6.0	0.03-0.09	>7.8	Low----------	0.15	
	30-60	0-8	>6.0	0.03-0.05	>7.8	Low----------	0.10	
16*:								
Greyback--------	0-5	15-25	0.6-2.0	0.09-0.14	6.6-8.4	Low----------	0.24	3
	5-13	15-25	2.0-6.0	0.09-0.14	6.6-8.4	Low----------	0.24	
	13-30	10-20	2.0-6.0	0.03-0.09	>7.8	Low----------	0.15	
	30-60	0-8	>6.0	0.03-0.05	>7.8	Low----------	0.10	
Charlos---------	0-4	10-20	0.6-2.0	0.14-0.20	5.6-7.3	Low----------	0.37	3
	4-28	20-30	0.6-2.0	0.12-0.18	5.6-7.3	Moderate-----	0.32	
	28-60	0-5	>20	0.02-0.04	6.1-7.3	Low----------	0.10	
17*, 18*, 19*, 20*:								
Greyback-------	0-5	15-25	0.6-2.0	0.09-0.14	6.6-8.4	Low----------	0.24	3
	5-13	15-25	2.0-6.0	0.09-0.14	6.6-8.4	Low----------	0.24	
	13-30	10-20	2.0-6.0	0.03-0.09	>7.8	Low----------	0.15	
	30-60	0-8	>6.0	0.03-0.05	>7.8	Low----------	0.10	
Thayne---------	0-6	10-25	0.6-2.0	0.10-0.14	6.6-7.8	Low----------	0.32	5
	6-34	10-25	0.6-2.0	0.10-0.14	7.4-8.4	Low----------	0.32	
	34-60	8-18	0.6-2.0	0.04-0.12	7.9-9.0	Low----------	0.24	
Tetonia---------	0-8	13-17	0.6-2.0	0.19-0.21	6.6-7.8	Low----------	0.37	5
	8-60	12-18	0.6-2.0	0.19-0.21	6.6-9.0	Low----------	0.49	
21*:								
Grobutte---------	0-4	15-25	0.6-2.0	0.09-0.13	7.9-8.4	Low----------	0.28	5
	4-10	15-25	0.6-2.0	0.09-0.13	7.9-8.4	Low----------	0.28	
	10-60	15-20	2.0-6.0	0.03-0.06	7.9-8.4	Low----------	0.10	
Thayne----------	0-6	10-25	0.6-2.0	0.10-0.14	6.6-7.8	Low----------	0.32	5
	6-34	10-25	0.6-2.0	0.10-0.14	7.4-8.4	Low----------	0.32	
	34-60	8-18	0.6-2.0	0.04-0.12	7.9-9.0	Low----------	0.24	

See footnote at end of table.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
21*:								
Greyback	0-5	15-25	0.6-2.0	0.09-0.14	6.6-8.4	Low	0.24	3
	5-13	15-25	2.0-6.0	0.09-0.14	6.6-8.4	Low	0.24	
	13-30	10-20	2.0-6.0	0.03-0.09	>7.8	Low	0.15	
	30-60	0-8	>6.0	0.03-0.05	>7.8	Low	0.10	
22*:								
Hechtman	0-6	8-15	2.0-6.0	0.07-0.09	5.1-6.5	Low	0.20	2
	6-15	8-15	6.0-20	0.02-0.04	5.6-6.5	Low	0.15	
	15	---	---	---	---	---	----	
Rock outcrop.								
23*, 24*:								
Leavitt	0-8	20-25	0.6-2.0	0.19-0.21	6.6-7.8	Low	0.43	5
	8-38	25-35	0.6-2.0	0.19-0.21	6.1-7.8	Moderate	0.32	
	38-52	18-30	0.6-2.0	0.16-0.18	7.9-9.0	Low	0.28	
	52-60	0-5	6.0-20	0.02-0.03	7.9-8.4	Low	0.10	
Youga	0-6	27-33	0.6-2.0	0.10-0.18	6.1-7.8	Low	0.24	5
	6-15	27-35	0.6-2.0	0.12-0.18	6.1-7.8	Moderate	0.20	
	15-60	27-35	0.6-2.0	0.12-0.14	6.1-7.8	Moderate	0.20	
25	0-7	20-25	0.6-2.0	0.16-0.21	6.6-7.8	Low	0.32	5
Leavitt Variant	7-38	27-35	0.6-2.0	0.19-0.21	6.1-7.8	Moderate	0.37	
	38-52	20-27	0.6-2.0	0.16-0.18	7.9-9.0	Low	0.43	
	52-60	0-5	6.0-20	0.02-0.03	7.9-8.4	Low	0.10	
26*:								
Leighcan	0-7	12-20	2.0-6.0	0.06-0.09	4.5-6.0	Low	0.20	5
	7-45	8-18	2.0-6.0	0.06-0.09	4.5-6.0	Low	0.24	
	45-60	8-18	6.0-20	0.03-0.07	4.5-6.0	Low	0.24	
Moran	0-6	5-10	2.0-6.0	0.05-0.07	5.6-6.0	Low	0.20	5
	6-15	5-10	2.0-6.0	0.02-0.05	5.1-6.5	Low	0.15	
	15-60	5-10	2.0-6.0	0.02-0.05	5.6-6.5	Low	0.15	
Walcott	0-8	10-15	2.0-6.0	0.07-0.09	4.5-5.0	Low	0.20	5
	8-60	5-15	2.0-6.0	0.03-0.06	5.1-5.5	Low	0.20	
27*:								
Leighcan	0-7	12-20	2.0-6.0	0.06-0.09	4.5-6.0	Low	0.20	5
	7-45	8-18	2.0-6.0	0.06-0.09	4.5-6.0	Low	0.24	
	45-60	8-18	6.0-20	0.03-0.07	4.5-6.0	Low	0.24	
Rock outcrop.								
Walcott	0-8	10-15	2.0-6.0	0.07-0.09	4.5-5.0	Low	0.20	5
	8-60	5-15	2.0-6.0	0.03-0.06	5.1-5.5	Low	0.20	
28*:								
Midfork	0-10	20-25	0.6-2.0	0.09-0.13	6.6-8.4	Low	0.28	5
	10-60	20-30	0.6-2.0	0.09-0.13	7.4-9.0	Low	0.28	
Spearhead	0-36	15-25	0.6-2.0	0.10-0.13	6.6-7.8	Low	0.28	5
	36-60	12-18	2.0-6.0	0.02-0.04	7.9-8.4	Low	0.20	
Owlcan	0-5	20-27	0.6-2.0	0.16-0.18	5.6-7.3	Low	0.28	5
	5-11	27-35	0.2-0.6	0.19-0.21	5.6-7.3	Moderate	0.32	
	11-16	35-40	0.2-0.6	0.19-0.21	6.1-7.3	Moderate	0.32	
	16-23	35-40	0.2-0.6	0.10-0.15	6.1-7.3	Moderate	0.28	
	23-60	27-35	0.2-0.6	0.05-0.10	7.4-8.4	Moderate	0.20	
29	0-10	10-15	2.0-6.0	0.11-0.14	6.1-7.8	Low	----	---
Newfork	10-16	5-15	2.0-6.0	0.11-0.14	6.1-7.8	Low	----	
	16-60	0-3	>20	0.03-0.04	6.1-7.8	Low	----	

See footnote at end of table.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
30*:								
Perceton	0-7	8-16	2.0-6.0	0.07-0.09	5.6-7.3	Low	0.10	3
	7-25	20-25	0.6-2.0	0.08-0.11	5.6-7.3	Moderate	0.15	
	25-35	8-16	2.0-6.0	0.06-0.08	5.6-7.3	Low	0.10	
	35	---	---	---	---	---	---	
Buffork	0-9	10-15	0.6-6.0	0.13-0.15	6.1-7.3	Low	0.32	3
	9-15	10-15	0.6-2.0	0.13-0.15	6.1-7.8	Low	0.37	
	15-26	20-35	0.6-2.0	0.14-0.16	6.1-7.8	Moderate	0.28	
	26	---	---	---	---	---	---	
31*, 32*, 33*:								
Robana	0-7	20-27	0.6-2.0	0.19-0.21	6.1-7.8	Low	0.37	5
	7-50	18-35	0.6-2.0	0.19-0.21	6.1-7.8	Moderate	0.43	
	50-60	15-25	0.6-2.0	0.19-0.21	6.1-8.4	Low	0.49	
Willow Creek	0-7	15-25	0.6-2.0	0.19-0.21	6.1-7.8	Low	0.32	5
	7-29	18-35	0.6-2.0	0.19-0.21	6.1-7.8	Moderate	0.37	
	29-60	15-25	0.6-2.0	0.19-0.21	7.9-9.0	Low	0.49	
34*.								
Rock outcrop*								
35*:								
Rock outcrop.								
Sheege	0-12	8-18	0.6-2.0	0.04-0.07	7.4-8.4	Low	0.20	---
	12	---	---	---	---	---	---	
Starman	0-4	15-23	0.6-2.0	0.09-0.11	7.4-8.4	Low	0.24	1
	4-8	20-35	0.6-2.0	0.09-0.11	7.9-9.0	Low	0.28	
	8	---	---	---	---	---	---	
36*:								
Rock outcrop.								
Teewinot	0-15	5-15	2.0-6.0	0.07-0.09	5.6-6.0	Low	0.20	2
	15	---	---	---	---	---	---	
Moran	0-6	5-10	2.0-6.0	0.05-0.07	5.6-6.0	Low	0.20	5
	6-15	5-10	2.0-6.0	0.02-0.05	5.1-6.5	Low	0.15	
	15-60	5-10	2.0-6.0	0.02-0.05	5.6-6.5	Low	0.15	
37*:								
Roxal	0-13	15-27	0.6-2.0	0.16-0.18	7.4-8.4	Low	0.28	2
	13	---	---	---	---	---	---	
Starley	0-8	15-20	0.6-2.0	0.09-0.12	6.6-8.4	Low	0.24	1
	8-15	15-30	0.6-2.0	0.05-0.12	7.9-9.0	Low	0.20	
	15	---	---	---	---	---	---	
Crow Creek	0-9	15-20	0.6-2.0	0.19-0.21	6.6-7.8	Low	0.37	5
	9-14	20-27	0.6-2.0	0.19-0.21	7.4-8.4	Low	0.49	
	14-60	15-25	0.6-2.0	0.19-0.21	7.9-9.0	Low	0.49	
38*.								
Rubble land*								
39*:								
Rubble land.								
Midfork	0-10	20-25	0.6-2.0	0.09-0.13	6.6-8.4	Low	0.28	5
	10-60	20-30	0.6-2.0	0.09-0.13	7.4-9.0	Low	0.28	

See footnote at end of table.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
39*:								
Starman	0-4	15-23	0.6-2.0	0.09-0.11	7.4-8.4	Low	0.24	1
	4-8	20-35	0.6-2.0	0.09-0.11	7.9-9.0	Low	0.28	
	8	---	---	---	---		----	
40*:								
Rubble land.								
Walcott	0-8	10-15	2.0-6.0	0.07-0.09	4.5-5.0	Low	0.20	5
	8-60	5-15	2.0-6.0	0.03-0.06	5.1-5.5	Low	0.20	
Leighcan	0-7	12-20	2.0-6.0	0.06-0.09	4.5-6.0	Low	0.20	5
	7-45	8-18	2.0-6.0	0.06-0.09	4.5-6.0	Low	0.24	
	45-60	8-18	6.0-20	0.03-0.07	4.5-6.0	Low	0.24	
41*, 42*:								
Sebud	0-11	15-27	0.6-2.0	0.08-0.10	6.6-7.3	Low	0.32	5
	11-17	20-35	0.6-2.0	0.06-0.09	6.6-7.8	Moderate	0.32	
	17-60	15-35	0.6-2.0	0.05-0.07	6.1-7.8	Moderate	0.28	
Sebud	0-11	15-20	0.6-2.0	0.06-0.09	6.6-7.8	Low	0.20	5
	11-17	20-35	0.6-2.0	0.06-0.09	6.6-7.8	Moderate	0.32	
	17-60	15-35	0.6-2.0	0.05-0.07	6.1-7.8	Moderate	0.28	
43*:								
Sebud	0-11	15-20	0.6-2.0	0.06-0.09	6.6-7.8	Low	0.20	5
	11-17	20-35	0.6-2.0	0.06-0.09	6.6-7.8	Moderate	0.32	
	17-60	15-35	0.6-2.0	0.05-0.07	6.1-7.8	Moderate	0.28	
Sebud	0-11	15-27	0.6-2.0	0.08-0.10	6.6-7.3	Low	0.32	5
	11-17	20-35	0.6-2.0	0.06-0.09	6.6-7.8	Moderate	0.32	
	17-60	15-35	0.6-2.0	0.05-0.07	6.1-7.8	Moderate	0.28	
44*:								
Slocum	0-8	15-27	0.6-2.0	0.14-0.20	6.6-7.3	Low	0.37	5
	8-32	27-35	0.6-2.0	0.12-0.18	7.4-8.4	Moderate	0.32	
	32-60	10-20	2.0-6.0	0.14-0.20	7.4-8.4	Low	0.32	
Silas	0-26	15-25	0.6-2.0	0.14-0.16	6.6-8.4	Low	0.32	5
	26-60	18-35	0.6-2.0	0.14-0.16	6.6-8.4	Low	0.32	
45*:								
Starley	0-8	15-20	0.6-2.0	0.09-0.12	6.6-8.4	Low	0.24	1
	8-15	15-30	0.6-2.0	0.05-0.12	7.9-9.0	Low	0.20	
	15	---	---	---	---		----	
Tetonia	0-8	13-17	0.6-2.0	0.19-0.21	6.6-7.8	Low	0.37	5
	8-60	12-18	0.6-2.0	0.19-0.21	6.6-9.0	Low	0.49	
Roxal	0-7	15-27	0.6-2.0	0.16-0.18	7.4-8.4	Low	0.28	2
	7-13	20-35	0.6-2.0	0.15-0.17	7.9-9.0	Low	0.32	
	13	---	---	---	---		----	
46*:								
Starman	0-4	15-23	0.6-2.0	0.09-0.11	7.4-8.4	Low	0.24	1
	4-8	20-35	0.6-2.0	0.09-0.11	7.9-9.0	Low	0.28	
	8	---	---	---	---		----	
Owlcan	0-5	20-27	0.6-2.0	0.16-0.18	5.6-7.3	Low	0.28	5
	5-11	27-35	0.2-0.6	0.19-0.21	5.6-7.3	Moderate	0.32	
	11-16	35-40	0.2-0.6	0.19-0.21	6.1-7.3	Moderate	0.32	
	16-23	35-40	0.2-0.6	0.10-0.15	6.1-7.3	Moderate	0.28	
	23-60	27-35	0.2-0.6	0.05-0.10	7.4-8.4	Moderate	0.20	
Midfork	0-10	20-25	0.6-2.0	0.09-0.13	6.6-8.4	Low	0.28	5
	10-60	20-25	0.6-2.0	0.09-0.13	7.4-9.0	Low	0.28	

See footnote at end of table.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
47*:								
Taglake	0-4	12-18	2.0-6.0	0.06-0.08	5.6-6.5	Low	0.15	3
	4-60	6-12	2.0-6.0	0.05-0.07	5.6-6.5	Low	0.10	
Sebud	0-11	15-20	0.6-2.0	0.06-0.09	6.6-7.8	Low	0.20	5
	11-17	20-35	0.6-2.0	0.06-0.09	6.6-7.8	Moderate	0.32	
	17-60	15-35	0.6-2.0	0.05-0.07	6.1-7.8	Moderate	0.28	
48*:								
Taglake	0-4	12-18	2.0-6.0	0.06-0.08	5.6-6.5	Low	0.15	3
	4-60	6-12	2.0-6.0	0.05-0.07	5.6-6.5	Low	0.10	
Sebud	0-11	15-20	0.6-2.0	0.06-0.09	6.6-7.8	Low	0.20	5
	11-17	20-35	0.6-2.0	0.06-0.09	6.6-7.8	Moderate	0.32	
	17-60	15-35	0.6-2.0	0.05-0.07	6.1-7.8	Moderate	0.28	
49*, 50*, 51*:								
Tetonia	0-8	13-17	0.6-2.0	0.19-0.21	6.6-7.8	Low	0.37	5
	8-60	12-18	0.6-2.0	0.19-0.21	6.6-9.0	Low	0.49	
Lantonia	0-80	10-18	0.6-2.0	0.18-0.21	6.1-7.8	Low	0.32	5
52*, 53*:								
Tetonia	0-8	13-17	0.6-2.0	0.19-0.21	6.6-7.8	Low	0.37	5
	8-60	12-18	0.6-2.0	0.19-0.21	6.6-9.0	Low	0.49	
Lantonia	0-80	10-18	0.6-2.0	0.18-0.21	6.1-7.8	Low	0.32	5
Crow Creek	0-9	15-20	0.6-2.0	0.19-0.21	6.6-7.8	Low	0.37	5
	9-14	20-27	0.6-2.0	0.19-0.21	7.4-8.4	Low	0.49	
	14-60	15-25	0.6-2.0	0.19-0.21	7.9-9.0	Low	0.49	
54*:								
Tetonia	0-8	13-17	0.6-2.0	0.19-0.21	6.6-7.8	Low	0.37	5
	8-60	12-18	0.6-2.0	0.19-0.21	6.6-9.0	Low	0.49	
Tineman	0-7	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low	0.28	3
	7-15	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low	0.24	
	15-27	8-18	2.0-6.0	0.02-0.05	6.1-7.3	Low	0.15	
	27-60	0-2	>6.0	0.02-0.04	6.1-7.3	Low	0.10	
Greyback	0-5	15-25	0.6-2.0	0.09-0.14	6.6-8.4	Low	0.24	3
	5-13	15-25	2.0-6.0	0.09-0.14	6.6-8.4	Low	0.24	
	13-30	10-20	2.0-6.0	0.03-0.09	>7.8	Low	0.15	
	30-60	0-8	>6.0	0.03-0.05	>7.8	Low	0.10	
55	0-17	15-25	0.6-2.0	0.10-0.13	6.6-7.8	Low	----	---
Tetonville	17-60	2-4	>6.0	0.02-0.04	7.4-8.4	Low	----	
56*:								
Tetonville	0-8	10-20	2.0-6.0	0.02-0.06	6.6-7.8	Low	----	---
	8-60	2-4	>6.0	0.02-0.04	7.4-8.4	Low	----	
Tetonville	0-8	10-20	2.0-6.0	0.13-0.15	6.6-7.8	Low	----	---
	8-17	10-20	2.0-6.0	0.13-0.15	7.4-8.4	Low	----	
	17-60	2-4	>6.0	0.02-0.04	7.4-8.4	Low	----	
57*:								
Tetonville	0-8	10-20	2.0-6.0	0.13-0.15	6.6-7.8	Low	----	---
	8-17	10-20	2.0-6.0	0.13-0.15	7.4-8.4	Low	----	
	17-60	2-4	>6.0	0.02-0.04	7.4-8.4	Low	----	
Riverwash.								

See footnote at end of table.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
58*:								
Tetonville------	0-8	10-20	2.0-6.0	0.13-0.15	6.6-7.8	Low----------	----	---
	8-17	10-20	2.0-6.0	0.13-0.15	7.4-8.4	Low----------	----	
	17-60	2-4	>6.0	0.02-0.04	7.4-8.4	Low----------	----	
Wilsonville-----	0-7	6-12	2.0-6.0	0.13-0.15	6.6-7.8	Low----------	0.28	5
	7-29	6-12	2.0-6.0	0.13-0.16	7.4-8.4	Low----------	0.32	
	29-54	5-10	6.0-20	0.05-0.07	7.4-7.8	Low----------	0.24	
	54-60	2-6	6.0-20	0.02-0.04	7.4-8.4	Low----------	0.15	
59*:								
Thayne----------	0-6	10-25	0.6-2.0	0.10-0.14	6.6-7.8	Low----------	0.32	5
	6-34	10-25	0.6-2.0	0.10-0.14	7.4-8.4	Low----------	0.32	
	34-60	8-18	0.6-2.0	0.04-0.12	7.9-9.0	Low----------	0.24	
Adel----------	0-26	20-27	0.6-2.0	0.16-0.20	6.1-7.8	Low----------	0.28	5
	26-60	20-30	0.6-2.0	0.14-0.20	6.1-7.8	Low----------	0.43	
Greyback--------	0-5	15-25	0.6-2.0	0.09-0.14	6.6-8.4	Low----------	0.24	3
	5-13	15-25	2.0-6.0	0.09-0.14	6.6-8.4	Low----------	0.24	
	13-30	10-20	2.0-6.0	0.03-0.09	>7.8	Low----------	0.15	
	30-60	0-8	>6.0	0.03-0.05	>7.8	Low----------	0.10	
60, 61----------	0-7	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.28	3
Tineman	7-15	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.24	
	15-27	8-18	2.0-6.0	0.02-0.05	6.1-7.3	Low----------	0.15	
	27-60	0-2	>6.0	0.02-0.04	6.1-7.3	Low----------	0.10	
62*, 63*:								
Tineman---------	0-7	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.28	3
	7-15	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.24	
	15-27	8-18	2.0-6.0	0.02-0.05	6.1-7.3	Low----------	0.15	
	27-60	0-2	>6.0	0.02-0.04	6.1-7.3	Low----------	0.10	
Bearmouth-------	0-6	10-25	2.0-6.0	0.14-0.18	6.1-6.5	Low----------	0.28	2
	6-15	10-25	2.0-6.0	0.06-0.10	6.6-7.8	Low----------	0.24	
	15-60	0-10	6.0-20.0	0.02-0.04	7.4-7.8	Low----------	0.10	
64*:								
Tineman---------	0-7	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.28	3
	7-15	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.24	
	15-27	8-18	2.0-6.0	0.02-0.05	6.1-7.3	Low----------	0.15	
	27-60	0-2	>6.0	0.02-0.04	6.1-7.3	Low----------	0.10	
Tineman---------	0-7	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.28	3
	7-15	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.24	
	15-27	8-18	2.0-6.0	0.02-0.05	6.1-7.3	Low----------	0.15	
	27-60	0-2	>6.0	0.02-0.04	6.1-7.3	Low----------	0.10	
65, 66, 67, 68, 69----------	0-46	18-27	0.6-2.0	0.19-0.21	6.1-7.3	Low----------	0.49	5
Turnerville	46-58	18-35	0.6-2.0	0.19-0.21	6.1-7.3	Moderate-----	0.49	
	58-80	15-25	0.6-2.0	0.19-0.21	6.1-7.3	Low----------	0.49	
70*:								
Uhl----------	0-13	15-25	0.6-2.0	0.16-0.18	6.1-7.3	Low----------	0.32	5
	13-60	18-35	0.6-2.0	0.16-0.18	6.6-7.8	Moderate-----	0.37	
Roxal----------	0-7	15-27	0.6-2.0	0.16-0.18	7.4-8.4	Low----------	0.28	2
	7-13	20-35	0.6-2.0	0.15-0.17	7.9-9.0	Low----------	0.32	
	13	---	---	---	---	----------	----	
71*:								
Youga----------	0-6	15-33	0.6-2.0	0.10-0.18	6.1-7.8	Low----------	0.24	5
	6-15	18-35	0.6-2.0	0.12-0.18	6.1-7.8	Moderate-----	0.20	
	15-60	18-35	0.6-2.0	0.12-0.14	6.1-7.8	Moderate-----	0.20	

See footnote at end of table.

TABLE 11.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
							K	T
	In	Pct	In/hr	In/in	pH			
71*:								
Tineman---------	0-7	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.28	3
	7-15	15-25	0.6-2.0	0.09-0.13	6.1-7.3	Low----------	0.24	
	15-27	8-18	2.0-6.0	0.02-0.05	6.1-7.3	Low----------	0.15	
	27-60	0-2	>6.0	0.02-0.04	6.1-7.3	Low----------	0.10	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
1---- Adel Variant	B	None	---	---	1.0-3.0	Apparent	May-Sep	>60	---	High	High	Low.
2*: Aquic Cryoborolls.												
Aquic Cryoboralfs.												
3---- Bearmouth	A	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
4*:												
Buffork	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	High	Low.
Adel	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Perceton	B	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	High	Low.
5*:												
Buffork	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	High	Low.
Tongue River	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	Moderate	Low.
Clayburn	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
6*:												
Buffork	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	High	Low.
Tongue River	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	Moderate	Low.
Clayburn	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
7---- Charlos	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
8---- Charlos Variant	C	Rare	---	---	1.0-3.0	Apparent	Apr-Sep	>60	---	Moderate	High	Moderate.
9, 10---- Crow Creek	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
11*:												
Crow Creek	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Starley	D	None	---	---	>6.0	---	---	10-20	Hard	Low	High	Low.
Roxal	D	None	---	---	>6.0	---	---	10-20	Rippable	Moderate	High	Low.

See footnote at end of table.

TABLE 12.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
12*:												
Cryaquolls.												
Cryofibrists.												
13*:												
Cryorthents.												
Cryoborolls.												
14, 15---------- Greyback	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
16*:												
Greyback---------	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
Charlos----------	C	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
17*, 18*, 19*, 20*:												
Greyback---------	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
Thayne----------	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
Tetonia---------	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Low.
21*:												
Grobutte---------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Thayne----------	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
Greyback---------	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.
22*:												
Hechtman---------	D	None---------	---	---	>6.0	---	---	10-20	Hard	Moderate	High-----	Low.
Rock outcrop.												
23*, 24*:												
Leavitt----------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Youga------------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
25--------------- Leavitt Variant	C	None---------	---	---	2.0-3.0	Apparent	May-Aug	>60	---	Moderate	High-----	Low.
26*:												
Leighcan---------	B	None---------	---	---	>6.0	---	---	>60	---	High-----	High-----	Low.
Moran------------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Walcott----------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.

See footnote at end of table.

TABLE 12.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
27*:												
Leighcan	B	None	---	---	>6.0	---	---	>60	---	High	High	Low.
Rock outcrop.												
Walcott	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
28*:												
Midfork	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Spearhead	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Owlcan	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
29 Newfork	D	Occasional	Brief	Apr-Jul	0.5-4.0	Apparent	Apr-Jul	>60	---	Low	High	Low.
30*:												
Perceton	B	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	High	Low.
Buffork	C	None	---	---	>6.0	---	---	20-40	Rippable	Moderate	High	Low.
31*, 32*, 33*:												
Robana	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Willow Creek	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
34*. Rock outcrop*												
35*:												
Rock outcrop.												
Sheege	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	Moderate	Low.
Starman	D	None	---	---	>6.0	---	---	3-10	Hard	Moderate	High	Low.
36*:												
Rock outcrop.												
Teewinot	D	None	---	---	>6.0	---	---	10-20	Hard	Moderate	High	Low.
Moran	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
37*:												
Roxal	D	None	---	---	>6.0	---	---	10-20	Rippable	Moderate	High	Low.
Starley	D	None	---	---	>6.0	---	---	10-20	Hard	Low	High	Low.
Crow Creek	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
38*. Rubble land*												

See footnote at end of table.

TABLE 12.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
39*:												
Rubble land.												
Midfork	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Starman	D	None	---	---	>6.0	---	---	3-10	Hard	Moderate	High	Low.
40*:												
Rubble land.												
Walcott	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Leighcan	B	None	---	---	>6.0	---	---	>60	---	High	High	Low.
41*, 42*, 43*:												
Sebud	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Sebud	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
44*:												
Slocum	B	Occasional	Brief to very long.	Apr-Jun	1.5-3.5	Apparent	Apr-Aug	>60	---	High	High	Low.
Silas	B	Rare	---	---	4.0-6.0	Apparent	Apr-Jul	>60	---	Moderate	High	Low.
45*:												
Starley	D	None	---	---	>6.0	---	---	10-20	Hard	Low	High	Low.
Tetonia	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Low.
Roxal	D	None	---	---	>6.0	---	---	10-20	Rippable	Moderate	High	Low.
46*:												
Starman	D	None	---	---	>6.0	---	---	3-10	Hard	Moderate	High	Low.
Owlcan	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Midfork	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
47*, 48*:												
Taglake	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Sebud	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
49*, 50*, 51*:												
Tetonia	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Low.
Lantonia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
52*, 53*:												
Tetonia	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Low.
Lantonia	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.

See footnote at end of table.

TABLE 12.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
52*, 53*: Crow Creek	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
54*: Tetonia	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Low.
Tineman	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
Greyback	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
55--- Tetonville	C	Occasional	Brief to long.	May-Jun	1.0-3.0	Apparent	May-Jul	>60	---	Low	High	Low.
56*: Tetonville	C	Occasional	Brief to long.	May-Jun	1.0-3.0	Apparent	May-Jul	>60	---	Low	High	Low.
Tetonville	C	Occasional	Brief to long.	May-Jun	1.0-3.0	Apparent	May-Jul	>60	---	Low	High	Low.
57*: Tetonville	C	Occasional	Brief to long.	May-Jun	1.0-3.0	Apparent	May-Jul	>60	---	Low	High	Low.
Riverwash.												
58*: Tetonville	C	Occasional	Brief to long.	May-Jun	1.0-3.0	Apparent	May-Jul	>60	---	Low	High	Low.
Wilsonville	C	Rare	Brief	May-Jun	1.0-3.0	Apparent	May-Jul	>60	---	Moderate	High	Low.
59*: Thayne	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
Adel	B	None	---	---	>6.0	---	---	>60	---	Moderate	High	Low.
Greyback	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
60--- Tineman	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
61--- Tineman	C	None	---	---	3.0-4.0	Apparent	May-Jul	>60	---	Low	High	Low.
62*, 63*: Tineman	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
Bearmouth	A	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
64*: Tineman	B	None	---	---	>6.0	---	---	>60	---	Low	High	Low.
Tineman	C	None	---	---	3.0-4.0	Apparent	May-Jul	>60	---	Low	High	Low.

See footnote at end of table.

TABLE 12.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
65, 66, 67, 68, 69---------- Turnerville	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
70*: Uhl----------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Roxal----------	D	None---------	---	---	>6.0	---	---	10-20	Rippable	Moderate	High-----	Low.
71*: Youga----------	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Low.
Tineman----------	B	None---------	---	---	>6.0	---	---	>60	---	Low------	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adel	Fine-loamy, mixed Pachic Cryoborolls
Adel Variant	Fine-loamy, mixed Pachic Cryoborolls
Bearmouth	Sandy-skeletal, mixed Typic Cryoborolls
Buffork	Fine-loamy, mixed Argic Cryoborolls
Charlos	Fine-loamy over sandy or sandy-skeletal, mixed Argic Cryoborolls
Charlos Variant	Fine-loamy over sandy or sandy-skeletal, mixed Argic Cryoborolls
Clayburn	Fine-loamy, mixed Argic Pachic Cryoborolls
Crow Creek	Coarse-silty, mixed Typic Cryoborolls
Greyback	Loamy-skeletal, mixed Typic Cryoborolls
Grobutte	Loamy-skeletal, mixed (calcareous), frigid Ustic Torriorthents
Hechtman	Loamy-skeletal, mixed Lithic Cryochrepts
Lantonia	Coarse-silty, mixed Pachic Cryoborolls
Leavitt	Fine-loamy, mixed Argic Cryoborolls
Leavitt Variant	Fine-loamy, mixed Argic Cryoborolls
Leighcan	Loamy-skeletal, mixed Dystric Cryochrepts
Midfork	Loamy-skeletal, mixed Typic Cryoborolls
Moran	Loamy-skeletal, mixed Typic Cryumbrepts
Newfork	Sandy-skeletal, mixed Typic Cryaquolls
Owlcan	Fine, montmorillonitic Typic Cryoboralfs
Perceton	Fine-loamy, mixed Typic Cryoboralfs
Robana	Fine-silty, mixed Argic Pachic Cryoborolls
Roxal	Loamy, mixed (calcareous), shallow Typic Cryorthents
Sebud	Loamy-skeletal, mixed Typic Cryoborolls
Sheege	Loamy-skeletal, carbonatic Cryic Lithic Rendolls
Silas	Fine-loamy, mixed Cumulic Cryoborolls
Slocum	Fine-loamy, mixed Aquic Cryoborolls
Spearhead	Loamy-skeletal, mixed Pachic Cryoborolls
Starley	Loamy-skeletal, mixed Lithic Cryoborolls
Starman	Loamy-skeletal, mixed (calcareous) Lithic Cryorthents
Taglake	Loamy-skeletal, mixed Typic Cryochrepts
Teewinot	Loamy-skeletal, mixed Lithic Cryumbrepts
Tetonia	Coarse-silty, mixed Calcic Pachic Cryoborolls
Tetonville	Sandy-skeletal, mixed Mollic Cryofluvents
Thayne	Fine-loamy, mixed Typic Cryoborolls
Tineman	Loamy-skeletal, mixed Typic Cryoborolls
Tongue River	Fine-loamy, mixed Typic Cryoboralfs
Turnerville	Fine-silty, mixed Typic Cryoboralfs
Uhl	Fine-loamy, mixed Typic Cryoborolls
Walcott	Loamy-skeletal, mixed Entic Cryumbrepts
Willow Creek	Fine-silty, mixed Argic Cryoborolls
Wilsonville	Coarse-loamy, mixed, nonacid Mollic Cryofluvents
Youga	Fine-loamy, mixed Argic Cryoborolls

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