United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station; State of Alaska Department of Natural Resources; and the Alaska Soil and Water Conservation District

Soil Survey of Kantishna Area, Alaska

How To Use This Soil Survey

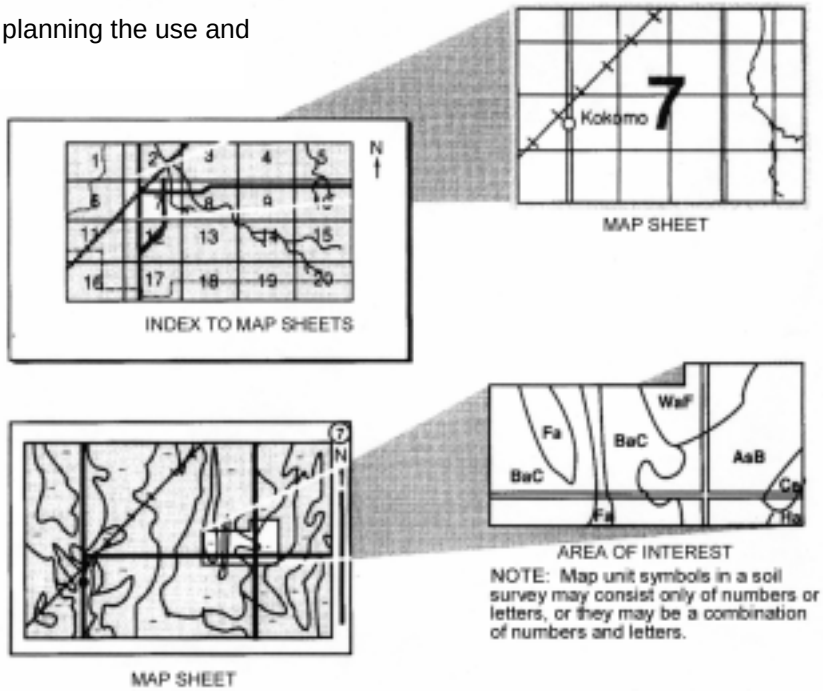
Detailed Soil Maps

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

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

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

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



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

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1996. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This survey was made cooperatively by the Natural Resources Conservation Service, the University of Alaska Fairbanks Agricultural and Forestry Experiment Station, and the State of Alaska Department of Natural Resources. The survey is part of the technical assistance furnished through the Alaska 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.

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Cover: A typical landscape in the Kantishna area. Iksgiza and Nenana soils are on dunes, on plains, and in depressions in the foreground. Typic Cryaquepts, Typic Histoturbels, and Terric Hemistels are on the flood plain in the middle background.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web.

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Foreword

This soil survey was conducted by the Natural Resources Conservation Service, an agency of the United States Department of Agriculture. The survey is part of the National Cooperative Soil Survey and, as such, was sponsored by Federal and State agencies and by the Alaska Soil and Water Conservation District.

This soil survey contains information that can be used in land planning in the Kantishna area, Alaska. 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 anticipated impact of selected land uses on the environment.

This soil survey is designed for many different users. Agronomists and foresters can use it to evaluate the potential of the soil and the management needed for small-scale vegetable production and sustainable timber harvest. Planners, community officials, tribal leaders, engineers, and others can use the survey to plan land use, select sites for construction, and locate facilities such as solid waste disposal sites. Conservationists, teachers, students, and specialists in recreation, streambank erosion and soil erosion, wildlife, timber, water resources, and solid waste disposal 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 or to permafrost. Some are too unstable to be used as a foundation for buildings or roads. Wet soils are poorly suited to use for waste treatment systems. A high water table makes a soil poorly suited to basements or underground installations.

Many soil properties that affect land use are described in this soil survey. 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. The Natural Resources Conservation Service, Alaska Soil and Water Conservation District, and Alaska Cooperative Extension would be pleased to help users better understand uses and specific interpretations of the Kantishna Area Soil Survey. Please feel free to contact any of these Alaska “conservation partners.”

It is our desire that this soil survey serve as one more tool that can be applied to help us retain the beauty, healthy environment, and sustainable use of natural resources in the great state of Alaska.

Charles W. Bell
State Conservationist
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Location of the Kantishna area, in Alaska.

Soil Survey of Kantishna Area, Alaska

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United States Department of Agriculture, Natural Resources Conservation Service
In cooperation with
the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station; the State of Alaska, Department of Natural Resources; and the Alaska Soil and Water Conservation District

General Nature of the Survey Area

The survey area is in Interior Alaska, approximately 100 miles (160 km) west of Fairbanks. The soil survey area is about 485,087 acres (196,460 ha) in size and extends from the Kantishna River west to the Cosna River, and from the Tanana River south for approximately 20 to 30 miles (32 to 48 km). At present, there is no road access to the survey area, and there are no permanent settlements.

The survey area is mainly on a large alluvial plain that is covered by wind-deposited sand and silt. The sand formed into large dunes that are covered by a layer of silt and are stabilized by vegetation. Several bedrock hills stand above the alluvial plain. These hills are mantled with wind-deposited sand and silt. The lowlands near the bedrock hills have an irregular surface as a result of soil subsidence following the thawing of large buried ice masses.

The drier soils in the survey area support forests of aspen, paper birch, and white spruce. Wet soils with permafrost generally support stands of black spruce, mosses, sedges, and low shrubs.

Permafrost underlies much of the survey area. Permafrost is most common in low, wet areas; in areas of finer-grained, silty soils; on north-facing slopes; and in places where a thick mat of organic matter and mosses insulates the soil.

The Kantishna area was included in the 1979 reconnaissance soil survey, the *Exploratory Soil Survey of Alaska* (Rieger and others 1979). This soil survey updates the information provided in the 1979 survey, provides more detailed information on larger scale maps and includes additional interpretations for use and management of the soils.

The descriptions, names, and delineations of soils in this survey may not fully agree with those of soils in surveys for adjacent areas. Any differences are the result of better knowledge of the soils, modifications in soil classification concepts, or different mapping intensities.

History

The lower Tanana River basin has been inhabited for about 9,000 years by Athabaskan Indians. These people hunted, fished, and gathered edible plants. Various hunting and fishing camps were occupied over the course of a year to best use the local resources. Following contact with outside traders in the mid 1800s, the Athabaskans came to

rely, in part, on non-native goods. Fur trapping for trade and the acquisition of firearms caused changes in the traditional subsistence lifestyle (Thorson 1986).

European settlement of central Alaska began in the 1860's with the navigation of the Yukon River between the trading posts at Nulato and Fort Yukon (Cochrane 1982). Settlement in the lower Tanana River region increased after the discovery of gold at Tofty and Eureka around the year 1900. Land was homesteaded and a telegraph station was built in the Manley Hot Springs area. By 1907, a post office had been established, and by 1915, about 60 acres (24 ha) was under cultivation in the Manley Hot Springs area (Davis 1982). The population decreased rapidly after 1913 as placer mining declined.

Today, residents of the lower Tanana region combine subsistence hunting, fishing, and gathering with commercial activities. Big game hunting, sport fishing, and tourism attract visitors to the region.

There are no permanent settlements, roads, or year-round trails in the survey area. Access is by boat, snowmobile, or aircraft. Most land in the survey area is owned and managed by the State of Alaska. Private lands include federal homesteads (mainly along the western edge of the survey area) and small remote floatplane-accessible parcels on lakes.

Physiography and Geology

The survey area includes an alluvial plain mantled by eolian sand and silt; active flood plains incised into the alluvial plain; and bedrock-cored hills mantled by eolian sediments. The alluvial plain is composed mainly of sediments washed northward from the north slope of the Alaska Range. Deposition of the alluvium forced the Tanana River northward against the Yukon-Tanana Upland (Péwé 1975). The alluvium buries a fairly rugged topography, the hilltops of which now form the bedrock-cored hills and low mountains, such as Mooseheart Mountain. The bedrock-cored hills are composed of granite and other igneous rocks, schist, and sandstone.

The alluvium is buried by a thick mantle of eolian sand that was deposited in dunes during Illinoian or Wisconsin time (10,000 to 500,000 years ago) (Collins 1985; Péwé 1975). The source of the sand is believed to be the flood plains along the Tanana River and its southern tributaries. The dunes are part of the largest area of stabilized sand dunes in Alaska (Collins 1985). They have a local relief of 6 to 200 feet (2 to 60 m) and are formed into parabolic, longitudinal, transverse, and rosette patterns. The orientation of the dunes indicates a prevailing wind from the northeast at the time of deposition.

Most of the survey area is blanketed with a mantle of silty loess. The dominant source of the loess is the unvegetated flood plains of the Tanana and Kantishna Rivers. The loess is many feet thick in the eastern part of the survey area, near to the source areas for the loess. The loess thins westward, away from the source. The bedrock hills have a thin loess mantle on their upper part that becomes thicker in downslope areas. Hills near the dune field typically have a layer of eolian sand under the loess.

Thick loess and silty, colluvial sediments are also found in the western part of the survey area, west of the sand dunes. Loess deposition probably occurred for a prolonged period in this area during the Pleistocene glaciations, resulting in burial of large ground-ice masses. Melting of these ice masses in some areas caused subsidence and extremely irregular topography.

The survey area drains into the Tanana River via the Kantishna, Cosna, and Zitziana Rivers. The source of the Kantishna River is glaciers in the Alaska Range; the Cosna River arises in the loess-blanketed hills north of the Alaska Range, and the Zitziana River arises within the dune field. There are a few lakes in depressions between dunes, as well as, numerous small ponds that formed by the thawing of buried ice masses.

Climate

Summers in the Kantishna area are short and moderately warm, and daylight lasts up to 21 hours a day. Most precipitation falls during the growing season and is adequate for crops adapted to the temperature and duration of the season. Winters are long and cold, with few hours of daylight and a continuous snow cover.

Table 1 gives data on temperature and precipitation recorded during the period 1949-1990at Manley Hot Springs, Alaska, which is approximately 10 miles (14 km) north of the survey area. In winter (November through March), the average temperature is -4 degrees F (-20 ºC) and the

average daily minimum temperature is -14 degrees F (-26 ºC). In summer (June through August), the average temperature is 56 degrees F (14 ºC) and the average daily maximum temperature is 69 degrees F (21 ºC).

Growing degree days, shown in table 1, are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day during the growing season exceeds a base temperature of 40 degrees F (4.4 ºC). The growing degree days in the survey area are sufficient for cool- and short-season adapted crops such as barley, potatoes, and cabbage.

The frost-free season at Manley Hot Springs is quite short, and frosts may occur in June or August (tables 2 and 3). Higher elevations in the Kantishna area have a longer frost-free season than Manley Hot Springs, while low-lying areas have a frost-free season as short or shorter than Manley Hot Springs. The length of the frost-free season varies greatly from year to year.

The average total annual precipitation at Manley Hot Springs is about 15 inches (37 cm). Of this total, about ten inches (25 cm), or 67 percent, usually falls in May through September, which is the growing season for most crops. During many years, a lack of precipitation in May and June results in a soil moisture deficit during the period of plant emergence.

Average snow depth in late-winter (April 1) for the period 1980-1989 at the Totchaket snow survey site, which is 15 miles (25 km) east of the survey area, is 20 inches (50 cm). The average quantity of liquid water stored in the snowpack at this time is 3.6 inches (9 cm). Snow covers the ground from mid-October through early May.

Permafrost

Much of the Kantishna area is underlain by permafrost (perennially frozen ground). Permafrost is a major factor affecting land use. During the summer, water perches above the impermeable permafrost and the soil is usually saturated.

The depth at which permafrost occurs varies widely and is affected by slope aspect, drainage, soil texture and the thickness of the organic surface soil horizons. Permafrost is more widespread on north-facing slopes and in level areas than on south-facing slopes, because the south-facing slopes receive more solar radiation. On wet toeslopes and depressions, permafrost often occurs within 1 foot (30 cm) of the mineral soil surface. Permafrost is more widespread and occurs nearer to the surface in more poorly drained, silty materials than in well drained, sandy and gravelly materials. Permafrost is favored by a thick, insulating surface cover of moss and other organic matter.

Ground ice occurs in permafrost as pore ice, segregated ice lenses, ice wedges, and irregular ice masses (Stearns 1966). Pore ice, which is the most common form of ground ice in the sandy sediments of the Kantishna area, occurs within pore spaces between soil particles. It forms by pore water freezing in place. Segregated ice occurs in lenses or layers up to several inches (10 cm) thick. These layers grow by drawing up water from below as the ground freezes. Wedge ice fills thermal contraction cracks in permafrost (Péwé 1975). Wedge ice was observed in the central part of the survey area, exposed in a stream bank below the normal depth of soil observations. The extent of segregated ice and wedge ice in the survey area is not known.

If the organic mat over the permafrost is burned or removed mechanically, the upper zone of permafrost will thaw and the associated perched water table may recede to a greater depth. Variation in the ice content of the permafrost results in differential subsidence of the soil surface and slumping as the permafrost melts (Péwé 1954). The resulting uneven ground is known as thermokarst (Czudek and Demek 1970). Many ponds in the survey area appear to be the result of thawing of buried ice. If no further disturbance occurs, the insulating vegetative mat will eventually become reestablished, accompanied by a drop in the soil temperature and a rise in the permafrost and water table levels.

Thermokarsting can also occur during warm climatic intervals. The heavily thermokarsted region in the western part of the survey area probably resulted from the melting of large buried ice masses during the warmer climate that followed glaciation. Nearby, the slightly higher, nearly level areas with continuous permafrost and little thermokarsting probably retain the large buried ice masses, and major thermokarsting could occur if the surface is disturbed.

The occurrence of permafrost in the survey area requires special consideration when selecting lands

for clearing and agriculture and during the construction of roads and buildings.

Native Vegetation

The Kantishna area is located within the boreal forest zone of Interior Alaska. The interrelated effects of landform, topographic position, soil, and fires determine the types of vegetation that occur on a soil. Native vegetation, together with the system of lakes, streams, and other wetlands in the survey area, provides habitat for a wide variety of mammals and birds. Area forests could also provide various wood products, including timber, house logs, and fuel wood.

Forest types on well drained sand dunes, flood plains, and hillslopes include pure and mixed stands of paper birch, quaking aspen, white spruce, and black spruce. Dwarf black spruce forestland, which may include tamarack and stunted paper birch, and birch-ericaceous shrubland occur on outwash plains, flood plains, and hillslopes underlain by shallow permafrost. Wet sedge meadows are common on the margins of lakes and ponds and on seasonally ponded areas on flood plains and outwash plains. Bluejoint reedgrass meadows are found in drained thaw ponds.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location, and a discussion of their suitability, limitations, and management for specified uses.

Before beginning the fieldwork, relevant information on the climate, geology, geomorphology, hydrology, and vegetation of the survey area was assembled. Aerial photography of the survey area was acquired and prepared for field use and mapping. Color infrared photography taken in 1978-1980 at a scale of 1:60,000 was enlarged to a scale of approximately 1:24,000 and printed in black-and-white for use during the survey.

Prior to detailed soils mapping, a reconnaissance of the area was done by low-altitude helicopter flights. At representative locations and landforms, the soil scientists stopped to investigate the nature of the soils. Soil-landform patterns and map unit concepts were developed for use during detailed mapping. Representative areas for future intensive soils investigation were identified and located.

The level of mapping intensity was determined by the degree of potential for the specified uses of the survey and by accessibility. Accessible areas with higher potential for the specified uses of the survey were mapped in greater detail. Map unit boundaries in these areas were determined in the field and by photo-interpretation of known soil-landform and soil-vegetation relationships. Due to the size of the survey area and the limited amount of time available, it was not possible to visit each delineation.

Due to the lack of ground access to the survey area, daily helicopter flights were used to place teams consisting of a soil scientist and a biological technician at various locations in the survey area. Some areas at higher elevations were inaccessible due to lack of safe helicopter landing sites. The inaccessible areas and areas with low potential for use were mapped primarily by photo-interpretation.

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

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

Soil scientists dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The soil scientists also

observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of native plants; and the kinds of geologic materials.

Many locations in the survey area have permafrost within the soil profile. In these areas a gasoline-powered ice auger was occasionally used to extract frozen soil cores from which the characteristics of the frozen layers could be determined.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, soil temperature, reaction, and other features. After describing the soils and determining their properties, the soil scientists classified the soils according to *Soil Taxonomy* (USDA 1999). The soil classification allows information about management of similar soils in other areas to be applied to soils in the survey area.

While the soil survey was in progress, samples of some of the soils in the area were collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests, as well as, the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses.

Soil behavior is affected not only by soil properties, but also by such variables as climate and biological activity. Average soil conditions are predictable, but conditions at a specific time and place are difficult to predict. For example, soil scientists can predict with a considerable degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Each map unit consists of an area of specified soil or soils having similar use and management characteristics. It also includes areas of minor soils that have different use and management characteristics. Each map unit is also defined in terms of nonsoil features, such as slope, climate, and landform. Aerial photographs show trees, lakes, and rivers, all of which help in locating boundaries accurately.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

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

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

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

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

Map units that consist of one major component are called *consociations*. Beales very fine sandy loam, 1 to 35 percent slopes, is an example.

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Iksgiza-Nenana complex, 1 to 35 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous

areas are somewhat similar. Typic Dystrocryepts-Lithic Dystrocryepts association, 15 to 70 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Typic Histoturbels, Terric Hemistels, and Bradway soils, 0 to 2 percent slopes, is an undifferentiated group in this survey area.

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

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

1—Beales very fine sandy loam, 1 to 35 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Beales and Similar Soils

Extent: 90 percent of the map unit
Landform: dunes on alluvial flats
Position on the slope: backslopes, summits
Slope shape: convex downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 1.5 inches (4 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); very fine sandy loam, moderate permeability
Bw—3 to 6 inches (8 to 16 cm); very fine sandy loam, moderate permeability
2C—6 to 60 inches (16 to 152 cm); fine sand, rapid permeability

Minor Components

- Poorly drained permafrost soils: 5 percent of the map unit
- Soils on slopes of more than 35 percent: 5 percent of the map unit

Management Considerations

Soil-related factors: steep slopes, water erosion and wind erosion, frost heaving, and shallow depth to sandy subsoil
Current uses: wildlife habitat
Potential uses: forestland and homesites

2—Beales very fine sandy loam, 35 to 70 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Beales and Similar Soils

Extent: 85 percent of the map unit
Landform: dunes
Position on the slope: backslopes
Slope shape: convex downslope
Slope range: 35 to 70 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 1.5 inches (4 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest

Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); very fine sandy loam, moderate permeability
Bw—3 to 6 inches (8 to 16 cm); very fine sandy loam, moderate permeability
2C—6 to 60 inches (16 to 152 cm); fine sand, rapid permeability

Minor Components

- Soils on slopes of less than 35 percent: 10 percent of the map unit
- Soils that have a loess mantle more than 10 inches thick: 5 percent of the map unit

Management Considerations

Soil-related factors: steep slopes, water erosion and wind erosion, and frost heaving
Current uses: wildlife habitat
Potential uses: wildlife habitat

3—Beales-Zitziana complex, 1 to 35 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Beales and Similar Soils

Extent: 50 percent of the map unit
Landform: dunes on alluvial flats
Position on the slope: backslopes
Slope shape: convex downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 1.5 inches (4 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); very fine sandy loam, moderate permeability
Bw—3 to 6 inches (8 to 16 cm); very fine sandy loam, moderate permeability
2C—6 to 60 inches (16 to 152 cm); fine sand, rapid permeability

Zitziana and Similar Soils

Extent: 40 percent of the map unit
Landform: dunes
Position on slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 6.2 inches (16 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 2 inches (0 to 5 cm); slightly decomposed plant material, moderately rapid permeability
A—2 to 3 inches (5 to 8 cm); silt loam, moderate permeability
E,Bw—3 to 17 inches (8 to 43 cm); silt loam, moderate permeability
2C—17 to 60 inches (43 to 152 cm); fine sand, rapid permeability

Minor Components

- Poorly drained permafrost soils: 5 percent of the map unit
- Soils on slopes of more than 35 percent: 5 percent of the map unit

Management Considerations

Soil-related factors: steep slopes, water erosion and wind erosion, frost heaving, and shallow depth to sandy subsoil

Current uses: wildlife habitat
Potential uses: forestland and homesites

4—Typic Histoturbels, Terric Hemistels, and Bradway soils, 0 to 2 percent slopes

Elevation: 249 to 397 feet (76 to 121 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Typic Histoturbels and Similar Soils

Extent: 30 percent of the map unit
Landform: depressions on flood plains
Slope shape: concave downslope
Slope range: 0 to 2 percent
Parent material: alluvium
Depth to permafrost: 8 to 18 inches (20 to 45 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: very poorly drained
Flooding: occasional
Depth to high water table (approximate): 6 inches (15 cm)
Ponding: occasional
Available water capacity (approximate): 3.0 inches (8 cm)
Vegetation: open black spruce forest with Labrador tea and moss
Typical profile:
Oi—0 to 11 inches (0 to 27 cm); slightly decomposed plant material, moderately rapid permeability
Af—11 to 13 inches (27 to 32 cm); permanently frozen silt loam, impermeable
Cgf—13 to 23 inches (32 to 59 cm); permanently frozen silt loam, impermeable

Terric Hemistels and Similar Soils

Extent: 30 percent of the map unit
Landform: depressions on flood plains
Slope shape: concave downslope
Slope range: 0 to 2 percent
Parent material: organic material over silty loess
Depth to permafrost: 6 to 40 inches (15 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: occasional
Depth to high water table (approximate): 6 inches (15 cm)
Ponding: occasional
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: cottonsedge and sedge
Typical profile:
Oi—0 to 20 inches (0 to 51 cm); slightly decomposed plant material, moderately rapid permeability
A—20 to 22 inches (51 to 56 cm); silt loam, moderate permeability
Bf—22 to 60 inches (56 to 152 cm); permanently frozen silt loam, impermeable

Bradway and Similar Soils

Extent: 30 percent of the map unit
Landform: depressions on flood plains
Slope shape: linear downslope
Slope range: 0 to 2 percent
Parent material: alluvium
Depth to permafrost: 14 to 40 inches (38 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: occasional
Depth to high water table (approximate): 13 inches (34 cm)
Ponding: occasional
Available water capacity (approximate): 3.1 inches (8 cm)
Vegetation: open black spruce forest with low shrubs and moss
Typical profile:
Oe—0 to 1 inch (0 to 3 cm); moderately decomposed plant material, moderately rapid permeability
A1—1 to 5 inches (3 to 13 cm); mucky silt loam, moderate permeability
A2—5 to 15 inches (13 to 39 cm); stratified fine sand to very fine sandy loam, moderately rapid permeability
Af—15 to 24 inches (39 to 61 cm); permanently frozen silt loam, impermeable

Minor Components

- Ponds and sloughs: 5 percent of the map unit
- Soils that are frequently flooded: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, flooding, and ponding
Current uses: wildlife habitat
Potential uses: wildlife habitat

5—Iksgiza peat, 0 to 3 percent slopes

Elevation: 249 to 997 feet (76 to 304 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Iksgiza and Similar Soils

Extent: 90 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 0 to 3 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 19 inches (48 cm)
Ponding: occasional
Available water capacity (approximate): 4.8 inches (12 cm)
Vegetation: open black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
Bg—10 to 18 inches (25 to 45 cm); silt loam, moderate permeability
Cf1—18 to 38 inches (45 to 96 cm); permanently frozen silt loam, impermeable
2Cf2—38 to 60 inches (96 to 152 cm); permanently frozen fine sand, impermeable

Minor Components

- Histosols and similar soils: 5 percent of the map unit
- Soils that are well drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, lack of drainage outlets, ponding, and possible thermokarst subsidence
Current uses: wildlife habitat
Potential uses: wildlife habitat

6—Iksgiza peat, 3 to 6 percent slopes

Elevation: 249 to 991 feet (76 to 302 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Iksgiza and Similar Soils

Extent: 85 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 3 to 6 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Hazard of erosion (organic mat removed): by water—moderate; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 19 inches (48 cm)
Ponding: occasional
Available water capacity (approximate): 4.8 inches (12 cm)
Vegetation: open black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
Bg—10 to 18 inches (25 to 45 cm); silt loam, moderate permeability
Cf1—18 to 38 inches (45 to 96 cm); permanently frozen silt loam, impermeable
2Cf2—38 to 60 inches (96 to 152 cm); permanently frozen fine sand, impermeable

Minor Components

- Histosols and similar soils: 10 percent of the map unit
- Soils that are well drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, possible thermokarst subsidence, and erodible topsoil
Current uses: wildlife habitat
Potential uses: cropland, hayland, pastureland, and homesites

7—Iksgiza peat, 6 to 12 percent slopes

Elevation: 249 to 997 feet (76 to 304 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Iksgiza and Similar Soils

Extent: 90 percent of the map unit
Landform: dunes on outwash plains
Position on the slope: toeslopes
Slope shape: concave downslope
Slope range: 6 to 12 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 19 inches (48 cm)
Ponding: occasional
Available water capacity (approximate): 4.8 inches (12 cm)
Vegetation: open black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
Bg—10 to 18 inches (25 to 45 cm); silt loam, moderate permeability
Cf1—18 to 38 inches (45 to 96 cm); permanently frozen silt loam, impermeable
2Cf2—38 to 60 inches (96 to 152 cm); permanently frozen fine sand, impermeable

Minor Components

- Soils on slopes of less than 6 percent: 5 percent of the map unit
- Soils that are well drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, possible thermokarst subsidence, erodible topsoil, and slope
Current uses: wildlife habitat
Potential uses: cropland, hayland, and pastureland

8—Iksgiza-Beales-Zitziana complex, pitted, 1 to 50 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Iksgiza and Similar Soils

Extent: 40 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 1 to 20 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 19 inches (48 cm)
Ponding: none
Available water capacity (approximate): 4.8 inches (12 cm)
Vegetation: open black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
Bg—10 to 18 inches (25 to 45 cm); silt loam, moderate permeability
Cf1—18 to 38 inches (45 to 96 cm); permanently frozen silt loam, impermeable
2Cf2—38 to 60 inches (96 to 152 cm); permanently frozen fine sand, impermeable

Beales and Similar Soils

Extent: 25 percent of the map unit
Landform: dunes on alluvial flats
Position on the slope: backslopes, summits
Slope shape: convex downslope

Slope range: 1 to 50 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 1.5 inches (4 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); very fine sandy loam, moderate permeability
Bw—3 to 6 inches (8 to 16 cm); very fine sandy loam, moderate permeability
2C—6 to 60 inches (16 to 152 cm); fine sand, rapid permeability

Zitziana and Similar Soils

Extent: 20 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 50 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 2 inches (3 to 6 cm); silt loam, moderate permeability
E,Bw—2 to 16 inches (6 to 41 cm); silt loam, moderate permeability
2C—16 to 60 inches (41 to 152 cm); fine sand, rapid permeability

Minor Components

- Ponds and lakes: 5 percent of the map unit
- Poorly drained permafrost soils: 5 percent of the map unit
- Soils that are well drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, steep slopes, water erosion and wind erosion, and frost heaving
Current uses: wildlife habitat
Potential uses: forestland and homesites

9—Iksgiza-Nenana complex, 1 to 35 percent slopes

Elevation: 249 to 997 feet (76 to 304 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Iksgiza and Similar Soils

Extent: 60 percent of the map unit
Landform: depressions on dunes
Slope shape: concave downslope
Slope range: 1 to 20 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 19 inches (48 cm)
Ponding: none
Available water capacity (approximate): 4.8 inches (12 cm)
Vegetation: open black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
Bg—10 to 18 inches (25 to 45 cm); silt loam, moderate permeability
Cf1—18 to 38 inches (45 to 96 cm); permanently frozen silt loam, impermeable
2Cf2—38 to 60 inches (96 to 152 cm); permanently frozen fine sand, impermeable

Nenana and Similar Soils

Extent: 25 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 8.6 inches (22 cm)
Vegetation: quaking aspen, paper birch, and white spruce forest
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); moderately decomposed plant material, moderately rapid permeability
A—2 to 4 inches (5 to 10 cm); silt loam, moderate permeability
Bw,C—4 to 38 inches (10 to 96 cm); silt loam, moderate permeability
2C—38 to 60 inches (96 to 152 cm); fine sand, rapid permeability

Minor Components

- Histosols and similar soils: 5 percent of the map unit
- Small ponds: 5 percent of the map unit
- Soils that are moderately well drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, steep slopes, water erosion and wind erosion, frost heaving, and thermokarst subsidence
Current uses: wildlife habitat
Potential uses: hayland, pastureland, forestland, and homesites

10—Iksgiza-Terric Hemistels complex, 0 to 3 percent slopes

Elevation: 249 to 997 feet (76 to 304 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Iksgiza and Similar Soils

Extent: 65 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 0 to 3 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 19 inches (48 cm)
Ponding: none
Available water capacity (approximate): 4.8 inches (12 cm)
Vegetation: open black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
Bg—10 to 18 inches (25 to 45 cm); silt loam, moderate permeability
Cf1—18 to 38 inches (45 to 96 cm); permanently frozen silt loam, impermeable
2Cf2—38 to 60 inches (96 to 152 cm); permanently frozen fine sand, impermeable

Terric Hemistels and Similar Soils

Extent: 30 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 0 to 3 percent
Parent material: organic material over silty loess
Depth to permafrost: 6 to 40 inches (15 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: occasional
Depth to high water table (approximate): 6 inches (15 cm)
Ponding: none
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: cottonsedge and sedge
Typical profile:
Oi—0 to 20 inches (0 to 51 cm); slightly decomposed plant material, moderately rapid permeability

A—20 to 22 inches (51 to 56 cm); silt loam, moderate permeability
Bf—22 to 60 inches (56 to 152 cm); permanently frozen silt loam, impermeable

Minor Components

- Soils that are ponded: 3 percent of the map unit
- Soils that are well drained: 2 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, thermokarst subsidence, and organic soil material
Current uses: wildlife habitat
Potential uses: wildlife habitat

11—Iksgiza-Zitziana-Nenana complex, 1 to 35 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Iksgiza and Similar Soils

Extent: 50 percent of the map unit
Landform: depressions on dunes
Slope shape: concave downslope
Slope range: 1 to 8 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Hazard of erosion (organic mat removed): by water—moderate; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 19 inches (48 cm)
Ponding: none
Available water capacity (approximate): 4.8 inches (12 cm)
Vegetation: open black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
Bg—10 to 18 inches (25 to 45 cm); silt loam, moderate permeability
Cf1—18 to 38 inches (45 to 96 cm); permanently frozen silt loam, impermeable
2Cf2—38 to 60 inches (96 to 152 cm); permanently frozen fine sand, impermeable

Zitziana and Similar Soils

Extent: 25 percent of the map unit
Landform: dunes
Position on the slope: summits, backslopes
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 2 inches (3 to 6 cm); silt loam, moderate permeability
E,Bw—2 to 16 inches (6 to 41 cm); silt loam, moderate permeability
2C—16 to 60 inches (41 to 152 cm); fine sand, rapid permeability

Nenana and Similar Soils

Extent: 20 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 8.6 inches (22 cm)

Vegetation: quaking aspen, paper birch, and white spruce forest
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); moderately decomposed plant material, moderately rapid permeability
A—2 to 4 inches (5 to 10 cm); silt loam, moderate permeability
Bw,C—4 to 38 inches (10 to 96 cm); silt loam, moderate permeability
2C—38 to 60 inches (96 to 152 cm); fine sand, rapid permeability

Minor Components

- Poorly drained permafrost soils: 3 percent of the map unit
- Soils on slopes of more than 35 percent: 2 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, wind erosion and water erosion, steep slopes, and frost heaving
Current uses: wildlife habitat
Potential uses: forestland and homesites

12—Kindanina mucky silt loam, 0 to 6 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Kindanina and Similar Soils

Extent: 90 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 0 to 6 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 10 to 22 inches (25 to 56 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): 9 inches (23 cm)
Ponding: none
Available water capacity (approximate): 2.2 inches (6 cm)
Vegetation: open black spruce forest with willows and low shrubs
Typical profile:
Oi—0 to 4 inches (0 to 10 cm); slightly decomposed plant material, moderately rapid permeability
A—4 to 6 inches (10 to 15 cm); mucky silt loam, moderate permeability
B—6 to 10 inches (15 to 25 cm); very fine sandy loam, moderate permeability
2C—10 to 22 inches (25 to 56 cm); sand, rapid permeability
2Cf—22 to 32 inches (56 to 81 cm); permanently frozen sand, impermeable

Minor Components

- Histic Aquiturbels and similar soils: 5 percent of the map unit
- Soils that are well drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, wind erosion and water erosion, possible thermokarst subsidence, frost heaving, and sandy subsoil
Current uses: wildlife habitat
Potential uses: hayland, pastureland, and homesites

13—Kindanina mucky silt loam, 6 to 12 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Kindanina and Similar Soils

Extent: 90 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 6 to 12 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 10 to 22 inches (25 to 56 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): 9 inches (23 cm)

Ponding: none
Available water capacity (approximate): 2.2 inches (6 cm)
Vegetation: open black spruce forest with willows and low shrubs
Typical profile:
Oi—0 to 4 inches (0 to 10 cm); slightly decomposed plant material, moderately rapid permeability
A—4 to 6 inches (10 to 15 cm); mucky silt loam, moderate permeability
B—6 to 10 inches (15 to 25 cm); very fine sandy loam, moderate permeability
2C—10 to 22 inches (25 to 56 cm); sand, rapid permeability
2Cf—22 to 32 inches (56 to 81 cm); permanently frozen sand, impermeable

Minor Components

- Histic Aquiturbels and similar soils: 5 percent of the map unit
- Soils on slopes of less than 6 percent: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, wind erosion and water erosion, possible thermokarst subsidence, frost heaving, sandy subsoil, and steep slopes
Current uses: wildlife habitat
Potential uses: cropland, hayland, pastureland, and homesites

14—Kindanina mucky silt loam, 12 to 20 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Kindanina and Similar Soils

Extent: 85 percent of the map unit
Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 12 to 20 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 10 to 22 inches (25 to 56 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): 9 inches (23 cm)
Ponding: none
Available water capacity (approximate): 2.2 inches (6 cm)
Vegetation: open black spruce forest with willows and low shrubs
Typical profile:
Oi—0 to 4 inches (0 to 10 cm); slightly decomposed plant material, moderately rapid permeability
A—4 to 6 inches (10 to 15 cm); mucky silt loam, moderate permeability
B—6 to 10 inches (15 to 25 cm); very fine sandy loam, moderate permeability
2C—10 to 22 inches (25 to 56 cm); sand, rapid permeability
2Cf—22 to 32 inches (56 to 81 cm); permanently frozen sand, impermeable

Minor Components

- Histic Aquiturbels and similar soils: 5 percent of the map unit
- Soils on slopes of more than 20 percent: 5 percent of the map unit
- Soils on slopes of less than 12 percent: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, wind erosion and water erosion, thermokarst subsidence, frost heaving, and steep slopes
Current uses: wildlife habitat
Potential uses: hayland, pastureland, and homesites

15—Kindanina-Beales-Zitziana complex, dunes, 1 to 50 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Kindanina and Similar Soils

Extent: 40 percent of the map unit
Landform: depressions on dunes

Slope shape: concave downslope
Slope range: 1 to 20 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 10 to 22 inches (25 to 56 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): 9 inches (23 cm)
Ponding: none
Available water capacity (approximate): 2.2 inches (6 cm)
Vegetation: open black spruce forest with willows and low shrubs
Typical profile:
Oi—0 to 4 inches (0 to 10 cm); slightly decomposed plant material, moderately rapid permeability
A—4 to 6 inches (10 to 15 cm); mucky silt loam, moderate permeability
B—6 to 10 inches (15 to 25 cm); very fine sandy loam, moderate permeability
2C—10 to 22 inches (25 to 56 cm); sand, rapid permeability
2Cf—22 to 32 inches (56 to 81 cm); permanently frozen sand, impermeable

Beales and Similar Soils

Extent: 25 percent of the map unit
Landform: dunes on alluvial flats
Position on the slope: backslopes, summits
Slope shape: convex downslope
Slope range: 1 to 50 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 1.5 inches (4 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); very fine sandy loam, moderate permeability
Bw—3 to 6 inches (8 to 16 cm); very fine sandy loam, moderate permeability
2C—6 to 60 inches (16 to 152 cm); fine sand, rapid permeability

Zitziana and Similar Soils

Extent: 20 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 50 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 2 inches (3 to 6 cm); silt loam, moderate permeability
E,Bw—2 to 16 inches (6 to 41 cm); silt loam, moderate permeability
2C—16 to 60 inches (41 to 152 cm); fine sand, rapid permeability

Minor Components

- Poorly drained permafrost soils: 10 percent of the map unit
- Soils that have an organic mat more than 8 inches thick: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, wind erosion and water erosion, thermokarst subsidence, frost heaving, and steep slopes
Current uses: wildlife habitat
Potential uses: forestland and homesites

16—Koyukuk silt loam, 1 to 35 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Koyukuk and Similar Soils

Extent: 90 percent of the map unit
Landform: dunes
Position on the slope: summits, backslopes
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: loess
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 12.8 inches (32 cm)
Vegetation: white spruce and paper birch forest
Typical profile:
Oi—0 to 5 inches (0 to 13 cm); slightly decomposed plant material, moderately rapid permeability
E—5 to 7 inches (13 to 18 cm); silt loam, moderate permeability
Bw,C—7 to 60 inches (18 to 152 cm); silt loam, moderate permeability

Minor Components

- Poorly drained permafrost soils: 5 percent of the map unit
- Soils on slopes of more than 35 percent: 5 percent of the map unit

Management Considerations

Soil-related factors: wind erosion and water erosion, frost heaving, and steep slopes
Current uses: wildlife habitat
Potential uses: forestland and homesites

17—Koyukuk-Typic Aquiturbels complex, dunes, 1 to 35 percent slopes

Elevation: 400 to 1,001 feet (122 to 305 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Koyukuk and Similar Soils

Extent: 45 percent of the map unit
Landform: dunes
Position on the slope: summits, backslopes
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: loess
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 12.8 inches (32 cm)
Vegetation: white spruce and paper birch forest
Typical profile:
Oi—0 to 5 inches (0 to 13 cm); slightly decomposed plant material, moderately rapid permeability
E—5 to 7 inches (13 to 18 cm); silt loam, moderate permeability
Bw,C—7 to 60 inches (18 to 152 cm); silt loam, moderate permeability

Typic Aquiturbels and Similar Soils

Extent: 40 percent of the map unit
Landform: depressions on dunes
Slope shape: concave downslope
Slope range: 1 to 30 percent
Parent material: loess
Depth to permafrost: 24 to 44 inches (61 to 112 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: medium
Drainage class: poorly drained

Flooding: none
Depth to high water table (approximate): 20 inches (50 cm)
Ponding: none
Available water capacity (approximate): 7.1 inches (18 cm)
Vegetation: black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oa—0 to 4 inches (0 to 10 cm); highly decomposed plant material, moderate permeability
A—4 to 8 inches (10 to 20 cm); silt loam, moderate permeability
Bg—8 to 28 inches (20 to 71 cm); silt loam, moderate permeability
Bgf—28 to 34 inches (71 to 86 cm); permanently frozen silt loam

Minor Components

- Iksgiza and similar soils: 10 percent of the map unit
- Nenana and similar soils: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, wind erosion and water erosion, frost heaving, and steep slopes
Current uses: wildlife habitat
Potential uses: forestland and homesites

18—Koyukuk-Typic Aquiturbels complex, pitted, 1 to 35 percent slopes

Elevation: 400 to 1,001 feet (122 to 305 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Koyukuk and Similar Soils

Extent: 70 percent of the map unit
Landform: hills on outwash plains
Position on the slope: summits, backslopes
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: loess
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 12.8 inches (32 cm)
Vegetation: white spruce and paper birch forest
Typical profile:
Oi—0 to 5 inches (0 to 13 cm); slightly decomposed plant material, moderately rapid permeability
E—5 to 7 inches (13 to 18 cm); silt loam, moderate permeability
Bw,C—7 to 60 inches (18 to 152 cm); silt loam, moderate permeability

Typic Aquiturbels and Similar Soils

Extent: 15 percent of the map unit
Landform: depressions
Slope shape: concave downslope
Slope range: 1 to 30 percent
Parent material: loess
Depth to permafrost: 24 to 44 inches (61 to 112 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: medium
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 20 inches (50 cm)
Ponding: none
Available water capacity (approximate): 7.1 inches (18 cm)
Vegetation: black spruce and paper birch forest with willows and low shrubs
Typical profile:
Oa—0 to 4 inches (0 to 10 cm); highly decomposed plant material, moderate permeability
A—4 to 8 inches (10 to 20 cm); silt loam, moderate permeability
Bg—8 to 28 inches (20 to 71 cm); silt loam, moderate permeability
Bgf—28 to 34 inches (71 to 86 cm); permanently frozen silt loam

Minor Components

- Histosols and similar soils: 5 percent of the map unit

- Ponds and lakes: 5 percent of the map unit
- Soils that are somewhat poorly drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, thermokarst subsidence, wind erosion and water erosion, and frost heaving
Current uses: wildlife habitat
Potential uses: forestland

19—Nenana silt loam, 3 to 6 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Nenana and Similar Soils

Extent: 90 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 3 to 6 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—moderate; by wind—severe
Runoff: low
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 8.6 inches (22 cm)
Vegetation: quaking aspen, paper birch, and white spruce forest
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); moderately decomposed plant material, moderately rapid permeability
A—2 to 4 inches (5 to 10 cm); silt loam, moderate permeability
Bw,C1—4 to 38 inches (10 to 96 cm); silt loam, moderate permeability
2C2—38 to 60 inches (96 to 152 cm); fine sand, rapid permeability

Minor Components

- Poorly drained permafrost soils: 10 percent of the map unit

Management Considerations

Soil-related factors: wind erosion and water erosion and frost heaving
Current uses: wildlife habitat
Potential uses: hayland, pastureland, cropland, forestland, and homesites

20—Nenana silt loam, 6 to 12 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Nenana and Similar Soils

Extent: 90 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 6 to 12 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 8.6 inches (22 cm)
Vegetation: quaking aspen, paper birch, and white spruce forest
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); moderately decomposed plant material, moderately rapid permeability
A—2 to 4 inches (5 to 10 cm); silt loam, moderate permeability
Bw,C1—4 to 38 inches (10 to 96 cm); silt loam, moderate permeability
2C2—38 to 60 inches (96 to 152 cm); fine sand, rapid permeability

Minor Components

- Poorly drained permafrost soils: 5 percent of the map unit
- Soils on slopes of more than 12 percent: 5 percent of the map unit

Management Considerations

Soil-related factors: wind erosion and water erosion, and frost heaving
Current uses: wildlife habitat
Potential uses: hayland, pastureland, cropland, forestland, and homesites

21—Nenana silt loam, 12 to 20 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Nenana and Similar Soils

Extent: 90 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 12 to 20 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 8.6 inches (22 cm)
Vegetation: quaking aspen, paper birch, and white spruce forest
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); moderately decomposed plant material, moderately rapid permeability
A—2 to 4 inches (5 to 10 cm); silt loam, moderate permeability
Bw,C1—4 to 38 inches (10 to 96 cm); silt loam, moderate permeability
2C2—38 to 60 inches (96 to 152 cm); fine sand, rapid permeability

Minor Components

- Soils on slopes of less than 12 percent: 5 percent of the map unit
- Soils that are poorly drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wind erosion and water erosion, and frost heaving
Current uses: wildlife habitat
Potential uses: hayland, pastureland, forestland, and homesites

22—Nenana-Zitziana complex, 1 to 35 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Nenana and Similar Soils

Extent: 50 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 8.6 inches (22 cm)
Vegetation: quaking aspen, paper birch, and white spruce forest
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); moderately decomposed plant material, moderately rapid permeability
A—2 to 4 inches (5 to 10 cm); silt loam, moderate permeability
Bw,C1—4 to 38 inches (10 to 96 cm); silt loam, moderate permeability
2C2—38 to 60 inches (96 to 152 cm); fine sand, rapid permeability

Zitziana and Similar Soils

Extent: 40 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 2 inches (3 to 6 cm); silt loam, moderate permeability
E,Bw—2 to 16 inches (6 to 41 cm); silt loam, moderate permeability
2C—16 to 60 inches (41 to 152 cm); fine sand, rapid permeability

Minor Components

- Poorly drained permafrost soils: 5 percent of the map unit
- Soils on slopes of more than 35 percent: 5 percent of the map unit

Management Considerations

Soil-related factors: wind erosion and water erosion, steep slopes, and frost heaving
Current uses: wildlife habitat
Potential uses: forestland and homesites

23—Terric Hemistels, 0 to 2 percent slopes

Elevation: 249 to 997 feet (76 to 304 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Terric Hemistels and Similar Soils

Extent: 85 percent of the map unit
Landform: depressions on alluvial flats
Slope shape: concave downslope
Slope range: 0 to 2 percent
Parent material: organic material over silty loess
Depth to permafrost: 6 to 40 inches (15 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): 6 inches (15 cm)
Ponding: occasional
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: cottonsedge and sedge
Typical profile:
Oi—0 to 20 inches (0 to 51 cm); slightly decomposed plant material, moderately rapid permeability
A—20 to 22 inches (51 to 56 cm); silt loam, moderate permeability
Bf—22 to 60 inches (56 to 152 cm); permanently frozen silt loam, impermeable

Minor Components

- Well drained mineral soils: 15 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, and organic soil material
Current uses: wildlife habitat
Potential uses: wildlife habitat

24—Riverwash

Elevation: 249 to 397 feet (76 to 121 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Riverwash

Extent: 95 percent of the map unit
Landform: flood plains
Slope range: 0 to 1 percent

Minor Components

- Salchaket and similar soils: 3 percent of the map unit
- Water: 2 percent of the map unit

Management Considerations

Soil-related factors: frequent flooding, shifting stream channels, and riverbank erosion
Current uses: wildlife habitat
Potential uses: wildlife habitat

25—Salchaket-Bradway complex, 0 to 3 percent slopes

Elevation: 249 to 397 feet (76 to 121 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Salchaket and Similar Soils

Extent: 65 percent of the map unit
Landform: flood plains
Slope shape: linear downslope
Slope range: 0 to 3 percent
Parent material: alluvium
Hazard of erosion (organic mat removed): by water—slight; by wind—severe
Runoff: very low
Drainage class: well drained
Flooding: occasional
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 12.5 inches (32 cm)
Vegetation: white spruce and balsam poplar forest; willow and alder scrub
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 6 inches (3 to 16 cm); stratified silt loam to very fine sandy loam to peat, moderate permeability
C—6 to 60 inches (16 to 152 cm); stratified silt loam to very fine sandy loam to very fine sand, moderate permeability

Bradway and Similar Soils

Extent: 20 percent of the map unit
Landform: depressions on outwash plains
Slope shape: linear downslope
Slope range: 0 to 3 percent
Parent material: alluvium
Depth to permafrost: 14 to 40 inches (38 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: occasional
Depth to high water table (approximate): 13 inches (34 cm)
Ponding: occasional
Available water capacity (approximate): 3.1 inches (8 cm)
Vegetation: open black spruce forest with low shrubs and moss
Typical profile:
Oe—0 to 1 inch (0 to 3 cm); moderately decomposed plant material, moderately rapid permeability
A1—1 to 5 inches (3 to 13 cm); mucky silt loam, moderate permeability
A2—5 to 15 inches (13 to 39 cm); stratified fine sand to very fine sandy loam, moderately rapid permeability
Af—15 to 24 inches (39 to 61 cm); permanently frozen silt loam, impermeable

Minor Components

- Histosols and similar soils: 5 percent of the map unit
- Ponds and sloughs: 5 percent of the map unit
- Riverwash: 5 percent of the map unit

Management Considerations

Soil-related factors: flooding, wetness and permafrost in the Bradway soil, and streambank erosion
Current uses: wildlife habitat
Potential uses: forestland

26—Saulich peat, 0 to 6 percent slopes

Elevation: 499 to 1,001 feet (152 to 305 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Saulich and Similar Soils

Extent: 85 percent of the map unit

Landform: depressions on outwash plains
Slope shape: concave downslope
Slope range: 0 to 6 percent
Parent material: loess
Depth to permafrost: 16 to 30 inches (40 to 76 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 12 inches (31 cm)
Ponding: none
Available water capacity (approximate): 7.1 inches (18 cm)
Vegetation: open black spruce forest with low shrubs and moss
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
A—10 to 14 inches (25 to 35 cm); silt loam, moderate permeability
Bg—14 to 27 inches (35 to 68 cm); silt loam, moderate permeability
Bgf—27 to 37 inches (68 to 94 cm); permanently frozen silt loam, impermeable

Minor Components

- Soils that are poorly drained: 10 percent of the map unit
- Soils that have an organic mat less than 8 inches thick: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, thermokarst subsidence, and wind erosion
Current uses: wildlife habitat
Potential uses: wildlife habitat

27—Saulich peat, 6 to 30 percent slopes

Elevation: 499 to 1,001 feet (152 to 305 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Saulich and Similar Soils

Extent: 85 percent of the map unit
Landform: depressions on hillsides
Slope shape: concave downslope
Slope range: 6 to 30 percent
Parent material: loess
Depth to permafrost: 16 to 30 inches (40 to 76 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 12 inches (31 cm)
Ponding: none
Available water capacity (approximate): 7.1 inches (18 cm)
Vegetation: open black spruce forest with low shrubs and moss
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
A—10 to 14 inches (25 to 35 cm); silt loam, moderate permeability
Bg—14 to 27 inches (35 to 68 cm); silt loam, moderate permeability
Bgf—27 to 37 inches (68 to 94 cm); permanently frozen silt loam, impermeable

Minor Components

- Soils on slopes of less than 3 percent: 10 percent of the map unit
- Soils that have an organic mat less than 8 inches thick: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, thermokarst subsidence, and wind erosion
Current uses: wildlife habitat
Potential uses: wildlife habitat

28—Typic Cryaquepts, 0 to 2 percent slopes

Elevation: 249 to 997 feet (76 to 304 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Typic Cryaquepts and Similar Soils

Extent: 85 percent of the map unit
Landform: depressions on alluvial flats

Slope shape: concave downslope
Slope range: 0 to 2 percent
Parent material: loess over alluvium
Hazard of erosion (organic mat removed): by water—slight; by wind—severe
Runoff: very low
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 27 inches (69 cm)
Ponding: none
Available water capacity (approximate): 8.3 inches (21 cm)
Vegetation: bluejoint grass, sedges, and forbs
Typical profile:
Oi—0 to 2 inches (0 to 5 cm); slightly decomposed plant material, moderately rapid permeability
A—2 to 6 inches (5 to 15 cm); silt loam, moderate permeability
Bg—6 to 42 inches (15 to 107 cm); stratified fine sand to silt loam, moderate permeability
2C—42 to 60 inches (107 to 152 cm); extremely gravelly sand, rapid permeability

Minor Components

- Histosols and similar soils: 5 percent of the map unit
- Small ponds and lakes: 5 percent of the map unit
- Soils that are well drained: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, ponding, inadequate drainage outlets, and wind erosion
Current uses: wildlife habitat
Potential uses: hayland and pastureland

29—Typic Dystrocryepts-Lithic Dystrocryepts Association, 15 to 70 percent slopes

Elevation: 797 to 1,998 feet (243 to 609 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Typic Dystrocryepts and Similar Soils

Extent: 65 percent of the map unit
Landform: hillsides
Position on the slope: shoulders, backslopes
Slope shape: linear downslope
Slope range: 15 to 70 percent
Parent material: loess over eolian sands
Depth to bedrock (lithic): 21 to 60 inches (54 to 152 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 2.8 inches (7 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); silt loam, moderate permeability
Bw,C1—3 to 13 inches (8 to 33 cm); silt loam, moderate permeability
2C2—13 to 51 inches (33 to 130 cm); fine sand, rapid permeability
3R—51 inches (130 cm); unweathered bedrock

Lithic Dystrocryepts and Similar Soils

Extent: 30 percent of the map unit
Landform: hills
Position on the slope: summits, backslopes
Slope shape: convex downslope
Slope range: 15 to 70 percent
Parent material: loess
Depth to bedrock (lithic): 7 to 20 inches (18 to 50 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 2.7 inches (7 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability

A—1 to 3 inches (3 to 8 cm); silt loam, moderate permeability
Bw—3 to 10 inches (8 to 26 cm); silt loam, moderate permeability
2BC—10 to 15 inches (26 to 39 cm); very gravelly silt loam, moderately rapid permeability
2R—15 inches (39 cm); bedrock

Minor Components

- Soils with permafrost: 5 percent of the map unit

Management Considerations

Soil-related factors: steep slopes, wind erosion and water erosion, frost heaving, and shallow depth to sandy subsoil or bedrock
Current uses: wildlife habitat
Potential uses: forestland and homesites

30—Typic Dystrocryepts-Saulich complex, 3 to 15 percent slopes

Elevation: 797 to 1,601 feet (243 to 488 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Typic Dystrocryepts and Similar Soils

Extent: 60 percent of the map unit
Landform: hillsides
Position on the slope: footslopes
Slope shape: linear downslope
Slope range: 3 to 15 percent
Parent material: loess over eolian sands
Depth to bedrock (lithic): 21 to 60 inches (54 to 152 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 2.8 inches (7 cm)
Vegetation: white spruce and paper birch forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); silt loam, moderate permeability
Bw,C1—3 to 13 inches (8 to 33 cm); silt loam, moderate permeability
2C2—13 to 51 inches (33 to 130 cm); fine sand, rapid permeability
3R—51 inches (130 cm); unweathered bedrock

Saulich and Similar Soils

Extent: 25 percent of the map unit
Landform: hillsides
Position on the slope: toeslopes
Slope shape: linear downslope
Slope range: 3 to 15 percent
Parent material: loess
Depth to permafrost: 16 to 30 inches (40 to 76 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 12 inches (31 cm)
Ponding: none
Available water capacity (approximate): 7.1 inches (18 cm)
Vegetation: open black spruce forest with low shrubs and moss
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
A—10 to 14 inches (25 to 35 cm); silt loam, moderate permeability
Bg—14 to 27 inches (35 to 68 cm); silt loam, moderate permeability
Bgf—27 to 37 inches (68 to 94 cm); permanently frozen silt loam, impermeable

Minor Components

- Soils on slopes of more than 15 percent: 5 percent of the map unit
- Soils with sandy subsoil: 5 percent of the map unit
- Typic Histoturbels and similar soils: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, thermokarst subsidence, wind erosion and water erosion, frost heaving, and steep slopes

Current uses: wildlife habitat
Potential uses: forestland and homesites

31—Typic Dystrocryepts-Tetlin-Saulich Association, 15 to 70 percent slopes

Elevation: 797 to 1,998 feet (243 to 609 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Typic Dystrocryepts and Similar Soils

Extent: 40 percent of the map unit
Landform: hillsides
Position on the slope: backslopes
Slope shape: linear downslope
Slope range: 15 to 70 percent
Parent material: loess over eolian sands
Depth to bedrock (lithic): 21 to 60 inches (54 to 152 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 2.8 inches (7 cm)
Vegetation: white spruce and paper birch forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 3 inches (3 to 8 cm); silt loam, moderate permeability
Bw,C1—3 to 13 inches (8 to 33 cm); silt loam, moderate permeability
2C2—13 to 51 inches (33 to 130 cm); fine sand, rapid permeability
3R—51 inches (130 cm); unweathered bedrock

Tetlin and Similar Soils

Extent: 25 percent of the map unit
Landform: hillsides
Slope shape: convex downslope
Slope range: 15 to 50 percent
Parent material: loess
Depth to permafrost: 11 to 60 inches (28 to 152 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 21 inches (54 cm)
Ponding: none
Available water capacity (approximate): 10.1 inches (26 cm)
Vegetation: white spruce and paper birch forest
Typical profile:
Oi—0 to 7 inches (0 to 18 cm); slightly decomposed plant material, moderately rapid permeability
A,Bg—7 to 38 inches (18 to 97 cm); silt loam, moderate permeability
Bgf—38 to 60 inches (97 to 152 cm); consolidated permafrost (ice rich), impermeable

Saulich and Similar Soils

Extent: 20 percent of the map unit
Landform: depressions on hillsides
Position on the slope: toeslopes
Slope shape: concave downslope
Slope range: 15 to 45 percent
Parent material: loess
Depth to permafrost: 16 to 30 inches (40 to 76 cm)
Hazard of erosion (organic mat removed): by water—severe; by wind—slight
Runoff: high
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): 12 inches (31 cm)
Ponding: none
Available water capacity (approximate): 7.1 inches (18 cm)
Vegetation: open black spruce forest with low shrubs and moss
Typical profile:
Oi—0 to 10 inches (0 to 25 cm); slightly decomposed plant material, moderately rapid permeability
A—10 to 14 inches (25 to 35 cm); silt loam, moderate permeability
Bg—14 to 27 inches (35 to 68 cm); silt loam, moderate permeability
Bgf—27 to 37 inches (68 to 94 cm); permanently frozen silt loam, impermeable

Minor Components

- Soils on slopes of less than 15 percent: 10 percent of the map unit
- Soils that are shallow to bedrock: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, thermokarst subsidence, wind erosion and water erosion, frost heaving, and steep slopes
Current uses: wildlife habitat
Potential uses: forestland and homesites

32—Typic Cryopsamments, Typic Cryaquepts, flooded, and Bradway soils, 0 to 5 percent slopes

Elevation: 249 to 397 feet (76 to 121 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Typic Cryopsamments and Similar Soils

Extent: 30 percent of the map unit
Landform: levees on flood plains
Slope shape: linear downslope
Slope range: 0 to 5 percent
Parent material: eolian sands over alluvium
Hazard of erosion (organic mat removed): by water—slight; by wind—severe
Runoff: low
Drainage class: excessively drained
Flooding: frequent
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 0.6 inches (2 cm)
Vegetation: white spruce forest with horsetail, alder, prickly rose, and moss
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 2 inches (3 to 6 cm); silt loam, moderate permeability
2C—2 to 60 inches (6 to 152 cm); fine sand, rapid permeability

Typic Cryaquepts, Flooded and Similar Soils

Extent: 30 percent of the map unit
Landform: depressions on flood plains
Slope shape: concave downslope
Slope range: 0 to 3 percent
Parent material: loess over alluvium
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very low
Drainage class: poorly drained
Flooding: frequent
Depth to high water table (approximate): 20 inches (50 cm)
Ponding: none
Available water capacity (approximate): 8.3 inches (21 cm)
Vegetation: paper birch and white spruce forest
Typical profile:
Oi—0 to 2 inches (0 to 5 cm); slightly decomposed plant material, moderately rapid permeability
A—2 to 6 inches (5 to 15 cm); silt loam, moderate permeability
Bg—6 to 42 inches (15 to 107 cm); stratified fine sand to silt loam, moderate permeability
2C—42 to 60 inches (107 to 152 cm); extremely gravelly sand, rapid permeability

Bradway and Similar Soils

Extent: 30 percent of the map unit
Landform: depressions on flood plains
Slope shape: linear downslope
Slope range: 0 to 3 percent
Parent material: alluvium
Depth to permafrost: 14 to 40 inches (38 to 102 cm)
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: poorly drained
Flooding: occasional
Depth to high water table (approximate): 13 inches (34 cm)
Ponding: occasional
Available water capacity (approximate): 3.1 inches (8 cm)
Vegetation: open black spruce forest with low shrubs and moss

Typical profile:
Oe—0 to 1 inch (0 to 3 cm); moderately decomposed plant material, moderately rapid permeability
A1—1 to 5 inches (3 to 13 cm); mucky silt loam, moderate permeability
A2—5 to 15 inches (13 to 39 cm); stratified fine sand to very fine sandy loam, moderately rapid permeability
Af—15 to 24 inches (39 to 61 cm); permanently frozen silt loam, impermeable

Minor Components

- Loamy soils that are well drained: 5 percent of the map unit
- Ponds: 3 percent of the map unit
- Riverwash: 2 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, flooding, and ponding
Current uses: wildlife habitat
Potential uses: wildlife habitat

33—Zitziana silt loam, 1 to 35 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Zitziana and Similar Soils

Extent: 90 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 6.1 inches (15 cm)
Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 2 inches (3 to 6 cm); silt loam, moderate permeability
E,Bw—2 to 16 inches (6 to 41 cm); silt loam, moderate permeability
2C—16 to 60 inches (41 to 152 cm); fine sand, rapid permeability

Minor Components

- Soils on slopes of more than 35 percent: 5 percent of the map unit
- Soils with permafrost: 5 percent of the map unit

Management Considerations

Soil-related factors: wind erosion and water erosion, steep slopes, and shallow depth to sandy underlying material
Current uses: wildlife habitat
Potential uses: forestland and homesites

34—Zitziana-Kindanina complex, 1 to 35 percent slopes

Elevation: 249 to 1,499 feet (76 to 457 m)
Mean annual precipitation: 14 to 16 inches (36 to 41 cm)
Frost-free period: 30 to 60 days

Zitziana and Similar Soils

Extent: 45 percent of the map unit
Landform: dunes
Position on the slope: backslopes, summits
Slope shape: linear downslope
Slope range: 1 to 35 percent
Parent material: silty loess over eolian sands
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): more than 72 inches (176 cm)
Ponding: none
Available water capacity (approximate): 6.1 inches (15 cm)

Vegetation: white spruce, paper birch, and quaking aspen forest
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); slightly decomposed plant material, moderately rapid permeability
A—1 to 2 inches (3 to 6 cm); silt loam, moderate permeability
E,Bw—2 to 16 inches (6 to 41 cm); silt loam, moderate permeability
2C—16 to 60 inches (41 to 152 cm); fine sand, rapid permeability

Kindanina and Similar Soils

Extent: 45 percent of the map unit
Landform: depressions on dunes
Slope shape: concave downslope
Slope range: 1 to 8 percent
Parent material: silty loess over eolian sands
Depth to permafrost: 10 to 22 inches (25 to 56 cm)
Hazard of erosion (organic mat removed): by water—moderate; by wind—slight
Runoff: high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): 9 inches (23 cm)
Ponding: none
Available water capacity (approximate): 2.2 inches (6 cm)
Vegetation: open black spruce forest with willows and low shrubs
Typical profile:
Oi—0 to 4 inches (0 to 10 cm); slightly decomposed plant material, moderately rapid permeability
A—4 to 6 inches (10 to 15 cm); mucky silt loam, moderate permeability
B—6 to 10 inches (15 to 25 cm); very fine sandy loam, moderate permeability
2C—10 to 22 inches (25 to 56 cm); sand, rapid permeability
2Cf—22 to 32 inches (56 to 81 cm); permanently frozen sand, impermeable

Minor Components

- Soils on slopes of more than 35 percent: 5 percent of the map unit
- Typic Histoturbels and similar soils: 5 percent of the map unit

Management Considerations

Soil-related factors: wetness, permafrost, wind erosion and water erosion, frost heaving, and steep slopes
Current uses: wildlife habitat
Potential uses: forestland and homesites

35—Water

Extent: 100 percent of the map unit

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, foresters, botanists, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and forestland; 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, permafrost, or unstable 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, and trails.

Crops and Pasture

Mark Kinney, district conservationist, Natural Resources Conservation Service, prepared this section.

At present there is no cropland, hayland or improved pastureland in the survey area. Limited amounts of vegetables for home use and grass crops, primarily for straw, are produced near the survey area at Nenana, Tanana, and Manley Hot Springs. Surface access to areas with the potential for agricultural and homestead development is limited to river systems. Because of such features as permafrost, wetlands, and steep dunes and terrace escarpments, road construction would be difficult and expensive.

Existing data suggests that in most years the frost-free period is insufficient for the successful production of commercially important crops such as wheat, barley, and potatoes. The growing season is sufficient for a variety of hay crops. Suitable crops include hay and haylage, permanent pasture, and some frost-hardy vegetables. Cole crops, such as cabbage, broccoli, and cauliflower, will mature each year. Other vegetable crops that are frost hardy and have a rapid germination and development cycle also mature. In established pastures and hayland areas of Interior Alaska, spring growth of grass generally begins by late May with a sudden surge of shoots and stems. The first hay crop is cut in mid to late June. This first crop is usually the most nutritious and the highest quality. A second hay cutting on intensively managed fields is possible in most years. This cutting is generally of lower feed value and requires clear, dry weather and an extended autumn for proper curing. Harvest as haylage is recommended if proper equipment is available.

Crop production in the survey area can vary significantly from year to year due to the climate. Midsummer frosts are possible and may reduce crop yields. Limited soil moisture could also be a problem. In the spring, prior to the soil thawing, much of the moisture stored in the snowpack is lost through surface runoff. Moisture available for spring seed germination is largely limited to that which the soil contained prior to the previous autumn freeze-up. During a dry spring and early summer, seed germination can be delayed by several days and sometimes weeks. The soil moisture holding capacity can be increased by following recommended conservation practices such as conservation tillage, and by reducing the amount of spring tillage.

The total acreage of soils in the survey area that have the potential for agricultural development and production total approximately 5,000 acres (2,025 ha). Arable soils occur in small units, and slopes can be highly variable over short distances.

Soils best suited for development of cropland and pastureland generally are in the eastern part of the survey area. These are the Koyukuk and Nenana soils on slopes of 12 percent or less. These soils do not occur in contiguous blocks large enough to make major agricultural development feasible. However, these units have a high potential for small-scale agriculture or for use as agricultural homestead sites. Some soils containing permafrost and associated perched water tables may be suitable for cultivation after clearing. These include the Iksgiza and Kindanina soils. Removal of the natural vegetation mat allows the soil to warm and subsequently results in a lowering of the permafrost level. Over a period of time, usually 5 to 7 years, permafrost and perched water tables may drop below the plow layer and allow field operations. The success of field development in nearly level and low-lying areas largely depends on the availablity of suitable surface drainage outlets.

Massive subsurface ice has been observed in some permafrost soils in the survey area. Melting of ice following clearing can cause uneven subsidence of the ground surface, known as thermokarst. In areas where thermokarst pitting occurs, the land must be smoothed repeatedly until the ground stabilizes, and field development can be slowed significantly. Operating farm machinery in affected areas can be hazardous, and appropriate safety precautions should be taken.

All soils in the survey area with agricultural potential are highly susceptible to erosion by wind and water if they are left exposed. Conservation practices are needed to protect the soils while they are developed and cultivated. Locally important conservation practices include winter site clearing, windbreaks, conservation tillage and cropping sequences, surface water disposal systems (where suitable drainage outlets area available), the establishment of a permanent cover of vegetation, and rotational livestock grazing. Increasing the content of organic matter in the soil and increasing the roughness of the soil surface reduces the hazard of wind erosion. Water erosion can be reduced by limiting tillage in areas where the slopes are more than 3 percent. On steeper slopes, contour cropping across the slopes and establishing a permanent cover of vegetation following land smoothing are highly recommended. Areas with slopes of more than 12 percent generally should not be cleared due to a severe hazard of water erosion.

On concave slopes of less than 3 percent, field access can be limited by wetness. Surface-water management systems, such as field ditches and grassed waterways, are recommended if suitable drainage outlets are available. These systems expedite the movement of surface water away from fields and are particularly important during the spring thaw when the soil is frozen and water perches in the soil profile. Properly installed and maintained surface-water management systems can speed field access by several critical days.

Land smoothing is also needed during land development to remove depressions and rough areas that would restrict the use of farm machinery and implements. In permafrost areas where differential ground subsidence occurs following initial land clearing, land smoothing may be necessary more than once during field development. Affected areas should be worked and planted to annual grass crops, such as oats, for 2 or 3 years before permanent vegetation is planted. This process generally allows adequate time for smoothing and field work-up.

Due to the low natural soil fertility, fertilizer application, green manure crops, and other practices that increase soil fertility are needed for successful crop production. Newly cleared soils in Interior Alaska generally require nitrogen to accelerate decomposition of organic matter and woody residues. Soil fertility tests are recommended prior to actual nutrient application.

Further information on adapted crop varieties, crop production, and general fertilizer recommendations for Interior Alaska are available from the Natural Resources Conservation Service and the Alaska Cooperative Extension.

Land Clearing

Land clearing in Interior Alaska is accomplished in several different ways, depending upon soils, season, and available equipment. Early winter clearing with a large bulldozer is recommended in most situations. Vegetation is sheared off to the frozen mineral soil surface and pushed into berm rows for drying and burning. When clearing is properly timed, little snow ends up in the berms and soil displacement is minimized. In areas where trees are large, the stand can be “walked down” with a bulldozer. This is usually done in the summer months so that tree root bases are exposed for later shearing and berming. Trees of commercial size can be harvested following walkdown, prior to shearing of remaining vegetation in early winter. In permafrost areas, vegetation shearing operations can take place into early summer since the soil remains frozen to the surface well into the season. Organic matter left after the initial ground clearing should be incorporated into the upper 4 inches (10 cm) of mineral soil with a breaking disc or other suitable tillage implement to improve tilth, fertility, and the water-holding capacity of the soils.

Natural drainage patterns in the area should be determined prior to clearing operations and berms should be placed parallel to the drainage ways. Berms placed perpendicular to the natural drainage pattern block spring surface flow of snowmelt and cause ponding. Berms should be allowed to dry for a minimum of one full summer before burning. Berms can be rebuilt by bulldozing the material remaining after the first burn, and then burned again. Ash and residue left after burning should be spread out over the fields and incorporated into the soil as field preparation progresses.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA 1961). Only capability class and subclass are used for soils in Alaska.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use. There are no Class 1 soils in Alaska due to the climate.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

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, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is

maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The acreage of soils in each capability class or subclass is shown in table 5.

Forestry

Darrell Kautz, plant ecologist, Natural Resources Conservation Service, prepared this section.

Except for incidental cutting of trees around remote cabin sites and along land survey lines, there has been no timber harvesting or other forest management activity within the survey area. Local utilization of forest resources for building materials and fuelwood would increase substantially in the future if the State of Alaska were to dispose of lands for homesteading or agriculture. Development of a commercial wood products industry would be dependent, in part, on extending the existing road system to access the area.

All tree species growing in the area are of value for wood products. White spruce (*Picea glauca*) provides good lumber for general construction purposes, is preferred for house logs, and can be used for posts and poles. Black spruce (*Picea mariana*) can be used for post and poles. Paper birch (*Betula papyrifera*) provides satisfactory small-dimension lumber and quality veneer. Quaking aspen (*Populus tremuloides*) can be used also for small-dimension lumber and veneer. Paper birch and tamarack (*Larix laricina*) are superior for fuelwood, although all species can be burned. All species, including balsam poplar (*Populus balsamifera*), can be used for wood chips and pulp.

Forest Vegetation

The Kantishna area is in the boreal forest zone of Interior Alaska. The major forest types of commercial importance are paper birch and white spruce. The paper birch type includes extensive pure stands of paper birch, as well as stands mixed with quaking aspen. White spruce is a common or minor component, in some areas forming mixed stands. Mature stands tend to be well stocked with trees up to 75 feet (23 m) tall and 12 inches (30 cm) or more in diameter. Heart-rot is prevalent in older stands of both paper birch and aspen. The paper birch forest type attains its best development on the deep, well drained soils of stabilized sand dunes and flood plains. Koyukuk, Nenana, Zitziana, and Beales soils are examples.

The white spruce forest type is not extensive in the Kantishna area. This forest type occurs in areas of well drained soils on bar deposits and natural levees of major flood plains. Pure stands of white spruce are rare on the uplands. White spruce grows rapidly on suitable sites, typically reaching or exceeding growth of 1 foot (.3 m) in height per year. Stands tend to be well stocked with trees up to 100 feet (30 m) tall and 15 inches (38 cm) or more in diameter. Old-growth stands greater than 200 years are occasionally found on the flood plains. The white spruce type frequently occurs as a later successional type on the same soils as the paper birch type. On flood plains, old-growth stands of white spruce often have permafrost within 40 inches (102 cm) of the surface.

Of lesser commercial value, but extensive in the Kantishna area, are the quaking aspen, mixed quaking aspen-spruce, and black spruce forest types. Quaking aspen and mixed aspen-spruce forests usually occur on shallow soils of stabilized sand dunes and hillslopes. Charred woody materials on the forest floor and other stand characteristics indicate periodic severe wildfires. Although the overstory typically is killed by fire, aspen readily sprout from root crowns immediately afterwards. Stands that develop from root suckers tend to be overstocked and stunted. Aspen less than 35 feet (11 m) tall and 5 inches (13 cm) in diameter are prevalent, as are young trees with advanced heart-rot. In mixed quaking aspen-spruce

stands, most of the spruce is black spruce, which is better adapted to periodic fires than white spruce. In general, the black spruce trees are of very poor form; broken and forked terminal leaders, “witches'-brooms,” and extensive layering are common. Some white spruce are found in aspen and mixed aspen-spruce stands. These trees tend to show excellent growth; they are tall and of good form. Beales, Zitziana, and occasionally Nenana soils support quaking aspen and mixed quaking aspen-spruce forest types.

The black spruce forest type occurs as extensive forestland and open stands on outwash plains, flood plains, and, in the southeastern part of the survey area, on stabilized sand dunes. Tamarack and stunted paper birch occur as minor or common components in many black spruce stands. The black spruce type is the least productive forest type in the area. Trees seldom exceed 40 feet (12 m) tall and 7 inches (18 cm) in diameter at maturity; dwarf stands of widely spaced trees less than 15 feet (4 m) tall are common. Soils that support black spruce typically have permafrost at a depth of less than 20 inches (51 cm). In level and gently sloping areas, water may be perched on the permafrost. Iksgiza and Kindanina soils are associated with the black spruce forest type.

The birch-ericaceous shrub type is found on the same soils as the black spruce forest type in level and nearly level areas. This vegetation type consists of low shrub vegetation with cottongrass tussocks on the soil surface. Common shrub species include shrub birch (*Betula glandulosum* and *B. nana*), Labrador tea (*Ledum decumbens* and *L. groenlandicum*), willow (*Salix spp.*), bog blueberry (*Vaccinium uliginosum*), and lowbush cranberry (*Vaccinium vitis*-idaea). Small clearings in the forest often support bluejoint reedgrass (*Calamagrostis canadensis*) meadows or, along the margins of ponds and in other wet areas, sedge (*Carex spp.*) wet meadows.

Forestry-Soil Interpretations

Soil surveys are becoming increasingly important to forest managers as they seek ways of improving the productivity and management of their lands and for planning the most efficient use of forest resources. Certain soils have a higher potential for productivity than others; some are more susceptible to compaction and erosion during and after harvesting, and others require special efforts if they are to be reforested.

Table 6 can serve as a quick reference for the more important forestry interpretations. The table lists the ordination (forestland suitability) symbol for each map unit in the survey area. Soils with the same ordination symbol have a similar potential productivity and require the same general kinds of forestland management.

The ordination symbol is based on a uniform system of labeling individual soils to indicate the potential productivity and the principal soil properties in relation to any hazards or limitations of that soil. The first element of the ordination symbol, is a number that denotes potential productivity in cubic meters of wood per hectare per year for the indicator species (the principal species listed in the soil map unit having the highest productivity). For example, a number 1 in the ordination symbol indicates potential productivity of 1 cubic meter of wood per hectare per year (14.3 cubic feet per acre per year); 10 indicates the soil has the potential to produce 10 cubic meters of wood per hectare per year (143 cubic feet per acre per year). The second element of the ordination symbol, the subclass, is a letter that indicates the major kind of soil limitation for tree growth and management. The letter *R* indicates restrictions due to steep slopes; *W* indicates excessive water in or on the soil; *D* indicates restrictions due to limited rooting depth; and *S* indicates limitations associated with dry sandy soils. The letter *A* indicates little or no limitations or restrictions.

In table 6, the soils are also rated for a number of factors to be considered in use and management. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations. For each *moderate* and *severe* rating, a statement in the applicable soil map unit description explains the soil factor or factors that are the basis of the rating.

Erosion hazard ratings refer to the risk of water erosion and soil loss from a noncompacted, bare soil surface for a period of 2 to 5 years following a major ground disturbance. A rating of *slight* indicates that expected soil loss is small and of no consequence to long-term potential productivity; *moderate* indicates measures are needed to control erosion during road construction and timber harvesting to prevent site degradation; and *severe* indicates that intensive management or special equipment and methods are needed to prevent excessive soil erosion. Water

erosion results from disturbance of the bare soil surface by raindrop impact and runoff, which detaches soil particles and carries them downslope. The velocity and volume of runoff increases, as does the hazard of erosion, as the gradient and length of a slope increases. Soils with a high content of silt and fine sand, a low content of organic matter, weak structure, and slow permeability are susceptible to erosion. Saturated soil conditions, which occur as seasonal frost thaws in late spring, also increase the hazard of erosion. Maintaining an adequate cover of vegetation, developing water-management structures, and avoiding surface disturbances, particularly during saturated conditions, can minimize erosion problems.

Equipment limitation ratings refer to the limits affecting the operability and use of wheeled and tracked equipment used for skidding logs during harvesting. A rating of *slight* indicates that the kind of equipment or time of year it can be used is not normally restricted because of soil factors; *moderate* indicates a short seasonal limitation due to soil wetness, a fluctuating water table, seasonal flooding, or some other factor; and *severe* indicates a longer seasonal limitation, a need for special equipment, or other factors affecting the safe use of equipment. The most obvious limitation is slope. As slope gradient increases, restrictions on the use of wheeled equipment also increases. In the steeper areas, tracked equipment must be used. In the steepest areas even tracked equipment cannot operate safely and more sophisticated harvesting systems must be used. Soil wetness can limit the use of equipment even in level and gently sloping areas, especially in combination with soils that have a surface layer of silty, fine sand, or organic surface material. Severe soil disturbance contributes to soil compaction and erosion. Other factors that affect the use of equipment include surface bedrock and rock fragments, cobbly and very cobbly surface textures and, in winter, a deep snowpack.

Seedling mortality ratings refer to the probability of death of naturally occurring and planted seedlings as influenced by soil or topographic conditions. Plant competition is not considered in the ratings. The ratings apply to healthy, dormant seedlings that are naturally established or properly planted. A rating of *slight* indicates that no problem is expected under normal conditions; *moderate* indicates that some mortality can be expected and extra precautions are advisable; and *severe* indicates that mortality will be high and extra precautions are essential for successful reforestation. Excessive soil wetness resulting from a high water table or saturated soil conditions, soil droughtiness caused by low available water capacity or landscape position, and a shallow or restricted rooting depth account for most seedling mortality problems. Special site preparation or reinforcement plantings may be needed on soils with a seedling mortality rating of moderate or severe.

Windthrow hazard ratings consider soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. Windthrow hazard is highly variable and is greatly affected by turbulence and wind funneling created by topography and cutting boundary patterns. Restricted rooting depth is the principal reason for an increased windthrow hazard. In Alaska, low soil temperatures and soil wetness restricts root growth, and supporting roots of all tree species typically are concentrated in the upper soil horizons. Because of the shallow rooting characteristics of trees in Alaska, a rating of *slight* is not used; a *moderate* rating indicates that occasionally a tree may be blown down during periods of excessive wetness combined with moderate or strong winds; and a rating of *severe* indicates that many trees may be expected to be blown down during such periods. In areas where soils have moderate and severe ratings more caution is needed during thinning operations and special attention should be given to wind direction and wind speed when designing timber sales and cuts. Plans for periodic salvage of windthrown trees may also be necessary.

Plant competition ratings refer to the likelihood of invasion or growth of understory plants, which would inhibit reforestation and stand development, following logging or other soil disturbances. A nearby seed source of the indicator tree species is assumed. The rating is highly variable and depends on the occurrence and proximity of competitive species. A rating of *slight* indicates that understory plants are not likely to delay reforestation and natural or planted seedlings have good prospects for development without undue competition; *moderate* indicates that plant competition will delay natural or planted reforestation; and *severe* indicates that competition can be expected to prevent the establishment of a new forest for tree crop production unless precautionary measures are taken. Favorable climate and soil moisture characteristics, which contribute to rapid and lush growth or invasion of understory plants, account for

most plant competition problems. Sources of competing vegetation include sprouting of existing plants, vegetative spread of plants from adjacent areas, and germination of new seed. *Moderate* and *severe* ratings indicate the need for careful and thorough post-harvest cleanup in preparation for reforestation, and, in some cases, mechanical or chemical treatments to retard growth of undesirable plants. Where the competing species is bluejoint reedgrass, intensive grazing by cattle for a few years can be used to reduce the grass cover and create a suitable seed bed for trees.

In table 6, the *potential productivity of common trees* on a soil is expressed as *site index*. Site index is determined from height and age measurements of selected trees from stands throughout the survey area. Tables and equations for determining site index are given in the appropriate publication for each principal tree species of the survey area (Farr 1967; Gregory and Haack 1965). Site index applies to fully stocked, even-aged, unmanaged stands. The most rapid tree growth and greatest yields of a particular species can be expected on soils with the highest site indices. Site index values can be converted into estimated yields at various ages using yield tables (Farr 1967; Gregory and Haack 1965). Actual stand volume varies from stand to stand and must be measured in the field. The *Volume of wood fiber*, described previously in relation to the ordination symbol and indicator tree species, is also listed in table 6.

Trees to manage are those that regenerate naturally under suitable conditions or that could be planted for reforestation. The species listed are suited to the soils and will produce a commercial wood crop. Trees are listed in the usual order of preference; however, the desired product, topographic position, and personal preference are only a few of the many factors that can influence which trees are selected for reforestation.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. Other tables indicate the suitability of the soils for use as source materials. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *source, probable source*, and *improbable source* or as *good, fair,* and *poor*. In some tables, *slight, moderate,* and *severe* are used to descrbie the degree to which certain soil features or site characteristics result in limitations that affect a specified use of the soil.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. The numerical ratings, as they relate to each specific interpretation, are explained in the sections that follow.

Recreation

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for foot and ATV trails. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical values in the table indicate the severity of individual limitations. The values are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00). If the soil is *not limited* (value = 0.00), no entry appears for the numerical value.

The ratings in the table 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 and vegetation.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities.

Foot and ATV trails for hiking, horseback riding, and ATV use should require little or no slope modification and site preparation through cutting and filling. These trails are not covered with surfacing material or vegetation. The ratings are based on the soil properties that affect trafficability, erodibility, dustiness, and the ease of revegetation. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Engineering

This section provides information for planning land uses related to building sites. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, and construction materials. The ratings are based on observed performance of the soils and on the estimates given under the heading “Soil Properties.”

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 between the surface and a depth of 5 to 7 feet (1.5 to 2.1 m). Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet (1.5 to 2.1 m) of the surface, soil wetness, depth to a water table, ponding, 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 kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 8 and 9

show the degree and kind of soil limitations that affect structures and site improvements, including dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical values in the table indicate the severity of individual limitations. The values are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00). If the soil is *not limited* (value = 0.00), no entry appears for the numerical value.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet (0.6 m) or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet (2.1 m). The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock, permafrost, or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet (0.6 m) or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock, permafrost, or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

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 soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO system group index number) (AASHTO 1998), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet (1.5 or 1.8 m) for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock, permafrost, or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when

excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches (101 cm); the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Tables 10 and 11 show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical values in the table indicate the severity of individual limitations. The values are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00). If the soil is *not limited* (value = 0.00), no entry appears for the numerical value.

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 4 and 6 feet (1.2 and 1.8 m) is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock, permafrost, or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet (1.2 m) below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

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. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock, permafrost, or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches (5 cm) per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches (101 cm), if the water table is high enough to raise the level of sewage in the lagoon, 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. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be

thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet (0.6 m) thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock, permafrost, or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet (1.8 m). For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid 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. A final cover of soil material at least 2 feet (0.6 m) thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock, permafrost, or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

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 the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Tables 12 and 13 give information about the soils as potential sources of gravel, sand, topsoil, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

In table 12 the soils are rated as a *source*, *probable source*, or *improbable source* of sand and gravel. A rating of *source* means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that

the soil is an improbable source. A number between 0.00 and 0.99 indicates the degree to which the soil is a probable source of sand or gravel. The number 1.00 indicates that the soil is a source of sand or gravel.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation is of sufficient thickness.

In table 13, the soils are rated *good, fair,* or *poor* as potential sources of topsoil and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil or roadfill. The lower the number, the greater the limitation. Only material in suitable quantity is evaluated.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches (102 cm) of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth, and the ease of excavating, loading, and spreading the material. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, and soil texture.

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.

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 (1.8 m) high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet (1.5 m). It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a 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 AASHTO classification of the soil) and linear extensibility (shrink-swell potential). Susceptibility to frost action is also considered. The soils are rated based on the most limiting layers. Often a soil will have finer textured upper layers that are affected by frost action, while coarser textured lower layers in the same soil may not be affected.

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others 1979; U.S. Army Corps of Engineers 1987; National Research Council 1995; Tiner 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information,

such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in *Soil Taxonomy* (USDA 1999) and *Keys to Soil Taxonomy* (USDA 1998) and in the *Soil Survey Manual* (USDA 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in *Field Indicators of Hydric Soils in the United States* (USDA 1996a).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches (50 cm). This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Those soils that meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators, are listed in table 14. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council 1995; USDA 1996a).

Some map units consist almost entirely of hydric soils, such as map unit 14—Kindanina mucky silt loam, 6 to 12 percent slopes (in which all listed components are hydric). Other map units consist primarily of nonhydric soils, such as map unit 2—Beales very fine sandy loam, 35 to 70 percent slopes, (in which all listed components are nonhydric), or map unit 1—Beales very fine sandy loam, 1 to 35 percent slopes (in which hydric soils are present only as minor components). Hydric soils may occur as minor inclusions even in map units listed without any hydric soils in table 14.

Table 14 also lists the local landform on which each soil occurs, the hydric criteria code, and whether or not each soil meets the saturation, flooding, or ponding criteria for hydric soils. Codes for hydric soil criteria are explained in the following key:

Key to Hydric Soil Criteria

1. All Histosols except Folists, or
2. Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, Pell great groups of Vertisols, Pachic subgroups, or cumulic subgroups that are:
   a. somewhat poorly drained and have a frequently occurring water table at less than 0.5 foot (ft) from the surface for a significant period (usually more than 2 weeks) during the growing season, or
   b. poorly drained or very poorly drained and have either:
      (1) a frequently occurring water table at less than 0.5 ft from the surface for a significant period (usually more than 2 weeks) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches (in), or for other soils
      (2) a frequently occurring water table at less than 1.0 ft from the surface for a significant period (usually more than 2 weeks) during the growing season if permeability is equal to or greater than 6.0 in/hour (h) in all layers within a depth of 20 in, or
      (3) a frequently occurring water table at less than 1.5 ft from the surface for a significant period (usually more than 2 weeks) during the growing season if permeability is less than 6.0 in/h in any layer within a depth of 20 in, or
3. Soils that are frequently ponded for a long duration or a very long duration during the growing season, or
4. Soils that are frequently flooded for a long duration or a very long duration during the growing season.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 15 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the USDA. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, 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 (ASTM 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1998).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches (75 mm) 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 (75 mm) in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-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.

Rock fragments larger than 10 inches (250 mm) in diameter and 3 to 10 inches (75 to 250 mm) 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 (75 mm) in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils

sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 16 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 16, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C (221 ºF). In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, 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 and septic tank absorption fields.

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 soil layer. The capacity varies, depending on soil properties that affect retention of water. 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.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is

expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 16 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation and the Revised Universal Soil Loss Equation (USDA 1996b) 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 and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. Soils are grouped according to the amount of stable aggregates more than 0.84 millimeter in size. Soils containing rock fragments can occur in any group. The groups are as follows:

1. 1 to 9 percent dry soil aggregates. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
2. 10 to 24 percent dry soil aggregates. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. 25 to 39 percent dry soil aggregates. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.
4. 25 to 39 percent dry soil aggregates with > 35 percent clay or > 5 percent calcium carbonate. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. 40 to 44 percent dry soil aggregates. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. 45 to 49 percent dry soil aggregates. These soils are very slightly erodible. Crops can easily be grown.
7. 50 percent or more dry soil aggregates. These soils are very slightly erodible. Crops can easily be grown.
8. Stony, gravelly, or wet soils and other soils not subject to wind erosion.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 17 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil 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.

Water Features

Table 18 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, 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 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.

The m*onths* in the table indicates the portion of the year in which the feature is most likely to be a concern.

Wet soil refers to a saturated zone in the soil. Table 18 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 18 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as *none, very rare, rare, occasional, frequent,* and *very frequent*. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

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 little or no horizon development.

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.

Soil Features

Table 19 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation.

Depth to top is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes 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 results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete 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 also is 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 (USDA 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Cryept (*Cry*, meaning cold, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Dystrocryepts (*Dystro*, meaning low low fertility, plus *cryept*, the suborder of the cold Inceptisols that have low fertility).

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 Dystrocryepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, mixed, superactive Typic Dystrocryepts.

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 vary within a series. An example from this survey area is the Koyukuk series.

Taxonomic Units and Their Morphology

In this section, each soil series and higher taxonomic unit recognized in the survey area is described.

Characteristics of the soil and the material in which it formed are identified for each taxanomic unit. 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* (USDA 1993). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy*

(USDA 1999) and in *Keys to Soil Taxonomy* (USDA 1998). Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Beales Series

Taxonomic Classification

- Sandy, mixed Typic Dystrocryepts

Setting

Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: somewhat excessively drained
Permeability: rapid
Position on the landscape: stabilized dunes on alluvial flats
Parent material: silty loess over eolian sands
Slope range: 1 to 70 percent
Elevation: 250 to 1,500 feet (76 to 457 m)

Typical Pedon

Beales very fine sandy loam—on a 1 percent slope, at 750 feet (229 m) elevation:

Oi—0 to 1 inch (0 to 3 cm); very dark grayish brown (10YR 3/2), slightly decomposed forest litter; abrupt smooth boundary.
A—1 to 3 inches (3 to 8 cm); dark yellowish brown (10YR 4/4) very fine sandy loam; weak fine granular structure; very friable; few fine roots; moderately acid; clear smooth boundary.
Bw—3 to 6 inches (8 to 16 cm); dark yellowish brown (10YR 3/4) very fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; moderately acid; clear smooth boundary.
2C—6 to 60 inches (16 to 152 cm); olive brown (2.5Y 4/4) fine sand; single grain; loose; moderately acid.

Typical Pedon Location

Map unit in which located: 1—Beales very fine sandy loam, 1 to 35 percent slopes
Location in survey area: NE¼, SE¼, Section 28, T1S, R17W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 4 inches (3 to 10 cm)
Depth to fine sand: 5 to 10 inches (13 to 25 cm)
Thickness of the solum: 5 to 10 inches (13 to 25 cm)

A horizon:
Color—value moist of 3 or 4; chroma moist of 2 to 4
Texture—silt loam or very fine sandy loam
Reaction—moderately acid or strongly acid

Bw horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value moist of 3 to 5; chroma moist of 4 to 6
Texture—silt loam or very fine sandy loam
Reaction—moderately acid or strongly acid

2C horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 4 to 6; chroma moist of 4 to 6
Texture—fine sand, loamy fine sand, or medium sand
Reaction—moderately acid or strongly acid

Bradway Series

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic Typic Aquiturbels

Setting

Depth class: shallow or moderately deep (14 to 40 inches, 38 to 102 cm) over permafrost
Drainage class: poorly drained
Permeability: moderate above the permafrost
Position on the landscape: depressions on flood plains and outwash plains
Parent material: alluvium
Slope range: 0 to 3 percent
Elevation: 250 to 400 feet (76 to 121 m)

Typical Pedon

Bradway mucky silt loam—on a 1 percent slope, at 310 feet (95 m) elevation:

Oe—0 to 1 inch (0 to 3 cm); very dark brown (10YR 2/2), moderately decomposed organic matter; abrupt smooth boundary.

A1—1 to 5 inches (3 to 13 cm); very dark grayish brown (2.5Y 3/2) mucky silt loam; massive; friable; common fine roots; slightly acid; clear smooth boundary.
A2—5 to 15 inches (13 to 39 cm); very dark brown (10YR 2/2), stratified fine sand to very fine sandy loam; massive; friable; common fine roots; slightly acid; abrupt smooth boundary.
Af—15 to 24 inches (39 to 61 cm); very dark brown (10YR 2/2), permanently frozen silt loam.

Typical Pedon Location

Map unit in which located: 25—Salchaket-Bradway complex, 0 to 3 percent slopes
Location in survey area: SE¼, NE¼, Section 5, T3S, R12W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 4 inches (3 to 10 cm)
Depth to permafrost: 14 to 40 inches (38 to 102 cm)

A horizons:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 2 or 3; chroma moist of 1 to 3
Texture—mucky silt loam, silt loam, very fine sandy loam, or fine sand
Reaction—moderately acid or slightly acid

C horizon (when present):
Color—hue of N, 5Y, or 2.5Y; value moist of 2 to 5; chroma moist of 1 or 2
Texture—silt loam, very fine sandy loam, or fine sandy loam
Reaction—neutral or slightly alkaline

Iksgiza Series

Taxonomic Classification

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, subgelic Typic Histoturbels

Setting

Depth class: moderately deep (20 to 40 inches, or 50 to 102 cm) over permafrost
Drainage class: poorly drained
Permeability: moderate above the permafrost
Position on the landscape: depressions on dunes and outwash plains
Parent material: silty loess over eolian sand
Slope range: 0 to 20 percent
Elevation: 250 to 1,500 feet (76 to 457 m)

Typical Pedon

Iksgiza peat—on a 12 percent slope, at 550 feet (168 cm) elevation:

Oi—0 to 7 inches (0 to 8 cm); very dark brown (10YR 2/2), slightly decomposed organic material; many fine and common medium roots; strongly acid; abrupt smooth boundary.
Oe—7 to 10 inches (8 to 25 cm); dark brown (10YR 2/2), moderately decomposed organic material; many fine and few medium roots; strongly acid; abrupt smooth boundary.
Bg—10 to 18 inches (25 to 45 cm); dark grayish brown (2.5Y 4/2) silt loam; many medium distinct olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; nonsticky and nonplastic; common very fine to medium roots; strongly acid; abrupt smooth boundary.
Cf1—18 to 38 inches (45 to 96 cm); light olive brown (2.5Y 5/4), permanently frozen silt loam; massive; very hard; moderately acid; clear smooth boundary.
2Cf2—38 to 60 inches (96 to 152 cm); pale olive (5Y 6/3), permanently frozen fine sand; massive; hard; moderately acid.

Typical Pedon Location

Map unit in which located: 11—Iksgiza-Zitziana-Nenana complex, 1 to 35 percent slopes
Location in survey area: NW¼, SE¼, Section 6, T2S, R14W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic material: 6 to 14 inches (13 to 36 cm)
Depth to permafrost: 20 to 40 inches (50 to 102 cm)
Depth to sandy underlying material: 10 to 40 inches (25 to 102 cm)
Depth to saturated soil: 10 to 30 inches (25 to 76 cm)

A horizon (when present):
Color—hue of 5YR, 7.5YR, or 10YR; value moist of 2 or 3; chroma moist of 1 to 3
Texture—silt loam or mucky silt loam
Reaction—strongly acid or moderately acid

Bg horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 3 to 5; chroma moist of 1 to 4
Texture—silt loam, very fine sandy loam; lenses of fine sandy loam in some pedons
Reaction—strongly acid to slightly acid

C or Cf horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 3 to 5; chroma moist of 2 to 4
Texture—silt loam, very fine sandy loam; lenses of fine sandy loam in some pedons
Reaction—moderately acid to neutral

2Cf horizon:
Color—hue of 2.5Y or 5Y; value moist of 3 to 6; chroma moist of 2 to 4
Texture—fine sand, loamy fine sand, sand, or loamy sand
Reaction—moderately acid to neutral

Kindanina Series

Taxonomic Classification

- Sandy, mixed, subgelic Typic Aquiturbels

Setting

Depth class: shallow or moderately deep (10 to 40 inches, or 25 to 100 cm) over permafrost
Drainage class: very poorly drained
Permeability: moderately rapid above the permafrost
Position on the landscape: depressions on dunes and outwash plains
Parent material: silty loess over eolian sand
Slope range: 0 to 20 percent
Elevation: 250 to 1,500 feet (76 to 457 m)

Typical Pedon

Kindanina mucky silt loam—on a 2 percent slope, at 700 feet (213 m) elevation:

Oi—0 to 4 inches (0 to 10 cm); brown (7.5YR 4/4) slightly decomposed moss and forest litter; many fine roots; abrupt smooth boundary.
A—4 to 6 inches (10 to 15 cm); black (10YR 2/1) mucky silt loam; strongly acid; common fine roots; abrupt smooth boundary.
B—6 to 10 inches (15 to 25 cm); dark yellowish brown (10YR 4/4) very fine sandy loam; massive; friable; moderately acid; abrupt smooth boundary.
2C1—10 to 16 inches (25 to 40 cm); very dark grayish brown (10YR 3/2) sand; single grain; loose; moderately acid; abrupt smooth boundary.
2C2—16 to 22 inches (40 to 56 cm); very dark grayish brown (10YR 3/2) sand; many medium prominent light olive gray (5Y 6/2) mottles; single grain; loose; moderately acid; abrupt smooth boundary.
2Cf—22 to 32 inches (56 to 81 cm); very dark grayish brown (10YR 3/2), permanently frozen sand; many medium prominent light olive gray (5Y 6/2) mottles; moderately acid.

Typical Pedon Location

Map unit in which located: 34—Zitziana-Kindanina complex, 1 to 35 percent slopes
Location in survey area: NE¼, SE¼, Section 7, T3S, R15W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 3 to 7 inches (8 to 18 cm)
Depth to sandy material: 8 to 18 inches (20 to 46 cm)
Depth to permafrost: 10 to 40 inches (25 to 100 cm)
Depth to saturated soil: 5 to 18 inches (12 to 46 cm)

A horizon:
Color—value moist of 2 to 4; chroma moist of 1 to 4
Texture—silt loam, mucky silt loam, fine sandy loam, or very fine sandy loam

B horizon (when present):
Color—hue of 10YR or 2.5Y; value moist of 4 or 5; chroma moist of 2 to 4
Texture—very fine sandy loam, fine sandy loam, or silt loam
Reaction—moderately acid or slightly acid

2C and 2Cf horizons:
Color—hue of 10YR or 2.5Y; value moist of 3 to 6
Texture—sand, loamy sand, fine sand, or loamy fine sand
Reaction—moderately acid or slightly acid

Koyukuk Series

Taxonomic Classification

- Coarse-silty, mixed, superactive Typic Dystrocryepts

Setting

Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: well drained
Permeability: moderate
Position on the landscape: loess-mantled dunes and hills on outwash plains
Parent material: loess
Slope range: 1 to 35 percent
Elevation: 250 to 1,500 feet (76 to 457 m)

Typical Pedon

Koyukuk silt loam—on a 12 percent slope, at 550 feet (168 m) elevation:

Oi—0 to 5 inches (0 to 13 cm); brown (10YR 4/3) slightly decomposed forest litter; abrupt smooth boundary.
E—5 to 7 inches (13 to 18 cm); grayish brown (10YR 5/2) silt loam; weak fine granular structure; friable; common medium and few coarse roots; strongly acid; abrupt smooth boundary.
Bw1—7 to 11 inches (18 to 27 cm); dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; few medium roots; strongly acid; gradual wavy boundary.
Bw2—11 to 15 inches (27 to 37 cm); brown (7.5YR 4/4) silt loam; moderate very thin platy structure; friable; few fine and medium roots; strongly acid; gradual wavy boundary.
C—15 to 60 inches (37 to 152 cm); light olive brown (2.5Y 5/6) and light gray (5Y 6/1) silt loam; massive; friable; moderately acid.

Typical Pedon Location

Map unit in which located: 16—Koyukuk silt loam, 1 to 35 percent slopes
Location in survey area: SE¼, SE¼, Section 30, T3S, R13W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 6 inches (3 to 15 cm)
Thickness of the solum: 9 to 24 inches (22 to 60 cm)

A horizon (when present):
Color—hue of 7.5YR or 10YR; value moist of 3 or 4; chroma moist of 2 to 4
Reaction—strongly acid or moderately acid

E horizon (when present):
Color—value moist of 4 or 5; chroma moist of 1 or 2
Reaction—strongly acid or moderately acid

Bw horizons:
Color—hue of 7.5YR or 10YR; value moist of 4 to 6; chroma moist of 3 to 6
Reaction—strongly acid or moderately acid

C horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 4 to 6; chroma moist of 1 to 6
Texture—silt loam or very fine sandy loam
Reaction—moderately acid or slightly acid

Lithic Dystrocryepts

Taxonomic Classification

- Lithic Dystrocryepts

Setting

Depth class: shallow to very shallow (7 to 20 inches, or 18 to 50 cm) over bedrock
Drainage class: well drained
Permeability: moderate in the loess mantle
Position on the landscape: slopes of bedrock hills
Parent material: loess over bedrock
Slope range: 15 to 70 percent
Elevation: 800 to 2,000 feet (243 to 609 m)

Representative Pedon

Lithic Dystrocryepts—on a 26 percent slope, at 1,350 feet (411 m) elevation:

Oi—0 to 1 inch (0 to 3 cm); slightly decomposed forest litter; abrupt smooth boundary.
A—1 to 3 inches (3 to 8 cm); black (10YR 2/1) silt loam; weak fine granular structure; very friable; many fine, medium and common coarse roots; strongly acid; clear wavy boundary.
Bw—3 to 10 inches (8 to 26 cm); brown (10YR 4/3) silt loam; weak thin platy structure; very friable; few fine roots; 2 percent gravel; moderately acid; clear wavy boundary.
2BC—10 to 15 inches (26 to 39 cm); brown (10YR 4/3), very gravelly silt loam; weak fine platy structure; very friable; 35 percent weathered slate gravel; moderately acid; clear wavy boundary.
2R—15 to 20 inches (39 to 50 cm); slate.

Representative Pedon Location

Map unit in which located: 29—Typic Dystrocryepts-Lithic Dystrocryepts association, 15 to 70 percent slopes
Location in survey area: SE¼, SW¼, Section 36, T1S, R18W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 7 inches (3 to 17 cm)
Depth to bedrock: 6 to 20 inches (15 to 50 cm)
Thickness of the solum: 6 to 20 inches (15 to 50 cm)

A horizon:
Color—hue of 7.5YR or 10YR; value moist of 2 to 4; chroma moist of 1 to 4
Texture—silt loam or very fine sandy loam
Reaction—strongly acid or moderately acid

Bw horizon:
Color—hue of 7.5YR or 10YR; value moist of 4 to 6; chroma moist of 3 to 6
Texture—silt loam or very fine sandy loam
Rock fragments—0 to 15 percent
Reaction—strongly acid to slightly acid

2BC horizon (when present):
Color—hue of 7.5YR or 10YR; value moist of 4 to 6; chroma moist of 3 to 6
Texture—gravelly silt loam or gravelly sandy loam
Rock fragments—15 to 60 percent
Reaction—moderately acid or slightly acid

Nenana Series

Taxonomic Classification

- Coarse-silty over sandy or sandy-skeletal, mixed, superactive Typic Dystrocryepts

Setting

Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: well drained
Permeability: moderate in the loess mantle, rapid in the sandy underlying material
Position on the landscape: stabilized dunes on alluvial plains
Parent material: silty loess over eolian sand
Slope range: 1 to 35 percent
Elevation: 250 to 1,500 feet (76 to 457 m)

Typical Pedon

Nenana silt loam—on an 8 percent slope, at 500 feet (302 m) elevation:

Oe—0 to 2 inches (0 to 5 cm); brown (10YR 4/3) moderately decomposed forest litter; very friable; abrupt wavy boundary.
A—2 to 4 inches (5 to 10 cm); dark grayish brown (10YR 4/2) silt loam; weak thin platy structure; very friable; slightly acid; abrupt wavy boundary.
Bw—4 to 26 inches (10 to 66 cm); yellowish brown (10YR 5/6 and 10YR 5/8) silt loam; weak medium blocky structure; friable; slightly acid; abrupt wavy boundary.
C—26 to 38 inches (66 to 96 cm); light olive brown (2.5Y 5/6) silt loam; weak coarse subangular blocky structure; very friable; slightly acid; abrupt wavy boundary.
2C—38 to 60 inches (96 to 152 cm); light olive brown (2.5Y 5/6) fine sand; single grain; loose; neutral.

Typical Pedon Location

Map unit in which located: 22—Nenana-Zitziana complex, 1 to 35 percent slopes
Location in survey area: SW¼, NE¼, Section 23, T1S, R19W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 4 inches (3 to 10 cm)
Depth to sandy material: 20 to 39 inches (50 to 99 cm)
Thickness of the solum: 6 to 27 inches (15 to 68 cm)
Reaction: strongly acid to slightly acid

A horizon:
Color—value moist of 2 to 5; chroma moist of 1 to 3
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 7.5YR or 10YR; value moist of 3 to 5; chroma moist of 3 to 8
Reaction—moderately acid or slightly acid

C horizon:
Color—hue of 10YR or 2.5Y; value moist of 3 to 5; chroma moist of 2 to 6
Texture—silt loam or very fine sandy loam
Reaction—moderately acid or slightly acid

2C horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 3 to 5; chroma moist of 2 to 6
Texture—fine sand or loamy fine sand
Reaction—slightly acid or neutral

Salchaket Series

Taxonomic Classification

- Coarse-loamy, mixed, superactive, nonacid Typic Cryofluvents

Setting

Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: well drained
Permeability: moderate
Position on the landscape: flood plains
Parent material: alluvium
Slope range: 0 to 3 percent
Elevation: 249 to 397 feet (76 to 121 m)

Typical Pedon

Salchaket silt loam—on a 0 percent slope, at 305 feet (93 m) elevation:

Oi—0 to 1 inch (0 to 3 cm); slightly decomposed forest litter; abrupt smooth boundary.
A—1 to 2 inches (3 to 5 cm); dark gray (5Y 4/1) silt loam; weak fine granular structure; friable; common fine to coarse roots; neutral; abrupt smooth boundary.
Oib—2 to 3 inches (5 to 8 cm); very dark grayish brown (10YR 3/2), slightly decomposed organic matter; moderately acid; abrupt smooth boundary.
Ab1—3 to 5 inches (8 to 13 cm); very dark brown (10YR 2/2) very fine sandy loam; weak fine granular structure; friable; common fine to coarse roots; slightly alkaline; abrupt smooth boundary.
Ab2—5 to 6 inches (13 to 16 cm); very dark gray (10YR 3/1) silt loam; weak fine granular structure; friable; slightly alkaline; abrupt smooth boundary.
C—6 to 60 inches (16 to 152 cm); olive gray (5Y 4/2) stratified silt loam, very fine sandy loam, and very fine sand; many fine distinct dark yellowish brown (10YR 4/6) mottles; massive; friable; slightly alkaline.

Typical Pedon Location

Map unit in which located: 25—Salchaket-Bradway complex, 0 to 3 percent slopes
Location in survey area: SW¼, SE¼, Section 4, T4S, R13W, Fairbanks Meridian.

Range in Characteristics

Thickness of the organic mat: 0 to 3 inches (0 to 8 cm)

A horizons:
Color—hue from 7.5YR to 5Y; value moist of 2 to 4; chroma moist of 1 to 3
Texture—silt loam, very fine sandy loam, or fine sandy loam
Reaction—neutral or slightly alkaline

C horizon:
Color—hue from 10YR to 5Y; value moist of 4 or 5; chroma moist of 2 or 3
Texture—stratified silt loam, very fine sandy loam, fine sandy loam, or very fine sand
Reaction—neutral or slightly alkaline

Saulich Series

Taxonomic Classification

- Coarse-silty, mixed, superactive, subgelic Typic Histoturbels

Setting

Depth class: moderately deep (16 to 30 inches, or 40 to 76 cm) over permafrost
Drainage class: poorly drained
Permeability: moderate above the permafrost
Position on the landscape: depressions on hillsides and outwash plains
Parent material: loess
Slope range: 0 to 45 percent
Elevation: 499 to 2,000 feet (152 to 609 m)

Typical Pedon

Saulich mucky peat—on a 3 percent slope, at 550 feet (168 m) elevation:

Oe—0 to 10 inches (0 to 25 cm); moderately decomposed organic matter; very friable; common fine and medium roots; abrupt wavy boundary.

A—10 to 14 inches (25 to 35 cm); dark brown (10YR 3/3) silt loam; weak thin platy structure; friable; common fine and medium roots; strongly acid; abrupt wavy boundary.
Bg1—14 to 20 inches (35 to 50 cm); light olive brown (2.5Y 5/4) silt loam; few fine faint grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; few fine and very fine roots; moderately acid; clear wavy boundary.
Bg2—20 to 27 inches (50 to 68 cm); light olive brown (2.5Y 5/4) and grayish brown (2.5Y 5/2) silt loam; weak medium subangular blocky structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.
Bgf—27 to 37 inches (68 to 94 cm); grayish brown (2.5Y 5/2) permanently frozen silt loam; common fine and medium light olive brown (2.5Y 5/4) mottles; massive; very firm.

Typical Pedon Location

Map unit in which located: 26—Saulich peat, 0 to 6 percent slopes
Location in survey area: SE¼, NW¼, Section 25, T2S, R21W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 8 to 14 inches (20 to 36 cm)
Depth to permafrost: 16 to 30 inches (40 to 76 cm)

A horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value moist of 2 to 4; chroma moist of 1 to 3

Bg and Bgf horizons:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 3 to 5; chroma moist of 1 to 4
Reaction—moderately acid or slightly acid

Terric Hemistels

Taxonomic Classification

- Terric Hemistels

Setting

Depth class: very shallow to moderately deep (6 to 40 inches, or 15 to 102 cm) over permafrost
Drainage class: very poorly drained
Permeability: rapid above the permafrost
Position on the landscape: depressions on alluvial flats, flood plains, and outwash plains
Parent material: organic matter over silty loess
Slope range: 0 to 3 percent
Elevation: 250 to 1,000 feet (76 to 304 m)

Representative Pedon

Terric Hemistels—on a 1 percent slope, at 745 feet (227 m) elevation:

Oi—0 to 14 inches (0 to 36 cm); very dark grayish brown (10YR 3/2), slightly decomposed organic matter; many fine and medium roots; strongly acid; clear smooth boundary.
Oe—14 to 20 inches (36 to 50 cm); black (10YR 2/1), moderately decomposed organic matter; many fine and medium roots; moderately acid; abrupt smooth boundary.
A—20 to 22 inches (50 to 56 cm); dark grayish brown (2.5YR 4/2) silt loam; weak fine granular structure; few fine roots; slightly acid; abrupt smooth boundary.
Bf—22 to 32 inches (56 to 81 cm); dark grayish brown (10YR 4/2), permanently frozen silt loam; massive; slightly acid.

Representative Pedon Location

Map unit in which located: 23—Terric Hemistels, 0 to 2 percent slopes
Location in survey area: NW¼, SW¼, Section 19, T2S, R18W, Fairbanks Meridian

Range in Characteristics

Depth to permafrost: 6 to 40 inches (15 to 102 cm)

O horizon:
Color—hue of 5YR, 7.5YR, 10YR, 2.5Y, or 5Y; value moist of 2 to 4; chroma moist of 1 to 3
Reaction—strongly acid or moderately acid

Tetlin Series

Taxonomic Classification

- Coarse-loamy, mixed, superactive, subgelic Typic Aquiturbels

Setting

Depth class: shallow to deep (11 to 60 inches, or 28 to 152 cm) over permafrost
Drainage class: poorly drained

Permeability: moderate above the permafrost
Position on the landscape: hillsides
Parent material: loess
Slope range: 15 to 50 percent
Elevation: 800 to 2,000 feet (243 to 609 m)

Typical Pedon

Tetlin mucky silt loam—on a 2 percent slope, at 1,600 feet (488 m) elevation:

Oi—0 to 3 inches (0 to 8 cm); slightly decomposed peat; clear smooth boundary.
Oe—3 to 7 inches (8 to 18 cm); moderately decomposed peat; abrupt wavy boundary.
A—7 to 9 inches (18 to 23 cm); very dark brown (10YR 2/2) mucky silt loam; weak fine granular structure; very friable; common very fine and fine, and few medium roots; strongly acid; clear wavy boundary.
Bw—9 to 12 inches (23 to 31 cm); brown (7.5YR 4/4) and light olive brown (2.5Y 5/4) silt loam; weak thin platy structure; very friable; few fine and very fine roots; strongly acid; clear irregular boundary.
Bg—12 to 38 inches (31 to 97 cm); dark grayish brown (2.5Y 4/2) silt loam; common medium distinct strong brown (7.5YR 4/6) mottles; weak thin platy structure; moderately acid; abrupt wavy boundary.
Bgf—38 to 60 inches (97 to 152 cm); dark grayish brown (2.5Y 4/2), permanently frozen silt loam; common medium distinct strong brown (7.5YR 4/6) mottles.

Typical Pedon Location

Map unit in which located: 31—Typic Dystrocryepts-Tetlin-Saulich association, 15 to 70 percent slopes
Location in survey area: SE¼, SE¼, Section 8, T3S, R19W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 7 inches (3 to 18 cm)
Depth to permafrost: 11 to 60 inches (28 to 152 cm)

A horizon:
Color—value moist of 2 or 3; chroma moist of 1 or 2
Texture—silt loam or mucky silt loam
Reaction—strongly acid or moderately acid

Bw horizon (*when present*):
Color—value moist of 3 to 5; chroma moist of 3 or 4
Reaction—strongly acid or moderately acid

Bg and Bgf horizons:
Color—hue of 5Y, 2.5Y, or 10YR; value moist of 3 to 5; chroma moist of 1 or 2
Texture—silt loam, fine sandy loam

Typic Aquiturbels

Taxonomic Classification

- Typic Aquiturbels

Setting

Depth class: moderately deep (24 to 40 inches, or 61 to 102 cm) over permafrost
Drainage class: poorly drained
Permeability: moderate above the permafrost
Position on the landscape: depressions on loess-mantled dunes and thermokarsted loess plain
Parent material: loess
Slope range: 1 to 30 percent
Elevation: 400 to 1,000 feet (122 to 305 m)

Representative Pedon

Typic Aquiturbels—on a 5 percent slope, at 550 feet (168 m) elevation:

Oa—0 to 4 inches (0 to 10 cm); highly decomposed organic matter; abrupt wavy boundary.
A—4 to 8 inches (10 to 20 cm); very dark grayish brown (10YR 3/2) silt loam; weak coarse subangular blocky structure; very friable; nonsticky and nonplastic; strongly acid; abrupt wavy boundary.
Bg1—8 to 24 inches (20 to 61 cm); dark grayish brown (10YR 4/2) silt loam; common fine to medium distinct dark yellowish brown (10YR 3/4) mottles; weak medium subangular blocky structure; friable; nonsticky and nonplastic; strongly acid; abrupt wavy boundary.
Bg2—24 to 28 inches (61 to 71 cm); dark grayish brown (10YR 4/2) silt loam; common fine to medium distinct dark yellowish brown (10YR 3/4) mottles; weak thin to medium platy structure; firm; nonsticky and nonplastic; strongly acid; abrupt smooth boundary.
Bgf—28 to 30 inches (71 to 86 cm); dark grayish brown (10YR 4/2), permanently frozen silt loam;

common fine to medium distinct dark yellowish brown (10YR 3/4) mottles; massive; very firm; nonsticky and nonplastic; slightly acid.

Representative Pedon Location

Map unit in which located: 18—Koyukuk-Typic Aquiturbels complex, pitted, 1 to 35 percent slopes
Location in survey area: NW¼, Section 34, T2S, R20W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 3 to 7 inches (8 to 18 cm)
Depth to permafrost: 24 to 40 inches (61 to 102 cm)
Reaction: extremely acid to strongly acid in the organic horizons; strongly acid to slightly acid in the mineral horizons

A horizon:
Color—value moist of 2 to 4; chroma moist of 1 or 2
Texture—silt loam or mucky silt loam
Reaction—strongly acid to slightly acid

Bw horizon (when present):
Color—hue of 10YR or 2.5Y; value moist of 3 to 5; chroma moist of 3 or 4

Bg and Bgf horizons:
Color—hue of 5Y, 2.5Y, or 10YR; value moist of 3 to 5; chroma moist of 1 or 2
Reaction—strongly acid to slightly acid

Typic Cryaquepts

Taxonomic Classification

- Typic Cryaquepts

Setting

Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: poorly drained
Permeability: moderate in the loamy surface mantle, moderately rapid to rapid in the underlying sandy material
Position on the landscape: depressions on alluvial flats and flood plains
Parent material: loess overlying alluvium
Slope range: 0 to 3 percent
Elevation: 250 to 1,000 feet (76 to 304 m)

Representative Pedon

Typic Cryaquepts—on a 0 percent slope, at 725 feet (221 m) elevation:

Oi—0 to 2 inches (0 to 5 cm); slightly decomposed organic matter; abrupt wavy boundary.
A—2 to 6 inches (5 to 15 cm); dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure parting to weak fine granular; very friable; many very fine and fine roots; strongly acid; clear wavy boundary.
Bg1—6 to 22 inches (15 to 56 cm); very dark grayish brown (10YR 3/2), stratified silt loam and fine sand; common fine distinct olive brown (2.5YR 4/6) mottles; weak fine to medium platy structure; very friable; common very fine and fine roots; moderately acid; gradual wavy boundary.
Bg2—22 to 42 inches (56 to 107 cm); very dark grayish brown (10YR 3/2), stratified silt loam and fine sand; many medium distinct olive brown (2.5YR 4/6) mottles; weak thin to medium subangular blocky structure; very friable; few very fine and fine roots; slightly acid; gradual wavy boundary.
2C—42 to 60 inches (107 to 152 cm); olive brown (2.5Y 4/4), extremely gravelly sand; single grain; loose; neutral.

Representative Pedon Location

Map unit in which located: 28—Typic Cryaquepts, 0 to 2 percent slopes
Location in survey area: NE¼, NE¼, Section 27, T1S, R18W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 6 inches (3 to 15 cm)
Depth to sandy material: 0 to more than 60 inches (0 to more than 152 cm)

A horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value moist of 2 to 4; chroma moist of 1 to 3
Texture—silt loam, very fine sandy loam
Reaction—strongly acid or moderately acid

Bg horizons:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 3 to 5; chroma moist of 0 to 4

Texture—silt loam, very fine sandy loam, fine sandy loam, fine sand
Reaction—moderately acid or slightly acid

2C horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 3 to 6; chroma moist of 2 to 5
Texture—silt loam, very fine sandy loam, fine sandy loam, loamy fine sand, loamy sand, fine sand, medium sand, gravel
Reaction—slightly acid or neutral

Typic Cryopsamments

Taxonomic Classification

- Typic Cryopsamments

Setting

Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: excessively drained
Permeability: rapid
Position on the landscape: natural levees
Parent material: eolian sands overlying alluvium
Slope range: 0 to 5 percent
Elevation: 250 to 400 feet (76 to 121 m)

Representative Pedon

Typic Cryopsamments—on a 1 percent slope, at 300 feet (91 m) elevation:

Oi—0 to 1 inch (0 to 3 cm); very dark gray (10YR 3/1), slightly decomposed forest litter; abrupt smooth boundary.
A—1 to 2 inches (3 to 6 cm); dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; few fine roots; moderately acid; abrupt smooth boundary.
2C—2 to 60 inches (6 to 152 cm); olive brown (2.5Y 4/4) fine sand; single grain; few fine roots; loose; moderately acid.

Representative Pedon Location

Map unit in which located: 32—Typic Cryopsamments, Typic Cryaquepts, flooded, and Bradway soils, 0 to 5 percent slopes
Location in survey area: SW¼, SW¼, Section 18, T1S, R15W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 4 inches (3 to 10 cm)

A horizon:
Color—hue of 7.5YR, 10YR, or 2.5Y; value moist of 2 to 4; chroma moist of 1 to 3
Texture—very fine sandy loam or silt loam
Reaction—moderately acid or strongly acid

2C horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 4 to 6; chroma moist of 4 to 8
Texture—fine sand, medium sand, loamy fine sand, or loamy sand
Reaction—slightly acid to strongly acid

Typic Dystrocryepts

Taxonomic Classification

- Typic Dystrocryepts

Setting

Depth class: moderately deep to very deep (21 to more than 60 inches, or 54 to more than 152 cm) over bedrock
Drainage class: well drained
Permeability: moderate to rapid
Position on the landscape: hillsides
Parent material: loess over eolian sand
Slope range: 3 to 70 percent
Elevation: 800 to 2,000 feet (243 to 609 m)

Representative Pedon

Typic Dystrocryepts—on an 18 percent slope, at 1,400 feet (427 m) elevation:

Oi—0 to 1 inch (0 to 3 cm); slightly decomposed forest litter; abrupt wavy boundary;
A—1 to 3 inches (3 to 8 cm); brown (10YR 5/3) silt loam; weak fine granular structure; very friable; many fine roots; moderately acid; clear wavy boundary.
Bw—3 to 7 inches (8 to 18 cm); strong brown (7.5YR 4/6) and dark yellowish brown (10YR 4/6) silt loam; weak fine subangular blocky structure; very friable; common fine roots; moderately acid; clear wavy boundary.

C1—7 to 13 inches (18 to 33 cm); light yellowish brown (2.5Y 6/4) very fine sandy loam; massive; friable; few fine roots; moderately acid; clear wavy boundary.
2C2—13 to 51 inches (33 to 130 cm); grayish brown (2.5Y 5/2) fine sand; single grain; loose; slightly acid; abrubt smooth boundary.
3R—51 to 60 inches (130 to 152 cm); unweathered bedrock.

Representative Pedon Location

Map unit in which located: 29—Typic Dystrocryepts-Lithic Dystrocryepts association, 15 to 70 percent slopes
Location in survey area: SE¼, SW¼, Section 36, T1S, R18W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 0 to 7 inches (0 to 18 cm)
Depth to sand: 5 to more than 60 inches (13 to more than 152 cm)
Depth to bedrock: 21 to more than 60 inches (54 to more than 152 cm)
Thickness of the solum: 4 to 20 inches (10 to 50 cm)

A horizon:
Color—hue of 7.5YR or 10YR; value moist of 2 to 5; chroma moist of 2 to 4
Texture—silt loam, very fine sandy loam
Reaction—moderately acid or strongly acid

Bw horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value moist of 4 to 6; chroma moist of 4 to 6
Texture—silt loam or very fine sandy loam
Reaction—moderately acid or slightly acid

C horizon (when present):
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 4 to 6; chroma moist of 4 to 8
Texture—silt loam or very fine sandy loam
Rock fragments—0 to 60 percent
Reaction—moderately acid or slightly acid

2C horizon (when present):
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 4 to 6; chroma moist of 2 to 8
Texture—fine sand, medium sand, loamy fine sand, loamy sand, fine sandy loam, sandy loam
Rock fragments—0 to 60 percent
Reaction—moderately acid to neutral

Typic Histoturbels

Taxonomic Classification

Typic Histoturbels

Setting

Depth class: very shallow to shallow (8 to 18 inches, or 20 to 45 cm) over permafrost
Drainage class: very poorly drained
Permeability: moderate above the permafrost
Position on the landscape: depressions on flood plains and low terraces
Parent material: alluvium
Slope range: 0 to 15 percent
Elevation: 250 to 400 feet (76 to 121 m)

Representative Pedon

Typic Histoturbels—on a 0 percent slope, at 325 feet (99 m) elevation:

Oi—0 to 6 inches (0 to 15 cm); yellowish brown (10YR 5/8), slightly decomposed peat; common fine roots; strongly acid; abrupt smooth boundary.
Oe—6 to 11 inches (15 to 27 cm); very dark brown (10YR 2/2), moderately decomposed peat; few fine roots; strongly acid; abrupt smooth boundary.
Af—11 to 13 inches (27 to 32 cm); very dark grayish brown (10YR 3/2), frozen silt loam; massive; moderately acid; abrupt smooth boundary.
Cgf—13 to 23 inches (32 to 59 cm); dark gray (5Y 4/1), permanently frozen silt loam; massive; moderately acid.

Representative Pedon Location

Map unit in which located: 4—Typic Histoturbels, Terric Hemistels, and Bradway soils, 0 to 2 percent slopes
Location in survey area: SW¼, NE¼, Section 18, T1S, R15W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 8 to 14 inches (20 to 35 cm)
Depth to permafrost: 8 to 18 inches (20 to 45 cm)

O horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value moist of 2 to 5; chroma moist of 1 to 8
Texture—fibric or hemic peat

A or Af horizon:
Color—value moist of 2 or 3; chroma moist of 1 to 3
Texture—silt loam, mucky silt loam
Reaction—strongly acid to moderately acid

Cg or Cgf horizon:
Color—hue of 5Y, 2.5Y, or 10YR; value moist of 3 or 4; chroma moist of 1 to 3
Texture—silt loam, fine sandy loam, loamy fine sand, or fine sand
Reaction—strongly acid to slightly acid

Zitziana Series

Taxonomic Classification

- Coarse-silty over sandy or sandy-skeletal, mixed, superactive Typic Dystrocryepts

Setting

Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: somewhat excessively drained
Permeability: moderate in loess mantle, rapid in sandy underlying material
Position on the landscape: stabilized sand dunes on alluvial plains
Parent material: silty loess over eolian sand
Slope range: 1 to 50 percent
Elevation: 250 to 1,500 feet (76 to 457 m)

Typical Pedon

Zitziana silt loam—on a 2 percent slope, at 550 feet (168 m) elevation:

Oi—0 to 1 inch (0 to 3 cm); brown (10YR 4/3), slightly decomposed forest litter; very friable; many fine, medium, and coarse roots; abrupt wavy boundary.
A—1 to 2 inches (3 to 6 cm); dark grayish brown (10YR 4/2) silt loam; weak thin platy structure; very friable, many fine, medium, and coarse roots; neutral; abrupt wavy boundary.
E—2 to 3 inches (6 to 8 cm); pale brown (10YR 6/3) silt loam; weak thin platy structure; very friable; many fine, medium, and coarse roots; slightly acid; abrupt wavy boundary.
Bw—3 to 16 inches (8 to 41 cm); strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; very friable; many fine and medium roots; slightly acid; abrupt wavy boundary.
2C—16 to 60 inches (41 to 152 cm); light olive brown (2.5Y 5/6) fine sand; single grain; loose; slightly acid.

Typical Pedon Location

Map unit in which located: 15—Kindanina-Beales-Zitziana complex, dunes, 1 to 50 percent slopes
Location in survey area: NW¼, SE¼, Section 18, T1S, R18W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 5 inches (3 to 13 cm)
Depth to sandy material: 10 to 20 inches (25 to 50 cm)
Thickness of the solum: 3 to 20 inches (8 to 50 cm)

A horizon:
Color—hue of 7.5YR or 10YR; value moist of 2 to 4; chroma moist of 1 to 4
Texture—silt loam or very fine sandy loam
Reaction—slightly acid or neutral

E horizon (when present):
Color—value moist of 4 to 6; chroma moist of 2 or 3
Texture—silt loam or very fine sandy loam

Bw horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value moist of 4 to 6; chroma moist of 4 to 8
Texture—silt loam or very fine sandy loam
Reaction—slightly acid or neutral

C horizon (when present):
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 4 to 6; chroma moist of 4 to 8
Texture—silt loam or very fine sandy loam

2C horizon:
Color—hue of 10YR, 2.5Y, or 5Y; value moist of 4 or 5; chroma moist of 2 to 6
Texture—fine sand, loamy fine sand, or medium sand
Reaction—slightly acid or neutral

Formation of the Soils

Soil is the unconsolidated mineral and organic material on the surface of the earth that serves as a natural medium for the growth of land plants (USDA 1999). Because soil has been subjected to and influenced by numerous physical and chemical weathering processes, it differs from the material from which it was derived in many physical, chemical and morphological properties. Soil formation also is influenced by genetic and environmental factors of climate (including temperature and moisture effects), topography, parent material, and living organisms, all acting over a period of time. The influence of any one of these factors varies from place to place, and the interaction of all of them determines the kind of soil that forms (Jenny 1941).

The Kantishna area lies within the Interior Alaska Lowlands Major Land Resource Area (USDA 1981). This area includes the Tanana River and several tributaries—the Kantishna, Zitziana and Cosna Rivers. The survey area includes five main physiographic units: 1) flood plains; 2) loess-mantled sand dunes on an alluvial plain; 3) a thermokarsted plain; 4) bedrock-controlled hillslopes; and 5) loess-covered lowlands between the bedrock-controlled hills. In the following paragraphs, climate, soil temperature, and permafrost are described for the survey areas as a whole and parent material, topography, time, and biological activity are discussed separately for each physiographic area.

Climate and Permafrost

The survey area has a subarctic, continental climate. Summers are short and warm, and winters are long and cold. The short duration of periods of warm air and warm soil temperatures results in slow decomposition of organic matter and slow weathering of soil minerals. Furthermore, low precipitation restricts leaching of the soil by infiltrating water. The result is the formation of cambic horizons by slight weathering of the parent material in place.

The Kantishna area lies within the zone of discontinuous permafrost (Péwé 1975). Permafrost underlies much of the survey area, with the exception of stabilized sand dunes of high relief, active flood plains, and lakes. Permafrost commonly occurs as fine ice crystals and thin discontinuous ice lenses throughout the soil matrix. Massive ice features have been observed and may be widespread in the subsurface layers. Soils with extensive ground ice usually liberate large quantities of water and subside substantially when they thaw.

Permafrost occurs in the survey area in the Iksgiza and Kindanina soils and in the Typic Histoturbels, Typic Aquiturbels, and Terric Hemistels. Because permafrost is impermeable to water, soil drainage is restricted and a perched water table commonly occurs above the permafrost. Saturated soil is susceptible to frost heaving during the winter as a result of an increase in soil volume upon freezing. The magnitude of volume increase is commonly greater than would be expected from freezing of existing soil moisture because of migration of additional water into the freezing zone and the segregation of ice lenses (Fahely 1974). Repeated cycles of freezing and thawing favors the development of irregular surface microrelief, or hummocks, in soils with shallow permafrost and perched water table. Convolution and fracturing of soil horizons, which occurs during freezing and subsequent thawing, reduces the degree of soil horizon development.

Soil temperatures vary widely depending, to a large degree, on the type of vegetation and thickness of the forest floor and elevation. Permafrost in the survey area generally is within 20 inches (50 cm) of the surface of the organic mat, and commonly is within 10 inches (25 cm). The cold climate of the area causes a reduction in the rate and degree of organic matter decomposition and, as a result, organic matter tends to accumulate on the soil surface. In addition, forest succession is often accompanied by the development of a thick layer of moss on the forest floor. The combined moss and

organic layer function as an excellent insulator against changes in soil temperature, most importantly, by limiting the degree of soil warming during the summer. Under mature black spruce forests, soils typically have a thick moss layer, an organic surface horizon, and have permafrost within a depth of 10 inches (25 cm). Under mature paper birch and aspen forests, soils typically have a thin organic layer consisting mostly of forest litter and do not have permafrost.

Soil temperature and the occurrence of permafrost also are influenced by topography. Typic Dystrocryepts-Tetlin-Saulich association, 15 to 70 percent slopes, provides an example of this relationship. The poorly drained permafrost soils (Tetlin and Saulich) occur on slightly concave sideslopes and footslopes, where moisture collects, drainage is restricted, and a thick moss mat is present. They also occur on north-facing slopes, which receive little solar radiation. Mature black spruce forests occur in these areas. The well drained Typic Dystrocryepts soils do not have permafrost and are on the crests and convex side slopes. These areas support a mixed forest of white spruce and paper birch.

Soil texture also exerts some control over soil temperature (Rieger 1983). In general, coarse-textured soils respond more quickly to changes in air temperature, warm more rapidly in spring, and thaw more deeply in summer than finer textured soils. Soil temperatures in late summer at a depth of 20 inches (50 cm) in the sandy Beales soils ranged from 50 to 60 degrees F (10 to 16 ºC). In areas of the silt loam Koyukuk soils, late summer soil temperatures ranged from 42 to 50 degrees F (6 to 10 ºC). The effects of a thick moss/organic layer on the soil surface and a shallow water table can mask the effect of texture on soil temperature.

Physical and chemical weathering processes and plant and animal activity also are restricted by low soil temperatures. Primary weathering processes include oxidation and reduction and alteration and translocation of minerals. Because these processes are active only during warm summer months, soil profile development occurs very slowly in cold climates. Soil weathering and profile development do not occur in permafrost.

Small alases (thermokarst depressions with steep sides and a flat to concave grass-covered floor) have formed in permafrost areas where buried ice masses have melted. Disturbance of the organic mat or a change in climate caused the permafrost to melt. This melting caused a sequential development of collapse areas with lakes, infilling of the lakes, and revegetation of the site (Washburn 1973). Most alases in the survey area range from less than 1 acre (1 ha) to several acres in size. Alases range from recently formed thaw lakes to completely grass-covered swales that support, a small amount of shrubby vegetation. These areas may collect and pond water up to several feet deep during the spring. Typic Cryaquepts, 0 to 2 percent slopes, occurs in alases.

The very irregular topography in the western part of the survey area (for example, the topogrpahy in areas of Iksgiza-Beales-Zitziana complex, pitted, 1 to 50 percent slopes) probably formed by subsidence caused by the melting of large buried ice masses (Czudek and Demek 1970). Surfaces with smooth topography and slightly higher elevation (Saulich peat, 0 to 6 percent slopes, and Saulich peat, 6 to 30 percent slopes) occur adjacent to the thermokarsted region. These areas have continuous permafrost and probably the large buried ice masses that melted in the adjacent thermokarsted land.

Soils on stabilized sand dunes of high relief generally have only a thin organic layer, do not have permafrost, and are well drained or somewhat excessively drained. Soils on these landforms include Koyukuk, Nenana, Zitziana, and Beales soils. Some soils on stabilized sand dunes with a deep loess mantle currently do not have permafrost but have features that indicate former permafrost within a depth of 60 inches (152 cm). It is not expected that the permafrost level will reinvade the soil profile under present vegetation and climatic conditions.

Wild fires in Interior Alaska tend to be high-intensity crown fires that kill and replace entire stands (Viereck and Schandelmeier 1980). When the overstory and insulative organic mat are removed and the forest floor is blackened, the soil surface receives and absorbs more solar radiation, which is transferred as heat to the subsoil. If the fire was severe enough to consume the entire organic layer and expose mineral soil, the conduction of heat to the subsoil is quite effective. Immediately after the fire and for a number of years thereafter, increased soil temperatures promote thawing of the permafrost and an increase in the thickness of the active layer above the permafrost.

Although reinvasion of the permafrost with post-fire forest succession occurs, the time required to reach pre-burn depths is not well documented. It depends, in part, on the depth of the organic layer consumed by fire and the rate of revegetation.

(Viereck and Schandelmeier 1980). Foote (1983) and Viereck (1983) suggest that in the black spruce forest type in Interior Alaska, a century may pass before the forst canopy, forest floor organic mat, and active layer thickness return to their original state. As the canopy develops and the moss/ organic layer thickens, soil temperatures decrease and the permafrost level gradually rises. If fires occur periodically or the soil is cultivated, a soil may remain free of permafrost indefinitely (Péwé 1954).

Physiographic Areas

Flood plains are the youngest landforms in the survey area. They are nearly level and gently sloping alluvial plains adjacent to active river and stream channels of the Tanana, Cosna, Kantishna, and Zitziana Rivers. These landforms include areas of riverwash, terraces, bars, natural levees, backwater areas, and sloughs in abandoned river channels.

Riverwash is composed of irregularly bedded sandy and silty sediments in the stream channels that are deposited by annual flooding. Active erosion and deposition by annual floods cause drastic changes in the configuration and location of the river channel. Riverwash is typically unvegetated, although some areas support very sparse stands of willows and alders.

Bars and natural levees are found adjacent to present and former stream channels. The soils on these convex landforms generally are formed in stratified sandy alluvium. Backslopes of the levees consist of stratified sandy and silty alluvium that grades into old channels that are nearly level or concave and filled with finer textured sediments and organic materials. Because of variations in the alluvial sediments, the drainage, and the occurrence of permafrost, several different soils occur in these channels. These include Salchaket and Bradway soils, Typic Histoturbels, Terric Hemistels, Typic Aquiturbels, Typic Cryopsamments, and Typic Cryaquepts. Organic soils commonly occur in backwater areas that formerly were open water.

Vegetation on the flood plains is highly variable. Excessively drained sandy areas support stands of white spruce. Areas that are underlain by permafrost support black spruce, willows, alders, shrubs, and mosses. Organic soils support mainly mosses and sedges with some willows.

The major part of the survey area is located on a broad alluvial plain in the Tanana Lowland. This plain is a structural basin, the floor of which is below sea level. The alluvial deposits that fill the basin originated mainly in the Alaska Range to the south. They range from 120 to 180 meters (394 to 591 ft) in thickness. Deposition of these sediments pushed the Tanana River north against the Yukon-Tanana Upland and buried a fairly rugged topography, the hilltops of which now form small knobs above the plain (Péwé 1975). Much of this plain is blanketed with eolian sand formed into dunes. A silty loess mantle covers the survey area. This mantle ranges from a few inches to many feet in thickness, depending on the distance from the loess source to the northeast.

Physical features of the sand dunes indicate redeposition of the alluvial sand by wind from the northeast. The Tanana River and its glacier-fed tributaries are thought to be the source of the sand (Collins 1985). The dunes generally are 10 to 150 feet (3 to 46 m) high, 50 feet to 3 miles (15 m to 4.8 km) long, and 50 to 1,000 feet (15 to 300 m) wide. Transverse dunes occur in the northeastern part of the survey area, adjacent to the flood plain along the Tanana River. The location of these transverse dunes indicates that the Tanana River was in essentially the same position at the time of sand deposition as it is at present. To the south, dunes have long wave crests as much as 200 feet (60 m) above the troughs. These asymmetrical dunes have steep western slopes and sinuous crests, which trend north to south, and appear to be composed of coalesced portions of parabolic dunes. Comparatively small longitudinal dunes are on the windward slopes of some transverse dunes.

Rosette dunes occur in the central and southern parts of the survey area. They are composed of small arcuate dunes arranged concentrically around a slightly depressed center. The component dunes of the rosettes range from 5 to over 30 feet (1.5 to 9 m) high and 1,000 feet to 2 miles (305 m to 3.2 km) long, with the steepest slopes on the convex outer sides. The rosettes occupy some of the highest terrain in the survey area and are thought to have developed on the crests of large, possibly transverse dunes. The sharp relief, lack of any developed drainage system, and location of the rosette dunes suggests that they are the youngest dunes in the area (Collins 1985). Eolian sand deposits typically do not occur above about 1,200 to 1,500 feet (365 to 457 m), where the loess mantles bedrock.

The silty loess that blankets most of the survey area originated from the unvegetated flood plains of glacial rivers, such as the Tanana and Kantishna

Rivers. The lack of buried soils suggests that most of the loess was deposited rapidly. The thickest loess deposits over dune sand occur in the northeast part of the survey area, near the confluence of the Tanana and Kantishna Rivers. The loess mantle over dune sand thins rapidly toward the southwest, away from the source of loess.

Soils on stabilized sand dunes include Beales, Zitziana, Nenana, and Koyukuk soils. These soils differ in the thickness of the silty loess mantle over eolian sand. Thickness of the loess layer ranges from less than 10 inches (25 cm) in the Beales soils to more than 40 inches (100 cm) in the Koyukuk soils. These well drained soils occur on the crests and side slopes of dunes. The soils are weakly developed, and like most loess soils of Interior Alaska, have a low content of clay and a low natural fertility. Very fine, fine, and medium sand occur in minor amounts in the silty loess layer, but very fine and fine sand dominate in the underlying material. Reaction of the soils generally increases with increasing depth.

Permafrost at shallow depths and poorly drained conditions occur in the interdune areas of the stabilized dunes, except rosette dunes, and on the remainder of the outwash plain. Permafrost soils in the interdune and plains areas include Iksgiza and Kindanina soils and Terric Hemistels. Iksgiza soils are formed in a silty loess mantle overlying the eolian sands. Kindanina soils formed in frozen eolian sands with a thin loess mantle. These soils exhibit severe frost churning and contain varying amounts of free ice within the profile; massive ice features probably occur at depth. Shallow depressions of varying size, which currently contain organic materials of varying thickness or shallow water bodies, occur throughout the survey area. Terric Hemistels have thick deposits of organic materials.

Vegetation on the stabilized dunes is largely dependent on the thickness of the silty loess mantle, which in turn, determines the available moisture capacity. Where the loess cap is thickest and the moisture capacity is highest, the dunes support forests of white spruce and paper birch. As the loess cap thins, the forest grades to paper birch and aspen and then to pure aspen stands with very sparse understory. The interdune areas support stands of black spruce with moss ground cover, regardless of whether continuous permafrost is present or not. Organic soils support wet meadow tussock vegetation composed of mosses, sedges, cottongrass, and shrubs. Alases support a dense stand of grasses with some shrubs. White spruce, paper birch, and willows are the dominant vegetation around the perimeter of the alases.

The thermokarsted loess plain is west of the sand dune region. Iksgiza-Beales-Zitziana complex, pitted, 1 to 50 percent slopes, occurs in this region. Deposition of eolian sediments and colluvium, and formation of ice wedges probably occurred for a prolonged period in this area during the Pleistocene glaciations, resulting in the burial of large ice masses. Melting of these ice masses caused subsidence and extremely irregular topography. Both climatic warming after glaciation and disturbance of the insulating surface organic mat may have caused soil warming and melting of the permafrost.

Soils in this area formed in a loess mantle over eolian sand. Any dune forms that may have existed have been obliterated by thermokarsting. There may be thick silty deposits beneath the eolian sand, as suggested by the thermokarsting (the ice bodies responsible for thermokarsting form most readily in silty sediment) and the silt-mantled topography just to the west, beyond the area where dune sand was deposited.

Mooseheart Mountain and other bedrock-controlled hills protrude above the outwash plain in several places. Soils on the hillslopes formed in a mantle of silty loess over bedrock. The thickness of the loess mantle is variable and generally thickens downslope. Where the loess cap is thin, many coarse fragments are in the lower part of the soil. In some places, bedrock occurs within a depth of 20 inches (50 cm).

Soils that formed in the silty loess mantle include Typic Dystrocryepts, Lithic Dystrocryepts, Typic Aquiturbels, and Saulich soils. Typic Dystrocryepts occur on the crests and side slopes of the hills and formed in loess that ranges from 20 to more than 60 inches (50 to 152 cm) in thickness. Lithic Dystrocryepts occupy similar landscape positions and formed in loess that is less than 20 inches (50 cm) thick over bedrock. Typic Aquiturbels and Saulich soils formed in silty loess deposits on footslopes and north-facing side slopes. These poorly drained soils have permafrost near the soil surface and an associated perched water table.

Vegetation on the Typic Dystrocryepts and Lithic Dystrocryepts consists of a mixed white spruce and paper birch forest. The Typic Aquiturbels and Saulich soils support typical permafrost vegetation consisting of black spruce forest with an understory

of willows and other shrubs and a thick ground cover of moss.

Between the bedrock-cored hills in the western part of the survey area are lowlands composed of silty loess and colluvial deposits from the hills. Saulich soils are typical soils in this region. Permafrost is nearly continuous in these lowlands; the soils are poorly drained and have thick organic surface horizons over silt loam. The land surface is generally smooth; however, locally there has been major subsidence due to thermokarsting. Koyukuk-Typic Aquiturbels complex, pitted, 1 to 35 percent slopes, have been affected by this process. The local subsidence suggests that large buried ice masses are still present under the silty lowlands. The buried ice masses probably formed during the colder climatic episodes of the Pleistocene glaciations. The magnitude of local thermokarst subsidence is comparable to that reported in Siberia (Czudek and Demek 1970) and is greater than that which has been previously described in Alaska (Péwé 1954). The vegetation on the silty lowlands consists mostly of black spruce with low shrubs and a moss ground cover.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alas. A depression with steep sides and a flat, grass-covered floor. Formed by subsidence resulting from melting of buried ice masses in permafrost.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and areal extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Angle of repose. Maximum slope or angle at which granular material such as sand or loose rock remains stable.

Arcuate. Curved in outline.

Aspect, slope. Direction of maximum pitch on a slope.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hill slopes. Backslopes in profile are commonly steep and linear and descend to a footslope. In terms of gradational process, backslopes are erosional forms produced mainly by mass wasting and running water.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeter thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

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.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Coarse fragments. Mineral or rock particles larger than 2 millimeter in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. If soil improving crops and practices used in the system more than offset the soil-depleting crops and deteriorating practices, then it is a good conservation cropping system. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a “wire” when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops using a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of the mean annual increment (CMAI). The average yearly volume growth of a stand of trees from the year of origin to that age which gives the highest average. The CMAI for a particular species is based on the applicable yield table and uses volumes given for the smallest size. All yield tables used to derive the CMAI pertain only to naturally established, even-aged, unmanaged stands.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Depth, soil. Generally, the thickness of soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to the underlying pure humus.

Effluent. Solid, liquid, or gas wastes which enter the environment as a byproduct of manmade processes. The discharge or outflow of water from ground or sub-surface storage.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian. Of or pertaining to wind.

Eolian soil material. Earthy parent material accumulated through wind action; commonly

refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Even aged, unmanaged stands (forestland). A natural stand of trees having little difference in total age. By convention, the maximum difference is 10 to 20 years.

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.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is typically a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Footslope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial outwash. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

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 the cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeter to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters.) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Crops such as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well-defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

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.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon.—Soft bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all of the time.

Infiltration The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration

capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application.

Irrigation. Application of water to soils to assist in production of crops.

Large stones (in tables). Rock fragments 3 inches (7.6 cm) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

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.

Longitudinal dune. Linear dune ridge that extends parallel to the direction of the dominant dune-building winds. Commonly nearly symmetrical in cross section.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

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 millimeter (about 0.2 inch); *medium*, from 5 to 15 millimeter (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeter (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes of more than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Muskeg. Wetland in boreal regions dominated by Sphagnum moss, stunted black spruce, and low shrubs.

Nutrient, plant Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorous, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial meltwater.

Outwash, plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parabolic dune. Dune with the approximate form of a parabola. The concave side opens toward the prevailing wind direction. Forms by downwind migration of an unvegetated area on a partially vegetated dune field.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	Less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	More than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Pleistocene. Geologic time period from 1,000,000 to 10,000 years before present.

Pond, thaw. Small water body in alas or thermokarst depression.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or by evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed. (see Climax plant community.)

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

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.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity. expressed as pH values, are:

Ultra acid	Below 3.5
Extremely acid	3.5 to 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3

Slightly alkaline..... ..... 7.4 to 7.8

Moderately alkaline..... ..... 7.9 to 8.4

Strongly alkaline..... ..... 8.5 to 9.0

Very strongly alkaline..... ... 9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeter or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rosette dune. Complex of small arcuate dunes arranged concentrically, with each are concave toward a slightly depressed center.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeter in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the 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.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

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.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site curve (100-year). A set of related curves on a graph which shows the average heights of dominant and codominant trees for a range of ages on ground with differing productivity levels. Each level is represented by a curve. The basis of the curves are the height of dominant and codominant trees that are 100 years of age.

Site index (forestland). A numerical index equal to the height that dominant or dominant and codominant trees reach at a specific age, usually 50 or 100 years. Using this index and the age of the stand of trees, yield can be determined using the appropriate yield table publication.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is

a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeter in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeter, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 centimeters) in length if flat.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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 E 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."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taiga. Forest dominated by coniferous trees at high latitude or high altitude.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thermokarst. Subsidence of the ground caused by melting of ground ice.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The outermost inclined surface at the base of a hill. Toe slopes are commonly gentle and linear in profile.

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.

Transverse dune. A strongly asymmetrical dune ridge extending trasverse to the direction of dominant sand-transporting winds; the leeward

slope stands at or near the angle of repose of sand if the dune is active, while the windward slope is comparatively gentle.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Windthrow. The action of uprooting and tipping over of trees by the wind.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1949-1990 at Manley Hot Springs, Alaska)

Month	Temperature					Precipitation					
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have Maximum temperature higher than	2 years in 10 will have Minimum temperature lower than	Average number of growing degree days*	Average	2 years in 10 will have Less than	2 years in 10 will have More than	Average number of days with 0.1 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	-1.5	-20.8	-11.2	37	-62	0	0.74	0.16	1.19	2	9.3
February----	6.1	-17.5	-5.7	38	-57	0	0.47	0.16	0.77	1	7.0
March-------	22.8	-5.7	8.5	46	-44	0	0.59	0.14	1.10	1	6.8
April-------	39.4	14.1	26.7	61	-24	11	0.45	0.11	0.81	1	3.3
May---------	59.0	32.4	45.7	78	14	198	0.65	0.24	0.99	2	0.5
June--------	70.7	43.3	57.0	86	28	502	1.72	0.82	2.50	5	0.0
July--------	72.4	46.4	59.4	88	32	586	2.70	1.36	3.86	6	0.0
August------	66.2	42.2	54.2	83	25	432	3.06	1.75	4.22	7	0.0
September---	53.4	31.8	42.6	71	8	131	1.86	0.83	2.74	5	0.5
October-----	31.4	14.6	23.0	54	-20	5	0.93	0.46	1.35	3	6.8
November----	10.3	-7.5	1.4	40	-43	0	0.78	0.28	1.29	2	10.8
December----	-1.6	-19.8	-10.7	36	-56	0	0.80	0.30	1.23	3	10.9
Yearly:											
Average---	35.7	12.8	24.2	---	---	---	----	----	----	---	---
Extreme---	93	-73	---	89	-64	---	----	----	----	---	---
Total-----	---	---	---	---	---	1865	14.75	8.83	17.35	38	56.0

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1949–1990 at Manley Hot Springs, Alaska)

Probability	Temperature		
	24°F or lower	28°F or lower	32°F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 25	June 9	July 18
2 years in 10 later than--	May 20	June 4	July 8
5 years in 10 later than--	May 10	May 27	June 21
First freezing temperature in fall:			
1 year in 10 earlier than---	Aug. 24	Aug. 13	August 4
2 years in 10 earlier than--	Aug. 29	Aug. 19	August 8
5 years in 10 earlier than--	Sept. 7	Aug. 29	August 17

Table 3.--Growing Season

(Recorded in the period 1949-1990 at Manley Hot Springs, Alaska)

Probability	Daily Minimum Temperature		
	Number of days higher than 24°F	Number of days higher than 28°F	Number of days higher than 32°F
9 years in 10	100	72	24
8 years in 10	106	79	35
5 years in 10	119	93	57
2 years in 10	132	107	79
1 year in 10	138	114	90

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
1	Beales very fine sandy loam, 1 to 35 percent slopes	22,328	4.6
2	Beales very fine sandy loam, 35 to 70 percent slopes	12,172	2.5
3	Beales-Zitziana complex, 1 to 35 percent slopes	26,615	5.5
4	Typic Histoturbels, Terric Hemistels, and Bradway soils, 0 to 2 percent slopes	23,199	4.8
5	Iksgiza peat, 0 to 3 percent slopes	11,944	2.5
6	Iksgiza peat, 3 to 6 percent slopes	9,629	2.0
7	Iksgiza peat, 6 to 12 percent slopes	700	0.1
8	Iksgiza-Beales-Zitziana complex, pitted, 1 to 50 percent slopes	18,895	3.9
9	Iksgiza-Nenana complex, 1 to 35 percent slopes	49,816	10.3
10	Iksgiza-Terric Hemistels complex, 0 to 3 percent slopes	20,694	4.3
11	Iksgiza-Zitziana-Nenana complex, 1 to 35 percent slopes	9,862	2.0
12	Kindanina mucky silt loam, 0 to 6 percent slopes	9,832	2.0
13	Kindanina mucky silt loam, 6 to 12 percent slopes	929	0.2
14	Kindanina mucky silt loam, 12 to 20 percent slopes	101	*
15	Kindanina-Beales-Zitziana complex, dunes, 1 to 50 percent slopes	62,699	12.9
16	Koyukuk silt loam, 1 to 35 percent slopes	21,660	4.5
17	Koyukuk-Typic Aquiturbels complex, dunes, 1 to 35 percent slopes	2,311	0.5
18	Koyukuk-Typic Aquiturbels complex, pitted, 1 to 35 percent slopes	5,891	1.2
19	Nenana silt loam, 3 to 6 percent slopes	681	0.1
20	Nenana silt loam, 6 to 12 percent slopes	649	0.1
21	Nenana silt loam, 12 to 20 percent slopes	1,095	0.2
22	Nenana-Zitziana complex, 1 to 35 percent slopes	17,253	3.6
23	Terric Hemistels, 0 to 2 percent slopes	8,610	1.8
24	Riverwash	243	*
25	Salchaket-Bradway complex, 0 to 3 percent slopes	7,470	1.5
26	Saulich peat, 0 to 6 percent slopes	19,153	3.9
27	Saulich peat, 6 to 30 percent slopes	10,503	2.2
28	Typic Cryaquepts, 0 to 2 percent slopes	963	0.2
29	Typic Dystrocryepts-Lithic Dystrocryepts association, 15 to 70 percent slopes	5,750	1.2
30	Typic Dystrocryepts-Saulich complex, 3 to 15 percent slopes	5,694	1.2
31	Typic Dystrocryepts-Tetlin-Saulich association, 15 to 70 percent slopes	21,573	4.4
32	Typic Cryopsamments, Typic Cryaquepts, flooded, and Bradway soils, 0 to 5 percent slopes	10,887	2.2
33	Zitziana silt loam, 1 to 35 percent slopes	23,334	4.8
34	Zitziana-Kindanina complex, 1 to 35 percent slopes	32,322	6.7
35	Water	9,630	2.0
	Total	485,087	100.0

* Less than 0.1 percent.

Table 5.--Land Capability

Map symbol and soil name	Land capability (nonirrigated)
1:	
Beales	6e
2:	
Beales	7e
3:	
Beales	6e
Zitziana	6e
4:	
Typic Histoturbels	6w
Terric Hemistels	7w
Bradway	5w
5:	
Iksgiza	6w
6:	
Iksgiza	6w
7:	
Iksgiza	6w
8:	
Iksgiza	6w
Beales	7e
Zitziana	7e
9:	
Iksgiza	6w
Nenana	6e
10:	
Iksgiza	6w
Terric Hemistels	7w
11:	
Iksgiza	6w
Zitziana	6e
Nenana	6e
12:	
Kindanina	5w
13:	
Kindanina	6w
14:	
Kindanina	6w
15:	
Kindanina	6w
Beales	7e
Zitziana	7e
16:	
Koyukuk	6e
17:	
Koyukuk	6e
Typic Aquiturbels	6w
18:	
Koyukuk	6e
Typic Aquiturbels	6w
19:	
Nenana	3s
20:	
Nenana	4s

Table 5.--Land Capability--Continued

Map symbol and soil name	Land capability (nonirrigated)
21:	
Nenana	6e
22:	
Nenana	6e
Zitziana	6e
23:	
Terric Hemistels	6w
24:	
Riverwash	8
25:	
Salchaket	4w
Bradway	5w
26:	
Saulich	6w
27:	
Saulich	6w
28:	
Typic Cryaquepts	5w
29:	
Typic Dystrocryepts	7e
Lithic Dystrocryepts	7e
30:	
Typic Dystrocryepts	4e
Saulich	6w
31:	
Typic Dystrocryepts	7e
Tetlin	7w
Saulich	7w
32:	
Typic Cryopsamments	4s
Typic Cryaquepts, flooded	5w
Bradway	5w
33:	
Zitziana	6e
34:	
Zitziana	6e
Kindanina	6w
35:	
Water	---

Table 6.--Forestland Management and Productivity

(Absence of an entry indicates that no data are available or that the component is not forested)

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
									cu ft/ac	
1:										
Beales-------	2S	Moderate	Moderate	Moderate	Severe	Moderate	paper birch	42	14	white spruce
							quaking aspen	42	29	
							white spruce	70	29	
2:										
Beales-------	2R	Severe	Severe	Severe	Severe	Moderate	paper birch	42	14	white spruce
							quaking aspen	42	29	
							white spruce	70	29	
3:										
Beales-------	2S	Moderate	Moderate	Moderate	Severe	Moderate	paper birch	42	14	white spruce
							quaking aspen	42	29	
							white spruce	70	29	
Zitziana-----	---	Moderate	Moderate	Slight	Moderate	Moderate	---	---	---	---
4:										
Typic Histoturbels-	---	Slight	Severe	Severe	Severe	Severe	---	---	---	---
Terric Hemistels----	---	---	---	---	---	---	---	---	---	---
Bradway------	---	---	---	---	---	---	---	---	---	---
5, 6:										
Iksgiza------	---	Severe	Severe	Severe	Moderate	Moderate	black spruce	---	---	---
7:										
Iksgiza------	---	---	---	---	---	---	---	---	---	---
8:										
Iksgiza------	---	Slight	Severe	Severe	Severe	Severe	---	---	---	---
Beales-------	2S	Moderate	Moderate	Moderate	Severe	Moderate	paper birch	42	14	white spruce
							quaking aspen	42	29	
							white spruce	70	29	
Zitziana-----	---	Moderate	Moderate	Slight	Moderate	Moderate	---	---	---	---
9:										
Iksgiza------	---	---	---	---	---	---	---	---	---	---
Nenana-------	2R	Moderate	Moderate	Slight	Moderate	Moderate	paper birch	50	29	white spruce
							quaking aspen	57	57	
							white spruce	83	29	
10:										
Iksgiza------	1W	Severe	Severe	Severe	Moderate	Moderate	black spruce	---	---	---
Terric Hemistels----	---	---	---	---	---	---	---	---	---	---
11:										
Iksgiza------	---	Severe	Severe	Severe	Moderate	Moderate	black spruce	---	---	---
Zitziana-----	---	Moderate	Moderate	Slight	Moderate	Moderate	---	---	---	---
Nenana-------	2R	Moderate	Moderate	Slight	Moderate	Moderate	paper birch	50	29	white spruce
							quaking aspen	57	57	
							white spruce	83	29	
12, 13:										
Kindanina----	---	Slight	Severe	Severe	Severe	Severe	---	---	---	---
14:										
Kindanina----	---	Moderate	Severe	Severe	Severe	Severe	---	---	---	---

Table 6.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
									cu ft/ac	
15:										
Kindanina----	---	Slight	Severe	Severe	Severe	Severe	---	---	---	---
Beales-------	2S	Moderate	Moderate	Moderate	Severe	Moderate	paper birch	42	14	white spruce
							quaking aspen	42	29	
							white spruce	70	29	
Zitziana-----	---	Moderate	Moderate	Slight	Moderate	Moderate	---	---	---	---
16:										
Koyukuk------	2R	Moderate	Moderate	Slight	Slight	Moderate	paper birch	60	43	white spruce
							quaking aspen	65	57	
							white spruce	83	29	
17, 18:										
Koyukuk------	2R	Moderate	Moderate	Slight	Slight	Moderate	paper birch	60	43	white spruce
							quaking aspen	65	57	
							white spruce	83	29	
Typic Aquiturbels--	---	Moderate	Severe	Moderate	Moderate	Moderate	---	---	---	---
19, 20:										
Nenana-------	2A	Slight	Slight	Slight	Moderate	Moderate	paper birch	50	29	white spruce
							quaking aspen	57	57	
							white spruce	83	29	
21:										
Nenana-------	2R	Moderate	Moderate	Slight	Moderate	Moderate	paper birch	50	29	white spruce
							quaking aspen	57	57	
							white spruce	83	29	
22:										
Nenana-------	2R	Moderate	Moderate	Slight	Moderate	Moderate	paper birch	50	29	white spruce
							quaking aspen	57	57	
							white spruce	83	29	
Zitziana-----	---	Moderate	Moderate	Slight	Moderate	Moderate	---	---	---	---
23:										
Terric Hemistels----	---	---	---	---	---	---	---	---	---	---
24:										
Riverwash----	---	---	---	---	---	---	---	---	---	---
25:										
Salchaket----	3A	Slight	Slight	Slight	Slight	Moderate	balsam poplar	---	---	white spruce
							white spruce	94	43	
Bradway------	---	---	---	---	---	---	---	---	---	---
26, 27:										
Saulich------	---	---	---	---	---	---	---	---	---	---
28:										
Typic Cryaquepts---	---	Moderate	Moderate	Moderate	Moderate	Moderate	black spruce	---	---	---
29:										
Typic Dystrocryepts	---	Severe	Severe	Slight	Moderate	Moderate	---	---	---	---
Lithic Dystrocryepts	---	Severe	Severe	Moderate	Moderate	Moderate	---	---	---	---
30:										
Typic Dystrocryepts	---	Slight	Slight	Slight	Moderate	Moderate	---	---	---	---
Saulich------	---	---	---	---	---	---	---	---	---	---

Table 6.--Forestland Management and Productivity--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees to manage
									cu ft/ac	
31:										
Typic Dystrocryepts	---	Severe	Severe	Slight	Moderate	Moderate	---	---	---	---
Tetlin-------	2R	Severe	Severe	Moderate	Moderate	Moderate	black spruce paper birch white spruce	--- --- 71	--- --- 29	---
Saulich------	---	---	---	---	---	---	---	---	---	---
32:										
Typic Cryopsamments	---	Slight	Moderate	Moderate	Severe	Moderate	---	---	---	---
Typic Cryaquepts, Flooded-----	---	Slight	Severe	Severe	Severe	Severe	---	---	---	---
Bradway------	---	---	---	---	---	---	---	---	---	---
33:										
Zitziana-----	---	Moderate	Moderate	Slight	Moderate	Moderate	---	---	---	---
34:										
Zitziana-----	---	Moderate	Moderate	Slight	Moderate	Moderate	---	---	---	---
Kindanina----	---	Slight	Severe	Severe	Severe	Severe	---	---	---	---
35:										
Water--------	---	---	---	---	---	---	---	---	---	---

Table 7.--Recreation: Foot and ATV Trails

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
1:			
Beales	90	Very limited	
		Water erosion hazard	1.00
2:			
Beales	85	Very limited	
		Water erosion hazard	1.00
3:			
Beales	50	Very limited	
		Water erosion hazard	1.00
Zitziana	40	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
4:			
Typic Histoturbels	30	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Excess surface organic matter	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Terric Hemistels	30	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Excess surface organic matter	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Bradway	30	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	0.96
		Silty surface layer dusty when dry and slippery when wet	0.50
5:			
Iksgiza	90	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.32
6:			
Iksgiza	85	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.32
7:			
Iksgiza	90	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.32

Table 7.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Percent of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
8:			
Iksgiza	40	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.32
Beales	25	Very limited	
		Water erosion hazard	1.00
Zitziana	20	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
9:			
Iksgiza	60	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.32
Nenana	25	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
10:			
Iksgiza	65	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.32
Terric Hemistels	30	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Excess surface organic matter	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
11:			
Iksgiza	50	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.32
Zitziana	25	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Nenana	20	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
12:			
Kindanina	90	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50

Table 7.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Percent of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
13:			
Kindanina	90	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
14:			
Kindanina	85	Very limited	
		Depth to permafrost	1.00
		Water erosion hazard	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
15:			
Kindanina	40	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Beales	25	Very limited	
		Water erosion hazard	1.00
Zitziana	20	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
16:			
Koyukuk	90	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
17:			
Koyukuk	45	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
17:			
Typic Aquiturbels	40	Very limited	
		Depth to permafrost	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.22
18:			
Koyukuk	70	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Typic Aquiturbels	15	Very limited	
		Depth to permafrost	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.22
19:			
Nenana	90	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50

Table 7.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Percent of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
20:			
Nenana	90	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
21:			
Nenana	90	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
22:			
Nenana	50	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Zitziana	40	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
23:			
Terric Hemistels	85	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Excess surface organic matter	1.00
		Ponding	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
24:			
Riverwash	95	Not rated	
25:			
Salchaket	65	Somewhat limited	
		Sandy surface layer easily displaced	0.50
		Clayey surface layer slippery when wet	0.50
		Silty surface layer dusty when dry and slippery when wet	0.50
Bradway	20	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	0.96
		Silty surface layer dusty when dry and slippery when wet	0.50
26:			
Saulich	85	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
27:			
Saulich	85	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Water erosion hazard	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
28:			
Typic Cryaquepts	85	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50

Table 7.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Percent of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
29:			
Typic Dystrocryepts	65	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Lithic Dystrocryepts	30	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
30:			
Typic Dystrocryepts	60	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Saulich	25	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Water erosion hazard	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
31:			
Typic Dystrocryepts	40	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Tetlin	25	Very limited	
		Depth to permafrost	1.00
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
		Depth to saturated zone	0.08
Saulich	20	Very limited	
		Depth to permafrost	1.00
		Excess surface organic matter	1.00
		Water erosion hazard	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
32:			
Typic Cryopsamments	30	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
		Flooding	0.40
Typic Cryaquepts, flooded	30	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
		Flooding	0.40
		Depth to saturated zone	0.22
Bradway	30	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	0.96
		Silty surface layer dusty when dry and slippery when wet	0.50
33:			
Zitziana	90	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50

Table 7.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Percent of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
34:			
Zitziana	45	Very limited	
		Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Kindanina	45	Very limited	
		Depth to permafrost	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
35:			
Water	100	Not rated	

Table 8.--Building Site Development: Structures

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Beales	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
2:							
Beales	85	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
3:							
Beales	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Zitziana	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
4:							
Typic Histoturbels	30	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Organic material	1.00	Organic material	1.00	Organic material	1.00
Terric Hemistels	30	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Organic material	1.00			Organic material	1.00
Bradway	30	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
5:							
Iksgiza	90	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Organic material	1.00	High water table	1.00	Organic material	1.00
		High water table	0.96	Organic material	1.00	High water table	0.96
6:							
Iksgiza	85	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Organic material	1.00	High water table	1.00	Organic material	1.00
		High water table	0.96	Organic material	1.00	High water table	0.96
						Slope	0.12
7:							
Iksgiza	90	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Organic material	1.00	High water table	1.00	Slope	1.00
		High water table	0.96	Organic material	1.00	Organic material	1.00
		Slope	0.04	Slope	0.04	High water table	0.96
8:							
Iksgiza	40	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Organic material	1.00	High water table	1.00	Slope	1.00
		High water table	0.96	Organic material	1.00	Organic material	1.00
		Slope	0.37	Slope	0.37	High water table	0.96

Table 8.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
8:							
Beales	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Zitziana	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
9:							
Iksgiza	60	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Organic material	1.00	High water table	1.00	Slope	1.00
		High water table	0.96	Organic material	1.00	Organic material	1.00
		Slope	0.37	Slope	0.37	High water table	0.96
Nenana	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
10:							
Iksgiza	65	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Organic material	1.00	High water table	1.00	Organic material	1.00
		High water table	0.96	Organic material	1.00	High water table	0.96
Terric Hemistels	30	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Organic material	1.00			Organic material	1.00
11:							
Iksgiza	50	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Organic material	1.00	High water table	1.00	Organic material	1.00
		High water table	0.96	Organic material	1.00	High water table	0.96
						Slope	0.12
Zitziana	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Nenana	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
12:							
Kindanina	90	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
13:							
Kindanina	90	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Slope	0.04	Slope	0.04	Slope	1.00
14:							
Kindanina	85	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	High water table	1.00
15:							
Kindanina	40	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Slope	0.37	Slope	0.37	Slope	1.00
Beales	25	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Zitziana	20	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 8.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
16:							
Koyukuk----------	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
17:							
Koyukuk----------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Typic Aquiturbels---	40	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Slope	1.00	High water table	1.00	Slope	1.00
		High water table	0.93	Slope	1.00	High water table	0.93
18:							
Koyukuk----------	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Typic Aquiturbels---	15	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Slope	1.00	High water table	1.00	Slope	1.00
		High water table	0.93	Slope	1.00	High water table	0.93
19:							
Nenana----------	90	Not limited		Not limited		Somewhat limited	
						Slope	0.12
20:							
Nenana----------	90	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Slope	0.04	Slope	1.00
21:							
Nenana----------	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
22:							
Nenana----------	50	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Zitziana----------	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
23:							
Terric Hemistels----	85	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Organic material	1.00			Organic material	1.00
24:							
Riverwash----------	95	Not rated		Not rated		Not rated	
25:							
Salchaket----------	65	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Bradway----------	20	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
26:							
Saulich----------	85	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	High water table	1.00

Table 8.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
27:							
Saulich----------	85	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
28:							
Typic Cryaquepts----	85	Somewhat limited		Very limited		Somewhat limited	
		High water table	0.58	High water table	1.00	High water table	0.58
29:							
Typic Dystrocryepts-	65	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Hard bedrock	0.42		
Lithic Dystrocryepts	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Hard bedrock	1.00	Hard bedrock	1.00	Hard bedrock	1.00
30:							
Typic Dystrocryepts-	60	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.04	Hard bedrock	0.42	Slope	1.00
				Slope	0.04		
Saulich----------	25	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
		Slope	0.04	Slope	0.04	Slope	1.00
31:							
Typic Dystrocryepts-	40	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
				Hard bedrock	0.42		
Tetlin----------	25	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		High water table	0.86	High water table	1.00	High water table	0.86
Saulich----------	20	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
32:							
Typic Cryopsamments-	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Typic Cryaquepts, flooded----------	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		High water table	0.93	High water table	1.00	High water table	0.93
Bradway----------	30	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
33:							
Zitziana----------	90	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
34:							
Zitziana----------	45	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Kindanina----------	45	Very limited		Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00	Permafrost	1.00
		High water table	1.00	High water table	1.00	High water table	1.00
						Slope	0.12
35:							
Water----------	100	Not rated		Not rated		Not rated	

Table 9.--Building Site Development: Site Improvements

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Beales	90	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Droughty	1.00
		Frost action	0.50	Very limiting slope	1.00	Slope	1.00
2:							
Beales	85	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Very limiting slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Droughty	1.00
3:							
Beales	50	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Droughty	1.00
		Frost action	0.50	Very limiting slope	1.00	Slope	1.00
Zitziana	40	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00		
4:							
Typic Histoturbels	30	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Frost action	1.00	Flooding	0.60	Depth to saturated zone	1.00
		Flooding	1.00	Cutbanks cave	0.10	Flooding	0.60
						Droughty	0.49
Terric Hemistels	30	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Subsidence	1.00	Content of organic matter	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Depth to dense layer	0.50		
Bradway	30	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.98
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Depth to saturated zone	0.99	Cutbanks cave	0.10	Droughty	0.40
5:							
Iksgiza	90	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.70	Cutbanks cave	1.00	Depth to saturated zone	0.68
6:							
Iksgiza	85	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.70	Cutbanks cave	1.00	Depth to saturated zone	0.68

Table 9.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Iksgiza----------	90	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.70	Cutbanks cave	1.00	Depth to saturated zone	0.68
		Moderately limiting slope	0.04	Moderately limiting slope	0.04	Slope	0.04
8:							
Iksgiza----------	40	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.70	Cutbanks cave	1.00	Depth to saturated zone	0.68
		Moderately limiting slope	0.37	Moderately limiting slope	0.37	Slope	0.37
Beales----------	25	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Droughty	1.00
		Frost action	0.50	Very limiting slope	1.00	Slope	1.00
Zitziana----------	20	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00		
9:							
Iksgiza----------	60	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.70	Cutbanks cave	1.00	Depth to saturated zone	0.68
		Moderately limiting slope	0.37	Moderately limiting slope	0.37	Slope	0.37
Nenana----------	25	Very limited		Very limited		Very limited	
		Frost action	1.00	Cutbanks cave	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00		
10:							
Iksgiza----------	65	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.70	Cutbanks cave	1.00	Depth to saturated zone	0.68
Terric Hemistels----	30	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Subsidence	1.00	Content of organic matter	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Flooding	0.60	Flooding	0.60
		Flooding	1.00	Depth to dense layer	0.50		
11:							
Iksgiza----------	50	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.70	Cutbanks cave	1.00	Depth to saturated zone	0.68
Zitziana----------	25	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00		

Table 9.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
11:							
Nenana	20	Very limited		Very limited		Very limited	
		Frost action	1.00	Cutbanks cave	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00		
12:							
Kindanina	90	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Droughty	0.97
		Low strength	1.00				
13:							
Kindanina	90	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Droughty	0.97
		Low strength	1.00	Moderately limiting slope	0.04	Slope	0.04
		Moderately limiting slope	0.04				
14:							
Kindanina	85	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00	Droughty	0.97
		Low strength	1.00				
15:							
Kindanina	40	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Droughty	0.97
		Low strength	1.00	Moderately limiting slope	0.37	Slope	0.37
		Moderately limiting slope	0.37				
Beales	25	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Droughty	1.00
		Frost action	0.50	Very limiting slope	1.00	Slope	1.00
Zitziana	20	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00		
16:							
Koyukuk	90	Very limited		Very limited		Very limited	
		Frost action	1.00	Very limiting slope	1.00	Slope	1.00
		Very limiting slope	1.00	Cutbanks cave	0.10		
17:							
Koyukuk	45	Very limited		Very limited		Very limited	
		Frost action	1.00	Very limiting slope	1.00	Slope	1.00
		Very limiting slope	1.00	Cutbanks cave	0.10		

Table 9.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
17:							
Typic Aquiturbels---	40	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00	Depth to saturated zone	0.60
		Depth to saturated zone	0.64	Cutbanks cave	0.10		
		Low strength	0.22				
18:							
Koyukuk----------	70	Very limited		Very limited		Very limited	
		Frost action	1.00	Very limiting slope	1.00	Slope	1.00
		Very limiting slope	1.00	Cutbanks cave	0.10		
18:							
Typic Aquiturbels---	15	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00	Depth to saturated zone	0.60
		Depth to saturated zone	0.64	Cutbanks cave	0.10		
		Low strength	0.22				
19:							
Nenana----------	90	Very limited		Very limited		Not limited	
		Frost action	1.00	Cutbanks cave	1.00		
20:							
Nenana----------	90	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Cutbanks cave	1.00	Slope	0.04
		Moderately limiting slope	0.04	Moderately limiting slope	0.04		
21:							
Nenana----------	90	Very limited		Very limited		Very limited	
		Frost action	1.00	Cutbanks cave	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00		
22:							
Nenana----------	50	Very limited		Very limited		Very limited	
		Frost action	1.00	Cutbanks cave	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00		
Zitziana----------	40	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00		
23:							
Terric Hemistels----	85	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Ponding	1.00
		Ponding	1.00	Ponding	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturzted zone	1.00	Excess surface organic matter	1.00
		Subsidence	1.00	Content of organic matter	1.00	Depth to saturated zone	1.00
		Frost action	1.00	Depth to layer	0.50		
24:							
Riverwash----------	95	Not rated		Not rated		Not rated	
25:							
Salchaket----------	65	Very limited		Very limited		Somewhat limited	
		Flooding	1.00	Cutbanks cave	1.00	Flooding	0.60
		Frost action	0.50	Flooding	0.60		

Table 9.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
25:							
Bradway----------	20	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.98
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Depth to saturzted zone	0.99	Cutbanks cave	0.10	Droughty	0.40
26:							
Saulich----------	85	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Cutbanks cave	0.10	Depth to saturated zone	1.00
27:							
Saulich----------	85	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Very limiting slope	1.00	Slope	1.00
		Very limiting slope	1.00	Cutbanks cave	0.10	Depth to saturated zone	1.00
28:							
Typic Cryaquepts----	85	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Cutbanks cave	1.00	Depth to saturated zone	0.03
		Depth to saturated zone	0.09	Depth to saturated zone	1.00		
29:							
Typic Dystrocryepts-	65	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Very limiting slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Droughty	0.65
				Depth to hard bedrock	0.42		
Lithic Dystrocryepts	30	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
		Depth to hard bedrock	1.00	Very limiting slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.70
30:							
Typic Dystrocryepts-	60	Somewhat limited		Very limited		Somewhat limited	
		Frost action	0.50	Cutbanks cave	1.00	Droughty	0.65
		Moderately limiting slope	0.04	Depth to hard bedrock	0.42	Slope	0.04
				Moderately limiting slope	0.04		
Saulich----------	25	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Cutbanks cave	0.10	Depth to saturated zone	1.00
		Moderately limiting slope	0.04	Moderately limiting slope	0.04	Slope	0.04
31:							
Typic Dystrocryepts-	40	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Very limiting slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Droughty	0.65
				Depth to hard bedrock	0.42		

Table 9.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31:							
Tetlin	25	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.43
		Depth to saturated zone	0.51	Cutbanks cave	0.10		
Saulich	20	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Slope	1.00
		Very limiting slope	1.00	Very limiting slope	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Cutbanks cave	0.10	Depth to saturated zone	1.00
32:							
Typic Cryopsamments	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Frost action	0.50	Cutbanks cave	1.00	Droughty	1.00
Typic Cryaquepts, flooded	30	Very limited		Very limited		Very limited	
		Frost action	1.00	Flooding	1.00	Flooding	1.00
		Flooding	1.00	Cutbanks cave	1.00	Depth to saturated zone	0.60
		Depth to saturated zone	0.64	Depth to saturated zone	1.00		
Bradway	30	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.98
		Flooding	1.00	Flooding	0.60	Flooding	0.60
		Depth to saturated zone	0.99	Cutbanks cave	0.10	Droughty	0.40
33:							
Zitziana	90	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00		
34:							
Zitziana	45	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00		
Kindanina	45	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Droughty	0.97
		Low strength	1.00				
35:							
Water	100	Not rated		Not rated		Not rated	

Table 10.--Sanitary Facilities: Sewage Treatment

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1:					
Beales----------	90	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
2:					
Beales----------	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Filtering capacity	0.50	Seepage	1.00
3:					
Beales----------	50	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
Zitziana----------	40	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
4:					
Typic Histoturbels--	30	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
Terric Hemistels----	30	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Subsidence	1.00		
Bradway----------	30	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
5:					
Iksgiza----------	90	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Seepage	0.53
				Depth to saturated zone	0.01
				Slope	0.01
6:					
Iksgiza----------	85	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Slope	0.67
				Seepage	0.53
				Depth to saturated zone	0.01

Table 10.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7:					
Iksgiza----------	90	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Slope	1.00
		Slope	0.04	Seepage	0.53
				Depth to saturated zone	0.01
8:					
Iksgiza----------	40	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Slope	1.00
		Slope	0.37	Seepage	0.53
				Depth to saturated zone	0.01
Beales----------	25	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
Zitziana----------	20	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
9:					
Iksgiza----------	60	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Slope	1.00
		Slope	0.37	Seepage	0.53
				Depth to saturated zone	0.01
Nenana----------	25	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
10:					
Iksgiza----------	65	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Seepage	0.53
				Depth to saturated zone	0.01
				Slope	0.01
Terric Hemistels----	30	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Subsidence	1.00	Slope	0.01
11:					
Iksgiza----------	50	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Slope	0.67
				Seepage	0.53
				Depth to saturated zone	0.01

Table 10.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
11:					
Zitziana----------	25	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
Nenana----------	20	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
12:					
Kindanina----------	90	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Seepage	1.00
				Slope	0.09
13:					
Kindanina----------	90	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Slope	0.04	Slope	1.00
14:					
Kindanina----------	85	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
15:					
Kindanina----------	40	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Slope	0.37	Slope	1.00
Beales----------	25	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
Zitziana----------	20	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
16:					
Koyukuk----------	90	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.29	Seepage	0.53
17:					
Koyukuk----------	45	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.29	Seepage	0.53
Typic Aquiturbels---	40	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Seepage	0.53
				Depth to saturated zone	0.02
18:					
Koyukuk----------	70	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.29	Seepage	0.53

Table 10.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
18:					
Typic Aquiturbels---	15	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Seepage	0.53
				Depth to saturated zone	0.02
19:					
Nenana----------	90	Somewhat limited		Very limited	
		Filtering capacity	0.50	Seepage	1.00
				Slope	0.67
20:					
Nenana----------	90	Somewhat limited		Very limited	
		Filtering capacity	0.50	Seepage	1.00
		Slope	0.04	Slope	1.00
21:					
Nenana----------	90	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Filtering capacity	0.50	Seepage	1.00
22:					
Nenana----------	50	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
Zitziana----------	40	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
23:					
Terric Hemistels----	85	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Ponding	1.00
		Ponding	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Subsidence	1.00		
24:					
Riverwash----------	95	Not rated		Not rated	
25:					
Salchaket----------	65	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Restricted permeability	0.29	Seepage	0.53
				Slope	0.01
Bradway----------	20	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
				Slope	0.01
26:					
Saulich----------	85	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
				Seepage	0.53
				Slope	0.09

Table 10.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
27:					
Saulich----------	85	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
28:					
Typic Cryaquepts----	85	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	0.50	Depth to saturated zone	1.00
29:					
Typic Dystrocryepts-	65	Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Depth to bedrock	0.42
Lithic Dystrocryepts	30	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
30:					
Typic Dystrocryepts-	60	Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00
		Filtering capacity	0.50	Seepage	1.00
		Slope	0.04	Depth to bedrock	0.42
Saulich----------	25	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Slope	0.04	Slope	1.00
				Seepage	0.53
31:					
Typic Dystrocryepts-	40	Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Depth to bedrock	0.42
Tetlin----------	25	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Restricted permeability	1.00	Slope	1.00
		Depth to saturated zone	1.00	Seepage	0.53
		Slope	1.00	Depth to saturated zone	0.08
Saulich----------	20	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
32:					
Typic Cryopsamments-	30	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	0.50	Seepage	1.00
				Slope	0.09

Table 10.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Percent of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
32:					
Typic Cryaquepts, flooded	30	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	0.50	Depth to saturated zone	1.00
				Slope	0.01
Bradway	30	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
				Slope	0.01
33:					
Zitziana	90	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
34:					
Zitziana	45	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
Kindanina	45	Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Seepage	1.00
				Slope	0.67
35:					
Water	100	Not rated		Not rated	

Table 11.--Sanitary Facilities: Landfill

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Beales	90	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
2:							
Beales	85	Very Limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00			Seepage	1.00
3:							
Beales	50	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
Zitziana	40	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
4:							
Typic Histoturbels	30	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Content of organic matter	1.00
		Organic material	1.00			Seepage	0.50
		Seepage	1.00				
Terric Hemistels	30	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Content of organic matter	1.00
		Organic material	1.00	Seepage	1.00	Seepage	0.50
Bradway	30	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00	Too Sandy	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00			Seepage	0.52
		Too Sandy, caving	1.00				
5:							
Iksgiza	90	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Organic material	1.00			Depth to saturated zone	1.00
6:							
Iksgiza	85	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Organic material	1.00			Depth to saturated zone	1.00

Table 11.--Sanitary Facilities: Landfill--Continued

Map symbol and soil name	Percent of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
7:							
Iksgiza	90	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Organic material	1.00	Slope	0.04	Depth to saturated zone	1.00
		Slope	0.04			Slope	0.04
8:							
Iksgiza	40	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Organic material	1.00	Slope	0.37	Depth to saturated zone	1.00
		Slope	0.37			Slope	0.37
Beales	25	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
Zitziana	20	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
9:							
Iksgiza	60	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Organic material	1.00	Slope	0.37	Depth to saturated zone	1.00
		Slope	0.37			Slope	0.37
Nenana	25	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Slope	1.00
		Slope	1.00	Slope	1.00		
10:							
Iksgiza	65	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Organic material	1.00			Depth to saturated zone	1.00
Terric Hemistels	30	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Content of organic matter	1.00
		Organic material	1.00	Seepage	1.00	Seepage	0.50
11:							
Iksgiza	50	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Hard to compact	1.00
		Organic material	1.00			Depth to saturated zone	1.00
Zitziana	25	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
Nenana	20	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Slope	1.00
		Slope	1.00	Slope	1.00		

Table 11.--Sanitary Facilities: Landfill--Continued

Map symbol and soil name	Percent of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
12:							
Kindanina----------	90	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00			Seepage	1.00
13:							
Kindanina----------	90	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	0.04	Seepage	1.00
		Slope	0.04			Slope	0.04
14:							
Kindanina----------	85	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
15:							
Kindanina----------	40	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	0.37	Seepage	1.00
		Slope	0.37			Slope	0.37
			1.00				
Beales----------	25	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
Zitziana----------	20	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
16:							
Koyukuk----------	90	Very Limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
17:							
Koyukuk----------	45	Very Limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Typic Aquiturbels---	40	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Hard to compact	1.00
						Depth to saturated zone	0.99
18:							
Koyukuk----------	70	Very Limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
Typic Aquiturbels---	15	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Hard to cmpact	1.00
						Depth to saturated zone	0.99

Table 11.--Sanitary Facilities: Landfill--Continued

Map symbol and soil name	Percent of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19:							
Nenana	90	Very Limited		Very limited		Not limited	
		Seepage	1.00	Seepage	1.00		
20:							
Nenana	90	Very Limited		Very limited		Somewhat limited	
		Seepage	1.00	Seepage	1.00	Slope	0.04
		Slope	0.04	Slope	0.04		
21:							
Nenana	90	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Slope	1.00
		Slope	1.00	Slope	1.00		
22:							
Nenana	50	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Slope	1.00
		Slope	1.00	Slope	1.00		
Zitziana	40	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
23:							
Terric Hemistels	85	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic material	1.00	Seepage	1.00	Content of organic matter	1.00
						Seepage	0.50
24:							
Riverwash	95	Not rated		Not rated		Not rated	
25:							
Salchaket	65	Very Limited		Very limited		Somewhat limited	
		Flooding	1.00	Flooding	1.00	Too Sandy	0.50
		Too Sandy, caving	1.00				
Bradway	20	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00	Ponding	1.00
		Ponding	1.00	Ponding	1.00	Too Sandy	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00			Seepage	0.52
26:							
Saulich	85	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
27:							
Saulich	85	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
28:							
Typic Cryaquepts	85	Very Limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too Sandy	1.00
		Seepage	1.00			Depth to saturated zone	0.72
		Too Sandy, caving	1.00				

Table 11.--Sanitary Facilities: Landfill--Continued

Map symbol and soil name	Percent of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
29:							
Typic Dystrocryepts-	65	Very Limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Depth to bedrock	0.46	Seepage	1.00
		Seepage	1.00			Depth to bedrock	0.46
		Cobble content	0.26				
Lithic Dystrocryepts	30	Very Limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Seepage	1.00			Seepage	0.22
		Cobble content	0.01				
30:							
Typic Dystrocryepts-	60	Very Limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Depth to bedrock	0.46	Seepage	1.00
		Seepage	1.00	Slope	0.04	Depth to bedrock	0.46
		Cobble content	0.26			Slope	0.04
		Slope	0.04				
Saulich----------	25	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.04	Slope	0.04	Slope	0.04
31:							
Typic Dystrocryepts-	40	Very Limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Depth to bedrock	0.46	Seepage	1.00
		Seepage	1.00			Depth to bedrock	0.46
		Cobble content	0.26				
Tetlin----------	25	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.97
Saulich----------	20	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
32:							
Typic Cryopsamments-	30	Very Limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too Sandy	1.00
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Too Sandy, caving	1.00				
32:							
Typic Cryaquepts, flooded----------	30	Very Limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too Sandy	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.99
		Seepage	1.00				
		Too Sandy, caving	1.00				
Bradway----------	30	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Flooding	1.00	Flooding	1.00	Too Sandy	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00			Seepage	0.52
		Too Sandy, caving	1.00				

Table 11.--Sanitary Facilities: Landfill--Continued

Map symbol and soil name	Percent of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
33:							
Zitziana	90	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
34:							
Zitziana	45	Very Limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00	Slope	1.00	Seepage	1.00
		Slope	1.00			Slope	1.00
Kindanina	45	Very Limited		Very limited		Very limited	
		Permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Seepage	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Seepage	1.00	Too Sandy	1.00
		Too Sandy, caving	1.00			Seepage	1.00
35:							
Water	100	Not rated		Not rated		Not rated	

Table 12.--Construction Materials: Gravel and Sand

(This table gives soil suitability ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. Information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1:					
Beales----------	90	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
2:					
Beales----------	85	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
3:					
Beales----------	50	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
Zitziana----------	40	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
4:					
Typic Histoturbels--	30	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
Terric Hemistels----	30	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Organic soil	0.00
		Organic soil	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
Bradway----------	30	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
5:					
Iksgiza----------	90	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
6:					
Iksgiza----------	85	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00

Table 12.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
7:					
Iksgiza----------	90	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
8:					
Iksgiza----------	40	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
Beales----------	25	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
Zitziana----------	20	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
9:					
Iksgiza----------	60	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
Nenana----------	25	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
10:					
Iksgiza----------	65	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
Terric Hemistels----	30	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Organic soil	0.00
		Organic soil	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
11:					
Iksgiza----------	50	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
Zitziana----------	25	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		

Table 12.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
11:					
Nenana	20	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
12, 13:					
Kindanina	90	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Bottom layer not a source	0.00		
14:					
Kindanina	85	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Bottom layer not a source	0.00		
15:					
Kindanina	40	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Bottom layer not a source	0.00		
Beales	25	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
Zitziana	20	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
16:					
Koyukuk	90	Improbable Gravel Source		Improbable Sand Source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
17:					
Koyukuk	45	Improbable Gravel Source		Improbable Sand Source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Typic Aquiturbels	40	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
18:					
Koyukuk	70	Improbable Gravel Source		Improbable Sand Source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Typic Aquiturbels	15	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00

Table 12.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
19, 20, 21:					
Nenana	90	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
22:					
Nenana	50	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
Zitziana	40	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
23:					
Terric Hemistels	85	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Organic soil	0.00
		Organic soil	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
24:					
Riverwash	95	Not rated		Not rated	
25:					
Salchaket	65	Improbable Gravel Source		Improbable Sand Source	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Bradway	20	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
26, 27:					
Saulich	85	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
28:					
Typic Cryaquepts	85	Gravel Source		Probable Sand Source	
				Bottom layer	0.43
29:					
Typic Dystrocryepts	65	Improbable Gravel Source		Probable Sand Source	
		Bottom layer not a source	0.00	Bottom layer	0.14
		Hard bedrock within 4 to 7 feet	0.50	Hard bedrock within 4 to 7 feet	0.50
Lithic Dystrocryepts	30	Improbable Gravel Source		Improbable Sand Source	
		Hard bedrock within 4 feet	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Hard bedrock within 4 feet	0.00

Table 12.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
30:					
Typic Dystrocryepts-	60	Improbable Gravel Source		Probable Sand Source	
		Bottom layer not a source	0.00	Bottom layer	0.14
		Hard bedrock within 4 to 7 feet	0.50	Hard bedrock within 4 to 7 feet	0.50
Saulich----------	25	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
31:					
Typic Dystrocryepts-	40	Improbable Gravel Source		Probable Sand Source	
		Bottom layer not a source	0.00	Bottom layer	0.14
		Hard bedrock within 4 to 7 feet	0.50	Hard bedrock within 4 to 7 feet	0.50
Tetlin----------	25	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
Saulich----------	20	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
32:					
Typic Cryopsamments-	30	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
Typic Cryaquepts, flooded----------	30	Gravel Source		Probable Sand Source	
				Bottom layer	0.43
Bradway----------	30	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
33:					
Zitziana----------	90	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		

Table 12.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
34:					
Zitziana	45	Improbable Gravel Source		Sand Source	
		Bottom layer not a source	0.00		
Kindanina	45	Improbable Gravel Source		Improbable Sand Source	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Bottom layer not a source	0.00		
35:					
Water	100	Not rated		Not rated	

Table 13.--Construction Materials: Topsoil and Roadfill

(This table gives soil suitability ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. Information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1:					
Beales----------	90	Poor Source of Topsoil		Fair Source for Roadfill	
		Slope	0.00	Moderate frost action (check lower layers)	0.50
		Too sandy	0.00	Slope	0.82
2:					
Beales----------	85	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
3:					
Beales----------	50	Poor Source of Topsoil		Fair Source for Roadfill	
		Slope	0.00	Moderate frost action (check lower layers)	0.50
		Too sandy	0.00	Slope	0.82
Zitziana----------	40	Poor Source of Topsoil		Fair Source for Roadfill	
		Slope	0.00	Moderate frost action (check lower layers)	0.50
		Too sandy	0.00	Slope	0.82
4:					
Typic Histoturbels--	30	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
		Too acid	0.32		
Terric Hemistels----	30	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
		Too acid	0.99		
4:					
Bradway----------	30	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.01	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.01

Table 13.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
5:					
Iksgiza----------	90	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.18	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.18
6:					
Iksgiza----------	85	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.18	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.18
7:					
Iksgiza----------	90	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.18	High frost action (check lower layers)	0.00
		Slope	0.96	Depth to saturated zone	0.18
8:					
Iksgiza----------	40	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.18	High frost action (check lower layers)	0.00
		Slope	0.63	Depth to saturated zone	0.18
Beales----------	25	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
8:					
Zitziana----------	20	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
9:					
Iksgiza----------	60	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.18	High frost action (check lower layers)	0.00
		Slope	0.63	Depth to saturated zone	0.18

Table 13.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
9:					
Nenana----------	25	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.82
10:					
Iksgiza----------	65	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.18	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.18
Terric Hemistels----	30	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
		Too acid	0.99		
11:					
Iksgiza----------	50	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.18	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.18
Zitziana----------	25	Poor Source of Topsoil		Fair Source for Roadfill	
		Slope	0.00	Moderate frost action (check lower layers)	0.50
		Too sandy	0.00	Slope	0.82
Nenana----------	20	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.82
12:					
Kindanina----------	90	Poor Source of Topsoil		Poor Source for Roadfill	
		Too sandy	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Depth to permafrost	0.00	High frost action (check lower layers)	0.00

Table 13.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
13:					
Kindanina----------	90	Poor Source of Topsoil		Poor Source for Roadfill	
		Too sandy	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Depth to permafrost	0.00	High frost action (check lower layers)	0.00
		Slope	0.96		
14:					
Kindanina----------	85	Poor Source of Topsoil		Poor Source for Roadfill	
		Too sandy	0.00	Depth to saturated zone	0.00
		Slope	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.00	High frost action (check lower layers)	0.00
		Depth to permafrost	0.00	Slope	0.98
15:					
Kindanina----------	40	Poor Source of Topsoil		Poor Source for Roadfill	
		Too sandy	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Depth to permafrost	0.00	High frost action (check lower layers)	0.00
		Slope	0.63		
Beales----------	25	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
Zitziana----------	20	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
16:					
Koyukuk----------	90	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.82
17:					
Koyukuk----------	45	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.82

Table 13.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
17:					
Typic Aquiturbels---	40	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Depth to permafrost	0.00
		Depth to permafrost	0.00	High frost action (check lower layers)	0.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
				Low strength	0.78
				Slope	0.98
18:					
Koyukuk----------	70	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.82
Typic Aquiturbels---	15	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Depth to permafrost	0.00
		Depth to permafrost	0.00	High frost action (check lower layers)	0.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
				Low strength	0.78
				Slope	0.98
19:					
Nenana----------	90	Good Source of Topsoil		Poor Source for Roadfill	
				High frost action (check lower layers)	0.00
20:					
Nenana----------	90	Fair Source of Topsoil		Poor Source for Roadfill	
		Slope	0.96	High frost action (check lower layers)	0.00
21:					
Nenana----------	90	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.98
22:					
Nenana----------	50	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.82
Zitziana----------	40	Poor Source of Topsoil		Fair Source for Roadfill	
		Slope	0.00	Moderate frost action (check lower layers)	0.50
		Too sandy	0.00	Slope	0.82

Table 13.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
23:					
Terric Hemistels----	85	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
		Too acid	0.99		
24:					
Riverwash----------	95	Not rated		Not rated	
25:					
Salchaket----------	65	Good Source of Topsoil		Fair Source for Roadfill	
				Moderate frost action (check lower layers)	0.50
Bradway----------	20	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.01	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.01
26:					
Saulich----------	85	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.00	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.00
27:					
Saulich----------	85	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Depth to permafrost	0.00
		Depth to permafrost	0.00	High frost action (check lower layers)	0.00
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
				Slope	0.82
28:					
Typic Cryaquepts----	85	Fair Source of Topsoil		Poor Source for Roadfill	
		Hard to reclaim	0.12	High frost action (check lower layers)	0.00
		Depth to saturatee zone	0.76	Depth to saturated zone	0.76
		Rock fragment content	0.95		

Table 13.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
29:					
Typic Dystrocryepts-	65	Poor Source of Topsoil		Poor Source for Roadfill	
		Too sandy	0.00	Slope	0.00
		Rock fragment content	0.00	Moderate frost action (check lower layers)	0.50
		Slope	0.00	Depth to bedrock	0.58
		Hard to reclaim	0.92	Cobble content	0.87
Lithic Dystrocryepts	30	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Rock fragment content	0.95	Moderate frost action (check lower layers)	0.50
				Cobble content	0.99
30:					
Typic Dystrocryepts-	60	Poor Source of Topsoil		Fair Source for Roadfill	
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
		Rock fragment content	0.00	Depth to bedrock	0.58
		Hard to reclaim	0.92	Cobble content	0.87
		Slope	0.96		
Saulich----------	25	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.00	High frost action (check lower layers)	0.00
		Slope	0.96	Depth to saturated zone	0.00
31:					
Typic Dystrocryepts-	40	Poor Source of Topsoil		Poor Source for Roadfill	
		Too sandy	0.00	Slope	0.00
		Rock fragment content	0.00	Moderate frost action (check lower layers)	0.50
		Slope	0.00	Depth to bedrock	0.58
		Hard to reclaim	0.92	Cobble content	0.87
Tetlin----------	25	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.32	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.32
Saulich----------	20	Poor Source of Topsoil		Poor Source for Roadfill	
		Slope	0.00	Slope	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.00	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.00

Table 13.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
32:					
Typic Cryopsamments-	30	Poor Source of Topsoil		Fair Source for Roadfill	
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
Typic Cryaquepts, flooded	30	Fair Source of Topsoil		Poor Source for Roadfill	
		Hard to reclaim	0.12	High frost action (check lower layers)	0.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
		Rock fragment content	0.95		
Bradway	30	Poor Source of Topsoil		Poor Source for Roadfill	
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Depth to saturated zone	0.01	High frost action (check lower layers)	0.00
				Depth to saturated zone	0.01
33:					
Zitziana	90	Poor Source of Topsoil		Fair Source for Roadfill	
		Slope	0.00	Moderate frost action (check lower layers)	0.50
		Too sandy	0.00	Slope	0.82
34:					
Zitziana	45	Poor Source of Topsoil		Fair Source for Roadfill	
		Slope	0.00	Moderate frost action (check lower layers)	0.50
		Too sandy	0.00	Slope	0.82
Kindanina	45	Poor Source of Topsoil		Poor Source for Roadfill	
		Too sandy	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Depth to permafrost	0.00	High frost action (check lower layers)	0.00
35:					
Water	100	Not rated		Not rated	

Table 14.--Hydric Soils List

(See text for a key to the hydric soils criteria codes and for an explanation of other terms used in this table.)

Map symbol and map unit name	Soil name (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
1: Beales very fine sandy loam, 1 to 35 percent slopes	Beales (90%)	No	dunes on alluvial flats	---	---	---	---
	Poorly drained permafrost soils (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes greater than 35 percent (5%)	No	dunes	---	---	---	---
2: Beales very fine sandy loam, 35 to 75 percent slopes	Beales (85%)	No	dunes	---	---	---	---
	Soils on slopes less than 35 percent (10%)	No	dunes	---	---	---	---
	Soils with thicker than 10 inch loess mantles (5%)	No	dunes	---	---	---	---
3: Beales-Zitziana complex, 1 to 35 percent slopes	Beales (50%)	No	dunes on alluvial flats	---	---	---	---
	Zitziana (40%)	No	dunes	---	---	---	---
	Poorly drained permafrost soils (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes greater than 35 percent (5%)	No	dunes	---	---	---	---
4: Typic Histoturbels, Terric Hemistels, and Bradway soils, 0 to 2 percent slopes	Typic Histoturbels (30%)	Yes	depressions on flood plains	2B3	YES	NO	NO
	Terric Hemistels (30%)	Yes	depressions on flood plains	1	YES	NO	NO
	Bradway (30%)	Yes	flood plains	2B3,3	YES	NO	YES
	Soils that are frequently flooded (5%)	Yes	flood plains	4	NO	YES	NO
	Ponds and sloughs (5%)	No	---	---	---	---	---
5: Iksgiza peat, 0 to 3 percent slopes	Iksgiza (90%)	Yes	depressions on outwash plains	2B3	YES	NO	NO
	Histosols (5%)	Yes	depressions	1	YES	NO	NO
	Soils that are well drained (5%)	No	dunes	---	---	---	---
6: Iksgiza peat, 3 to 6 percent slopes	Iksgiza (85%)	Yes	depressions on outwash plains	2B3	YES	NO	NO
	Histosols (10%)	Yes	depressions	1	YES	NO	NO
	Soils that are well drained (5%)	No	dunes	---	---	---	---

Table 14.--Hydric Soils List--Continued

Map symbol and map unit name	Soil name (% of map unit)	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
7: Iksgiza peat, 6 to 12 percent slopes	Iksgiza (90%)	Yes	dunes on outwash plains	2B3	YES	NO	NO
	Soils on slopes less than 6 percent (5%)	Yes	depressions on dunes	2B3	YES	NO	NO
	Soils that are well drained (5%)	No	dunes	---	---	---	---
8: Iksgiza-Beales-Zitziana complex, pitted, 1 to 50 percent slopes	Iksgiza (40%)	Yes	depressions on outwash plains	2B3	YES	NO	NO
	Beales (25%)	No	dunes on alluvial flats	---	---	---	---
	Zitziana (20%)	No	dunes	---	---	---	---
	Ponds and lakes (5%)	No	---	---	---	---	---
	Poorly drained permafrost soils (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils that are well drained (5%)	No	dunes	---	---	---	---
9: Iksgiza-Nenana complex, 1 to 35 percent slopes	Iksgiza (60%)	Yes	depressions on dunes	2B3	YES	NO	NO
	Nenana (25%)	No	dunes	---	---	---	---
	Histosols (5%)	Yes	depressions	1	YES	NO	NO
	Small ponds (5%)	No	---	---	---	---	---
	Soils that are moderately well drained (5%)	No	dunes	---	---	---	---
10: Iksgiza-Terric Hemistels complex, 0 to 3 percent slopes	Iksgiza (65%)	Yes	depressions on outwash plains	2B3	YES	NO	NO
	Terric Hemistels (30%)	Yes	depressions on outwash plains	1	YES	NO	NO
	Soils that are ponded (3%)	Yes	depressions	3	NO	NO	YES
	Soils that are well drained (2%)	No	dunes	---	---	---	---
11: Iksgiza-Zitziana-Nenana complex, 1 to 35 percent slopes	Iksgiza (50%)	Yes	depressions on dunes	2B3	YES	NO	NO
	Zitziana (25%)	No	dunes	---	---	---	---
	Nenana (20%)	No	dunes	---	---	---	---
	Poorly drained permafrost soils (3%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes greater than 35 percent (2%)	No	dunes	---	---	---	---

Table 14.--Hydric Soils List--Continued

Map symbol and map unit name	Soil name (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
12: Kindanina mucky silt loam, 0 to 6 percent slopes	Kindanina (90%)	Yes	depressions on outwash plains	2B1	YES	NO	NO
	Histic Aquiturbels (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils that are well drained (5%)	No	dunes	---	---	---	---
13: Kindanina mucky silt loam, 6 to 12 percent slopes	Kindanina (90%)	Yes	depressions on outwash plains	2B1	YES	NO	NO
	Histic Aquiturbels (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes less than 6 percent (5%)	Yes	outwash plains	2B3	YES	NO	NO
14: Kindanina mucky silt loam, 12 to 20 percent slopes	Kindanina (85%)	Yes	depressions on outwash plains	2B3	YES	NO	NO
	Histic Aquiturbels (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes greater than 20 percent (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes less than 12 percent (5%)	Yes	depressions	2B3	YES	NO	NO
15: Kindanina-Beales-Zitziana complex, dunes, 1 to 50 percent slopes	Kindanina (40%)	Yes	depressions on dunes	2B3	YES	NO	NO
	Beales (25%)	No	dunes on alluvial flats	---	---	---	---
	Zitziana (20%)	No	dunes	---	---	---	---
	Poorly drained permafrost soils (10%)	Yes	depressions on dunes	2B3	YES	NO	NO
	Soils with organic mats thicker than 8 inches (5%)	Yes	depressions on dunes	2B3	YES	NO	NO
16: Koyukuk silt loam, 1 to 35 percent slopes	Koyukuk (90%)	No	dunes	---	---	---	---
	Poorly drained permafrost soils (5%)	Yes	depressions on dunes	2B3	YES	NO	NO
	Soils on slopes greater than 35 percent (5%)	No	dunes	---	---	---	---
17: Koyukuk-Typic Aquiturbels complex, dunes, 1 to 35 percent slopes	Koyukuk (45%)	No	dunes	---	---	---	---
	Typic Aquiturbels (40%)	Yes	depressions on dunes	2B3	YES	NO	NO
	Iksgiza (10%)	Yes	depressions on outwash plains	2B3	YES	NO	NO
	Nenana (5%)	No	dunes	---	---	---	---

Table 14.--Hydric Soils List--Continued

Map symbol and map unit name	Soil name (% of map unit)	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
18: Koyukuk-Typic Aquiturbels complex, pitted, 1 to 35 percent slopes	Koyukuk (70%)	No	hills on outwash plains	---	---	---	---
	Typic Aquiturbels (15%)	Yes	depressions	2B3	YES	NO	NO
	Histosols (5%)	Yes	depressions	1	YES	NO	NO
	Ponds and lakes (5%)	No	---	---	---	---	---
	Soils that are somewhat poorly drained (5%)	No	depressions on outwash plains	---	---	---	---
19: Nenana silt loam, 3 to 6 percent slopes	Nenana (90%)	No	dunes	---	---	---	---
	Poorly drained permafrost soils (10%)	Yes	depressions	2B3	YES	NO	NO
20: Nenana silt loam, 6 to 12 percent slopes	Nenana (90%)	No	dunes	---	---	---	---
	Poorly drained permafrost soils (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes greater than 12 percent (5%)	No	dunes	---	---	---	---
21: Nenana silt loam, 12 to 20 percent slopes	Nenana (90%)	No	dunes	---	---	---	---
	Soils on slopes less than 12 percent (5%)	No	dunes	---	---	---	---
	Soils that are poorly drained (5%)	Yes	depressions	2B3	YES	NO	NO
22: Nenana-Zitziana complex, 1 to 35 percent slopes	Nenana (50%)	No	dunes	---	---	---	---
	Zitziana (40%)	No	dunes	---	---	---	---
	Poorly drained permafrost soils (5%)	Yes	depressions	2B3	YES	NO	NO
	Soils on slopes greater than 35 percent (5%)	No	dunes	---	---	---	---
23: Terric Hemistels, 0 to 2 percent slopes	Terric Hemistels (85%)	Yes	depressions on alluvial flats	1	YES	NO	NO
	Well drained mineral soils (15%)	No	dunes	---	---	---	---
24: Riverwash	Riverwash (95%)	No	flood plains	---	---	---	---
	Salchaket (3%)	No	flood plains	---	---	---	---
	Water (2%)	No	---	---	---	---	---

Table 14.--Hydric Soils List--Continued

Map symbol and map unit name	Soil name (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
25: Salchaket-Bradway complex, 0 to 3 percent slopes	Salchaket (65%)	No	flood plains	---	---	---	---
	Bradway (20%)	Yes	outwash plains	2B3	YES	NO	NO
	Histosols (5%)	Yes	depressions	1	YES	NO	NO
	Ponds and sloughs (5%)	No	---	---	---	---	---
	Riverwash (5%)	No	flood plains	---	---	---	---
26: Saulich peat, 0 to 6 percent slopes	Saulich (85%)	Yes	outwash plains	2B3	YES	NO	NO
	Soils that are poorly drained (10%)	Yes	depressions	2B3	YES	NO	NO
	Soils with less than 8 inch thick organic mats (5%)	Yes	depressions	2B3	YES	NO	NO
27: Saulich peat, 6 to 30 percent slopes	Saulich (85%)	Yes	depressions on hillsides	2B3	YES	NO	NO
	Soils on slopes less than 3 percent (10%)	Yes	hillsides	2B3	YES	NO	NO
	Soils with less than 8 inch thick organic mats (5%)	Yes	depressions	2B3	YES	NO	NO
28: Typic Cryaquepts, 0 to 2 percent slopes	Typic Cryaquepts (85%)	No	depressions on alluvial flats	---	---	---	---
	Histosols (5%)	Yes	depressions	1	YES	NO	NO
	Small ponds and lakes (5%)	No	---	---	---	---	---
	Soils that are well drained (5%)	No	dunes	---	---	---	---
29: Typic Dystrocryepts-Lithic Dystrocryepts association, 15 to 70 percent slopes	Typic Dystrocryepts (65%)	No	hillsides	---	---	---	---
	Lithic Dystrocryepts (30%)	No	hills	---	---	---	---
	Soils with permafrost (5%)	Yes	depressions	2B3	YES	NO	NO
30: Typic Dystrocryepts-Saulich complex, 3 to 15 percent slopes	Typic Dystrocryepts (60%)	No	hillsides	---	---	---	---
	Saulich (25%)	Yes	hillsides	2B3	YES	NO	NO
	Soils on slopes greater than 15 percent (5%)	No	dunes	---	---	---	---
	Soils with sandy subsoil (5%)	No	dunes	---	---	---	---
	Typic Histoturbels (5%)	Yes	depressions on dunes	2B3	YES	NO	NO

Table 14.--Hydric Soils List--Continued

Map symbol and map unit name	Soil name (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
31: Typic Dystrocryepts-Tetlin-Saulich association, 15 to 70 percent slopes	Typic Dystrocryepts (40%)	No	hillsides	---	---	---	---
	Tetlin (25%)	Yes	hillsides	2B3	YES	NO	NO
	Saulich (20%)	Yes	depressions on hillsides	2B3	YES	NO	NO
	Soils on slopes less than 15 percent (10%)	Yes	hillsides	2B3	YES	NO	NO
	Soils that are shallow to bedrock (5%)	No	hills	---	---	---	---
32: Typic Cryopsamments, Typic Cryaquepts, flooded, and Bradway soils, 0 to 5 percent slopes	Typic Cryopsamments (30%)	No	levees on flood plains	---	---	---	---
	Typic Cryaquepts, flooded (30%)	Yes	depressions on flood plains	4	NO	YES	NO
	Bradway (30%)	Yes	flood plains	2B3	YES	NO	NO
	Loamy soils that are well drained (5%)	No	flood plains	---	---	---	---
	Ponds (3%)	No	---	---	---	---	---
	Riverwash (2%)	No	flood plains	---	---	---	---
33: Zitziana silt loam, 1 to 35 percent slopes	Zitziana (90%)	No	dunes	---	---	---	---
	Soils on slopes greater than 35 percent (5%)	No	dunes	---	---	---	---
	Soils with permafrost (5%)	Yes	depressions	2B3	YES	NO	NO
34: Zitziana-Kindanina complex, 1 to 35 percent slopes	Zitziana (45%)	Yes	depressions on dunes	2B1	YES	NO	NO
	Kindanina (45%)	No	dunes	---	---	---	---
	Soils on slopes greater than 35 percent (5%)	No	dunes	---	---	---	---
	Typic Histoturbels (58%)	Yes	depressions	2B3	YES	NO	NO
35: Water	Water (100%)	No	---	---	---	---	---

Table 15.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1, 2:												
Beales-------	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	3-6	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	6-60	Fine sand	SP-SM	A-2, A-3	0	0	100	100	85-90	5-10	---	NP
3:												
Beales-------	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	3-6	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	6-60	Fine sand	SP-SM	A-2, A-3	0	0	100	100	85-90	5-10	---	NP
Zitziana-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-3	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	3-17	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	17-60	Fine sand, sand	SM, SP-SM	A-2	0	0	100	100	60-100	10-25	0-14	NP
4:												
Typic Histoturbels-	0-11	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	11-13	Permanently frozen silt loam	---	---	0	0-10	---	---	---	---	0-14	---
	13-23	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
Terric Hemistels----	0-20	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	20-22	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	22-60	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
Bradway------	0-1	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-5	Mucky silt loam	OL	A-5	0	0	100	100	95-100	75-90	40-50	NP-10
	5-15	Stratified fine sand to very fine sandy loam	ML, SM	A-4	0	0	95-100	95-100	85-95	40-65	0-14	NP
	15-24	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
5, 6, 7:												
Iksgiza------	0-10	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-18	Silt loam	MH, ML, OH, OL	A-5	0	0	100	100	90-100	70-90	40-60	NP-10
	18-38	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
	38-60	Permanently frozen fine sand	---	---	---	---	---	---	---	---	---	---
8:												
Iksgiza------	0-10	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-18	Silt loam	MH, ML, OH, OL	A-5	0	0	100	100	90-100	70-90	40-60	NP-10
	18-38	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
	38-60	Permanently frozen fine sand	---	---	---	---	---	---	---	---	---	---
Beales-------	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	3-6	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	6-60	Fine sand	SP-SM	A-2, A-3	0	0	100	100	85-90	5-10	---	NP
Zitziana-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-3	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	3-17	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	17-60	Fine sand, sand	SM, SP-SM	A-2	0	0	100	100	60-100	10-25	0-14	NP

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
9:												
Iksgiza------	0-10	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-18	Silt loam	MH, ML, OH, OL	A-5	0	0	100	100	90-100	70-90	40-60	NP-10
	18-38	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
	38-60	Permanently frozen fine sand	---	---	---	---	---	---	---	---	---	---
Nenana-------	0-2	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-4	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	4-38	Silt loam	ML	A-4	0	0	100	100	90-100	80-95	25-35	NP-10
	38-60	Fine sand, sand, gravelly sand	SP-SM	A-2, A-3	0	0	100	100	85-95	5-10	---	NP
10:												
Iksgiza------	0-10	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-18	Silt loam	MH, ML, OH, OL	A-5	0	0	100	100	90-100	70-90	40-60	NP-10
	18-38	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
	38-60	Permanently frozen fine sand	---	---	---	---	---	---	---	---	---	---
Terric Hemistels----	0-20	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	20-22	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	22-60	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
11:												
Iksgiza------	0-10	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-18	Silt loam	MH, ML, OH, OL	A-5	0	0	100	100	90-100	70-90	40-60	NP-10
	18-38	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
	38-60	Permanently frozen fine sand	---	---	---	---	---	---	---	---	---	---
11:												
Zitziana-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-3	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	3-17	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	17-60	Fine sand, sand	SM, SP-SM	A-2	0	0	100	100	60-100	10-25	0-14	NP
Nenana-------	0-2	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-4	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	4-38	Silt loam	ML	A-4	0	0	100	100	90-100	80-95	25-35	NP-10
	38-60	Fine sand, sand, gravelly sand	SP-SM	A-2, A-3	0	0	100	100	85-95	5-10	---	NP
12, 13, 14:												
Kindanina----	0-4	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	4-6	Mucky silt loam	MH, ML, OH, OL	A-5	0	0	100	100	95-100	85-95	40-60	NP-10
	6-10	Very fine sandy loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	10-22	Sand	SM, SP-SM	A-2, A-4	0	0	100	100	95-100	10-40	0-14	NP
	22-32	Permanently frozen sand	---	---	---	---	---	---	---	---	---	---
15:												
Kindanina----	0-4	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	4-6	Mucky silt loam	MH, ML, OH, OL	A-5	0	0	100	100	95-100	85-95	40-60	NP-10
	6-10	Very fine sandy loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	10-22	Sand	SM, SP-SM	A-2, A-4	0	0	100	100	95-100	10-40	0-14	NP
	22-32	Permanently frozen sand	---	---	---	---	---	---	---	---	---	---

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
15:												
Beales-------	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	3-6	Very fine sandy loam	ML	A-4	0	0	100	100	90-95	75-90	30-40	NP-10
	6-60	Fine sand	SP-SM	A-2, A-3	0	0	100	100	85-90	5-10	---	NP
Zitziana-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-3	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	3-17	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	17-60	Fine sand, sand	SM, SP-SM	A-2	0	0	100	100	60-100	10-25	0-14	NP
16:												
Koyukuk------	0-5	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	5-7	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	7-60	Silt loam	ML	A-4	0	0	95-100	95-100	85-100	75-95	25-35	NP-10
17, 18:												
Koyukuk------	0-5	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	5-7	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	7-60	Silt loam	ML	A-4	0	0	95-100	95-100	85-100	75-95	25-35	NP-10
Typic Aquiturbels--	0-4	Highly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	4-8	Silt loam	MH, ML, OH, OL	A-5	0	0	100	100	90-100	65-95	40-60	NP-10
	8-28	Silt loam	MH, ML	A-4, A-5	0	0	100	100	90-100	70-90	30-55	NP-10
	28-34	Permanently frozen silt loam			---	---	---	---	---	---	---	---
19, 20, 21:												
Nenana-------	0-2	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-4	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	4-38	Silt loam	ML	A-4	0	0	100	100	90-100	80-95	25-35	NP-10
	38-60	Fine sand, sand, gravelly sand	SP-SM	A-2, A-3	0	0	100	100	85-95	5-10	---	NP
22:												
Nenana-------	0-2	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-4	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	4-38	Silt loam	ML	A-4	0	0	100	100	90-100	80-95	25-35	NP-10
	38-60	Fine sand, sand, gravelly sand	SP-SM	A-2, A-3	0	0	100	100	85-95	5-10	---	NP
Zitziana-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-3	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	3-17	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	17-60	Fine sand, sand	SM, SP-SM	A-2	0	0	100	100	60-100	10-25	0-14	NP
23:												
Terric Hemistels----	0-20	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	20-22	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	22-60	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
24:												
Riverwash----	---	---	---	---	---	---	---	---	---	---	---	---
25:												
Salchaket----	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-6	Stratified silt loam to very fine sandy loam to peat	ML	A-4	0	0	100	100	90-100	65-75	25-30	NP-5
	6-60	Stratified silt loam to very fine sandy loam to very fine sand	ML	A-4	0	0	100	100	90-100	65-75	25-30	NP-5

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
25:												
Bradway------	0-1	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-5	Mucky silt loam	OL	A-5	0	0	100	100	95-100	75-90	40-50	NP-10
	5-15	Stratified fine sand to very fine sandy loam	ML, SM	A-4	0	0	95-100	95-100	85-95	40-65	0-14	NP
	15-24	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
26, 27:												
Saulich------	0-10	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-14	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	14-27	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	27-37	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
28:												
Typic Cryaquepts---	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-6	Silt loam	MH, ML, OH, OL	A-4, A-5	0	0	100	100	90-100	70-90	30-100	NP-10
	6-42	Stratified fine sand to silt loam	ML	A-4	0	0-15	100	90-100	80-100	65-75	10-15	NP-5
	42-60	Extremely gravelly sand, very gravelly sand, gravelly sand	GW, SW	A-1	0	0-40	40-70	20-50	5-20	0-5	---	NP
29:												
Typic Dystrocryepts	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	3-13	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	13-51	Fine sand	GM, SM, SP-SM	A-1, A-2, A-3, A-4	0	0-60	50-100	40-100	35-90	5-50	---	NP
	51+	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Lithic Dystrocryepts	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Silt loam	ML	A-4	0	0	100	100	90-100	85-95	30-40	NP-10
	3-10	Silt loam	ML	A-4	0	0-15	80-100	80-100	70-95	60-90	30-40	NP-10
	10-15	Very gravelly silt loam, very cobbly silt loam	SM, SP-SM	A-1, A-2, A-4	0	15-60	80-100	50-100	40-90	10-50	0-14	NP
	15+	Bedrock	---	---	---	---	---	---	---	---	---	---
30:												
Typic Dystrocryepts	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	3-13	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	13-51	Fine sand	GM, SM, SP-SM	A-1, A-2, A-3, A-4	0	0-60	50-100	40-100	35-90	5-50	---	NP
	51+	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Saulich------	0-10	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-14	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	14-27	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	27-37	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
31:												
Typic Dystrocryepts	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-3	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	3-13	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	13-51	Fine sand	GM, SM, SP-SM	A-1, A-2, A-3, A-4	0	0-60	50-100	40-100	35-90	5-50	---	NP
	51+	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 15.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
31:												
Tetlin-------	0-7	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	7-38	Silt loam	ML	A-4, A-5	0	0	100	100	90-100	70-90	30-50	NP-5
	38-60	Consolidated permafrost (ice rich)	---	---	---	---	---	---	---	---	---	---
Saulich------	0-10	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	10-14	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	14-27	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	27-37	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
32:												
Typic Cryopsamments	0-1	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-2	Silt loam	ML	A-4	0	0	100	100	90-100	75-95	30-40	NP-10
	2-60	Fine sand, sand	SM, SP-SM	A-2, A-3	0	0	100	100	50-100	5-25	0-14	NP
Typic Cryaquepts, Flooded-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-6	Silt loam	MH, ML, OH, OL	A-4, A-5	0	0	100	100	90-100	70-90	30-100	NP-10
	6-42	Stratified fine sand to silt loam	ML	A-4	0	0-15	100	90-100	80-100	65-75	10-15	NP-5
	42-60	Extremely gravelly sand, very gravelly sand, gravelly sand	GW, SW	A-1	0	0-40	40-70	20-50	5-20	0-5	---	NP
Bradway------	0-1	Moderately decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	1-5	Mucky silt loam	OL	A-5	0	0	100	100	95-100	75-90	40-50	NP-10
	5-15	Stratified fine sand to very fine sandy loam	ML, SM	A-4	0	0	95-100	95-100	85-95	40-65	0-14	NP
	15-24	Permanently frozen silt loam	---	---	---	---	---	---	---	---	---	---
33:												
Zitziana-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-3	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	3-17	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	17-60	Fine sand, sand	SM, SP-SM	A-2	0	0	100	100	60-100	10-25	0-14	NP
34:												
Zitziana-----	0-2	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	2-3	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-10
	3-17	Silt loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	17-60	Fine sand, sand	SM, SP-SM	A-2	0	0	100	100	60-100	10-25	0-14	NP
Kindanina----	0-4	Slightly decomposed plant material	PT	A-8	---	---	---	---	---	---	---	---
	4-6	Mucky silt loam	MH, ML, OH, OL	A-5	0	0	100	100	95-100	85-95	40-60	NP-10
	6-10	Very fine sandy loam	ML	A-4	0	0	100	100	95-100	85-95	30-40	NP-5
	10-22	Sand	SM, SP-SM	A-2, A-4	0	0	100	100	95-100	10-40	0-14	NP
	22-32	Permanently frozen sand	---	---	---	---	---	---	---	---	---	---
35:												
Water--------	---	---	---	---	---	---	---	---	---	---	---	---

Table 16.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
1, 2:												
Beales----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-3	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	3-6	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	6-60	0-5	1.10-1.20	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.24	.24			
3:												
Beales----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-3	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	3-6	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	6-60	0-5	1.10-1.20	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.24	.24			
Zitziana----------	0-2	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	2-3	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.37	.37			
	3-17	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	17-60	0-5	1.30-1.50	6-20	0.05-0.15	0.0-2.9	0.0-1.0	.15	.10			
4:												
Typic Histoturbels	0-11	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	11-13	---	---	0.00-0.00	---	---	---	---	---			
	13-23	---	---	0.00-0.00	---	---	---	---	---			
Terric Hemistels--	0-20	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	2	8	0
	20-22	1-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	22-60	---	---	0.00-0.00	---	---	---	---	---			
Bradway----------	0-1	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	8	0
	1-5	0-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	5-15	5-10	1.10-1.20	2-6	0.15-0.18	0.0-2.9	0.0-1.0	.32	.32			
	15-24	---	---	0.00-0.00	---	---	---	---	---			
5, 6, 7:												
Iksgiza----------	0-10	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	10-18	0-10	0.80-1.20	0.6-2	0.24-0.28	0.0-2.9	5.0-15	.37	.37			
	18-38	---	---	0.00-0.00	---	---	---	---	---			
	38-60	---	---	0.00-0.00	---	---	---	---	---			
8:												
Iksgiza----------	0-10	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	10-18	0-10	0.80-1.20	0.6-2	0.24-0.28	0.0-2.9	5.0-15	.37	.37			
	18-38	---	---	0.00-0.00	---	---	---	---	---			
	38-60	---	---	0.00-0.00	---	---	---	---	---			
Beales----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-3	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	3-6	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	6-60	0-5	1.10-1.20	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.24	.24			
Zitziana----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-2	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.37	.37			
	2-16	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	16-60	0-5	1.30-1.50	6-20	0.05-0.15	0.0-2.9	0.0-1.0	.15	.10			
9:												
Iksgiza----------	0-10	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	10-18	0-10	0.80-1.20	0.6-2	0.24-0.28	0.0-2.9	5.0-15	.37	.37			
	18-38	---	---	0.00-0.00	---	---	---	---	---			
	38-60	---	---	0.00-0.00	---	---	---	---	---			
Nenana----------	0-2	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	2	134
	2-4	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.37	.37			
	4-38	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	38-60	0-5	1.30-1.40	6-20	0.04-0.06	0.0-2.9	0.0-1.0	.15	.17			
10:												
Iksgiza----------	0-10	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	10-18	0-10	0.80-1.20	0.6-2	0.24-0.28	0.0-2.9	5.0-15	.37	.37			
	18-38	---	---	0.00-0.00	---	---	---	---	---			
	38-60	---	---	0.00-0.00	---	---	---	---	---			

Table 16.--Physical Properties of the Soil--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
10:												
Terric Hemistels--	0-20	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	2	8	0
	20-22	1-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	22-60	---	---	0.00-0.00	---	---	---	---	---			
11:												
Iksgiza----------	0-10	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	10-18	0-10	0.80-1.20	0.6-2	0.24-0.28	0.0-2.9	5.0-15	.37	.37			
	18-38	---	---	0.00-0.00	---	---	---	---	---			
	38-60	---	---	0.00-0.00	---	---	---	---	---			
Zitziana----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-2	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.37	.37			
	2-16	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	16-60	0-5	1.30-1.50	6-2	0.05-0.15	0.0-2.9	0.0-1.0	.15	.10			
Nenana----------	0-2	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	2	134
	2-4	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.37	.37			
	4-38	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	38-60	0-5	1.30-1.40	6-2	0.04-0.06	0.0-2.9	0.0-1.0	.15	.17			
12, 13, 14:												
Kindanina---------	0-4	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	4-6	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	10-15	.37	.37			
	6-10	0-5	1.10-1.30	0.6-2	0.15-0.20	0.0-2.9	1.0-5.0	.43	.43			
	10-22	0-5	1.30-1.50	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.15	.10			
	22-32	---	---	0.00-0.00	---	---	---	---	---			
15:												
Kindanina---------	0-4	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	4-6	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	10-15	.37	.37			
	6-10	0-5	1.10-1.30	0.6-2	0.15-0.20	0.0-2.9	1.0-5.0	.43	.43			
	10-22	0-5	1.30-1.50	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.15	.10			
	22-32	---	---	0.00-0.00	---	---	---	---	---			
Beales----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-3	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	3-6	0-10	1.10-1.20	0.6-2	0.20-0.23	0.0-2.9	1.0-5.0	.37	.37			
	6-60	0-5	1.10-1.20	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.24	.24			
Zitziana----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-2	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.37	.37			
	2-16	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	16-60	0-5	1.30-1.50	6-20	0.05-0.15	0.0-2.9	0.0-1.0	.15	.10			
16:												
Koyukuk----------	0-5	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	5	2	134
	5-7	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.37	.37			
	7-60	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
17, 18:												
Koyukuk----------	0-5	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	5	2	134
	5-7	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.37	.37			
	7-60	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
Typic Aquiturbels--	0-4	0-1	0.20-0.30	0.6-2	0.25-0.30	0.0-1.0	70-90	.05	.05	2	8	0
	4-8	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	5.0-15	.37	.37			
	8-28	0-10	1.10-1.40	0.6-2	0.24-0.28	0.0-2.9	5.0-10	.37	.37			
	28-34	---	---	---	---	---	---	---	---			
19, 20, 21:												
Nenana----------	0-2	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	2	134
	2-4	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.37	.37			
	4-38	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	38-60	0-5	1.30-1.40	6-20	0.04-0.06	0.0-2.9	0.0-1.0	.15	.17			
22:												
Nenana----------	0-2	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	2	134
	2-4	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.37	.37			
	4-38	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	38-60	0-5	1.30-1.40	6-20	0.04-0.06	0.0-2.9	0.0-1.0	.15	.17			

Table 16.--Physical Properties of the Soil--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
22:												
Zitziana----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-2	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.37	.37			
	2-16	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	16-60	0-5	1.30-1.50	6-20	0.05-0.15	0.0-2.9	0.0-1.0	.15	.10			
23:												
Terric Hemistels--	0-20	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	2	8	0
	20-22	1-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	22-60	---	---	0.00-0.00	---	---	---	---	---			
24:												
Riverwash---------	---	---	---	---	---	---	---	---	---		---	---
25:												
Salchaket---------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	5	2	134
	1-6	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-6.0	.37	.37			
	6-60	5-10	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
Bradway----------	0-1	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	8	0
	1-5	0-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	5-15	5-10	1.10-1.20	2-6	0.15-0.18	0.0-2.9	0.0-1.0	.32	.32			
	15-24	---	---	0.00-0.00	---	---	---	---	---			
26, 27:												
Saulich----------	0-10	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	8	0
	10-14	0-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	14-27	0-5	1.10-1.20	0.6-2	0.21-0.23	0.0-2.9	1.0-3.0	.43	.43			
	27-37	---	---	0.00-0.00	---	---	---	---	---			
28:												
Typic Cryaquepts--	0-2	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	2-6	5-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-10	.37	.37			
	6-42	5-10	1.20-1.50	0.6-2	0.15-0.22	0.0-2.9	1.0-3.0	.43	.43			
	42-60	0-5	1.60-1.70	6-20	0.02-0.05	0.0-2.9	0.0-1.0	.05	.10			
29:												
Typic Dystrocryepts-----	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	3	2	134
	1-3	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.37	.37			
	3-13	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	1.0-5.0	.43	.43			
	13-51	0-10	1.30-1.50	0.6-20	0.03-0.20	0.0-2.9	0.0-1.0	.15	.32			
	51+	---	---	---	---	---	---	---	---			
Lithic Dystrocryept------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-3	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.37	.37			
	3-10	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	1.0-5.0	.43	.43			
	10-15	0-10	1.50-1.70	0.6-6	0.05-0.15	0.0-2.9	0.0-1.0	.15	.15			
	15+	---	---	---	---	---	---	---	---			
30:												
Typic Dystrocryepts-----	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	3	2	134
	1-3	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.37	.37			
	3-13	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	1.0-5.0	.43	.43			
	13-51	0-10	1.30-1.50	0.6-20	0.03-0.20	0.0-2.9	0.0-1.0	.15	.32			
	51+	---	---	---	---	---	---	---	---			
Saulich----------	0-10	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	1	8	0
	10-14	0-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	14-27	0-5	1.10-1.20	0.6-2	0.21-0.23	0.0-2.9	1.0-3.0	.43	.43			
	27-37	---	---	0.00-0.00	---	---	---	---	---			
31:												
Typic Dystrocryepts-----	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	3	2	134
	1-3	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.37	.37			
	3-13	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	1.0-5.0	.43	.43			
	13-51	0-10	1.30-1.50	0.6-20	0.03-0.20	0.0-2.9	0.0-1.0	.15	.32			
	51+	---	---	---	---	---	---	---	---			
Tetlin----------	0-7	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	2	8	0
	7-38	0-10	0.80-1.30	0.6-2	0.24-0.28	0.0-2.9	2.0-5.0	.37	.37			
	38-60	---	---	0.00-0.00	---	---	---	---	---			

Table 16.--Physical Properties of the Soil--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
31:												
Saulich----------	0-10	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	8	0
	10-14	0-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	14-27	0-5	1.10-1.20	0.6-2	0.21-0.23	0.0-2.9	1.0-3.0	.43	.43			
	27-37	---	---	0.00-0.00	---	---	---	---	---			
32:												
Typic Cryopsamments-----	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	5	2	134
	1-2	0-10	0.80-1.20	0.6-2	0.20-0.23	0.0-2.9	3.0-5.0	.37	.37			
	2-60	0-5	1.20-1.60	6-20	0.05-0.15	0.0-2.9	0.0-1.0	.24	.24			
Typic Cryaquepts, flooded----------	0-2	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	2	8	0
	2-6	5-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-10	.37	.37			
	6-42	5-10	1.20-1.50	0.6-2	0.15-0.22	0.0-2.9	1.0-3.0	.43	.43			
	42-60	0-5	1.60-1.70	6-20	0.02-0.05	0.0-2.9	0.0-1.0	.05	.10			
Bradway----------	0-1	0-0	0.07-0.18	2-6	0.30-0.35	0.0-1.0	80-90	.05	.05	2	8	0
	1-5	0-5	1.10-1.20	0.6-2	0.23-0.25	0.0-2.9	8.0-12	.37	.37			
	5-15	5-10	1.10-1.20	2-6	0.15-0.18	0.0-2.9	0.0-1.0	.32	.32			
	15-24	---	---	0.00-0.00	---	---	---	---	---			
33:												
Zitziana----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-2	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.37	.37			
	2-16	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	16-60	0-5	1.30-1.50	6-20	0.05-0.15	0.0-2.9	0.0-1.0	.15	.10			
34:												
Zitziana----------	0-1	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	2	134
	1-2	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.37	.37			
	2-16	0-10	1.10-1.30	0.6-2	0.20-0.22	0.0-2.9	0.0-1.0	.43	.43			
	16-60	0-5	1.30-1.50	6-20	0.05-0.15	0.0-2.9	0.0-1.0	.15	.10			
Kindanina---------	0-4	0-0	0.05-0.10	2-6	0.25-0.30	0.0-1.0	60-80	.05	.05	1	8	0
	4-6	0-10	0.80-1.20	0.6-2	0.20-0.22	0.0-2.9	10-15	.37	.37			
	6-10	0-5	1.10-1.30	0.6-2	0.15-0.20	0.0-2.9	1.0-5.0	.43	.43			
	10-22	0-5	1.30-1.50	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.15	.10			
	22-32	---	---	0.00-0.00	---	---	---	---	---			
35:												
Water----------	---	---	---	---	---	---	---	---	---	-	---	---

Table 17.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
1, 2:				
Beales	0-1	---	30-80	4.5-5.5
	1-3	15-30	---	5.1-6.0
	3-6	10-15	---	5.1-6.0
	6-60	1.0-5.0	---	5.1-6.0
3:				
Beales	0-1	---	30-80	4.5-5.5
	1-3	15-30	---	5.1-6.0
	3-6	10-15	---	5.1-6.0
	6-60	1.0-5.0	---	5.1-6.0
Zitziana	0-2	---	30-80	4.5-5.5
	2-3	20-30	---	6.1-7.3
	3-17	5.0-15	---	6.1-7.3
	17-60	1.0-5.0	---	6.1-7.3
4:				
Typic Histoturbels	0-11	---	40-70	3.6-5.0
	11-13	15-30	---	5.1-6.0
	13-23	---	---	---
Terric Hemistels	0-20	---	40-80	5.1-6.0
	20-22	20-30	---	6.1-6.5
	22-60	1.0-5.0	---	6.1-6.5
Bradway	0-1	---	30-80	4.5-5.5
	1-5	15-30	---	5.6-6.5
	5-15	1.0-10	---	7.4-7.8
	15-24	---	---	---
5, 6, 7:				
Iksgiza	0-10	---	30-80	4.5-5.5
	10-18	10-40	---	5.1-6.5
	18-38	---	---	---
	38-60	---	---	---
8:				
Iksgiza	0-10	---	30-80	4.5-5.5
	10-18	10-40	---	5.1-6.5
	18-38	---	---	---
	38-60	---	---	---
Beales	0-1	---	30-80	4.5-5.5
	1-3	15-30	---	5.1-6.0
	3-6	10-15	---	5.1-6.0
	6-60	1.0-5.0	---	5.1-6.0
Zitziana	0-2	---	30-80	4.5-5.5
	2-3	20-30	---	6.1-7.3
	3-17	5.0-15	---	6.1-7.3
	17-60	1.0-5.0	---	6.1-7.3
9:				
Iksgiza	0-10	---	30-80	4.5-5.5
	10-18	10-40	---	5.1-6.5
	18-38	---	---	---
	38-60	---	---	---
Nenana	0-2	---	30-80	4.5-5.5
	2-4	15-30	---	5.6-6.5
	4-38	5.0-15	---	5.6-6.5
	38-60	1.0-5.0	---	6.1-7.3
10:				
Iksgiza	0-10	---	30-80	4.5-5.5
	10-18	10-40	---	5.1-6.5
	18-38	---	---	---
	38-60	---	---	---

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
10:				
Terric Hemistels------	0-20	---	40-80	5.1-6.0
	20-22	20-30	---	6.1-6.5
	22-60	1.0-5.0	---	6.1-6.5
11:				
Iksgiza----------	0-10	---	30-80	4.5-5.5
	10-18	10-40	---	5.1-6.5
	18-38	---	---	---
	38-60	---	---	---
Zitziana----------	0-2	---	30-80	4.5-5.5
	2-3	20-30	---	6.1-7.3
	3-17	5.0-15	---	6.1-7.3
	17-60	1.0-5.0	---	6.1-7.3
Nenana----------	0-2	---	30-80	4.5-5.5
	2-4	15-30	---	5.6-6.5
	4-38	5.0-15	---	5.6-6.5
	38-60	1.0-5.0	---	6.1-7.3
12, 13, 14:				
Kindanina----------	0-4	---	30-80	4.5-5.5
	4-6	---	30-50	5.1-5.5
	6-10	5.0-15	---	5.6-6.5
	10-22	1.0-5.0	---	5.6-6.5
	22-32	---	---	---
15:				
Kindanina----------	0-4	---	30-80	4.5-5.5
	4-6	---	30-50	5.1-5.5
	6-10	5.0-15	---	5.6-6.5
	10-22	1.0-5.0	---	5.6-6.5
	22-32	---	---	---
Beales----------	0-1	---	30-80	4.5-5.5
	1-3	15-30	---	5.1-6.0
	3-6	10-15	---	5.1-6.0
	6-60	1.0-5.0	---	5.1-6.0
15:				
Zitziana----------	0-2	---	30-80	4.5-5.5
	2-3	20-30	---	6.1-7.3
	3-17	5.0-15	---	6.1-7.3
	17-60	1.0-5.0	---	6.1-7.3
16:				
Koyukuk----------	0-5	---	30-80	4.5-5.5
	5-7	5.0-15	---	5.1-6.0
	7-60	1.0-5.0	---	5.1-6.5
17:				
Koyukuk----------	0-5	---	30-80	4.5-5.5
	5-7	5.0-15	---	5.1-6.0
	7-60	1.0-5.0	---	5.1-6.5
Typic Aquiturbels-----	0-4	---	30-80	4.5-5.0
	4-8	20-40	---	5.1-6.5
	8-28	10-20	---	5.1-6.5
	28-34	---	---	---
18:				
Koyukuk----------	0-5	---	30-80	4.5-5.5
	5-7	5.0-15	---	5.1-6.0
	7-60	1.0-5.0	---	5.1-6.5
Typic Aquiturbels-----	0-4	---	30-80	4.5-5.0
	4-8	20-40	---	5.1-6.5
	8-28	10-20	---	5.1-6.5
	28-34	---	---	---

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
19, 20, 21:				
Nenana	0-2	---	30-80	4.5-5.5
	2-4	15-30	---	5.6-6.5
	4-38	5.0-15	---	5.6-6.5
	38-60	1.0-5.0	---	6.1-7.3
22:				
Nenana	0-2	---	30-80	4.5-5.5
	2-4	15-30	---	5.6-6.5
	4-38	5.0-15	---	5.6-6.5
	38-60	1.0-5.0	---	6.1-7.3
Zitziana	0-2	---	30-80	4.5-5.5
	2-3	20-30	---	6.1-7.3
	3-17	5.0-15	---	6.1-7.3
	17-60	1.0-5.0	---	6.1-7.3
23:				
Terric Hemistels	0-20	---	40-80	5.1-6.0
	20-22	20-30	---	6.1-6.5
	22-60	1.0-5.0	---	6.1-6.5
24:				
Riverwash	---	---	---	---
25:				
Salchaket	0-1	---	30-80	5.1-6.0
	1-6	15-30	---	6.6-7.8
	6-60	1.0-5.0	---	6.6-7.8
Bradway	0-1	---	30-80	4.5-5.5
	1-5	15-30	---	5.6-6.5
	5-15	1.0-10	---	7.4-7.8
	15-24	---	---	---
26:				
Saulich	0-10	---	30-80	4.5-5.5
	10-14	---	15-30	5.1-5.5
	14-27	1.0-5.0	---	5.6-6.5
	27-37	---	---	---
27:				
Saulich	0-10	---	30-80	4.5-5.5
	10-14	---	15-30	5.1-5.5
	14-27	1.0-5.0	---	5.6-6.5
	27-37	---	---	---
28:				
Typic Cryaquepts	0-2	---	30-80	4.5-5.5
	2-6	15-30	---	5.1-6.0
	6-42	1.0-5.0	---	5.6-6.5
	42-60	---	---	6.1-7.3
29:				
Typic Dystrocryepts	0-1	---	30-80	4.5-5.5
	1-3	20-30	---	5.1-6.0
	3-13	5.0-15	---	5.6-6.5
	13-51	1.0-5.0	---	5.6-7.3
	51+	---	---	---
Lithic Dystrocryepts	0-1	---	30-80	4.5-5.5
	1-3	20-30	---	5.1-6.0
	3-10	5.0-15	---	5.1-6.5
	10-15	1.0-5.0	---	5.6-6.5
	15+	---	---	---
30:				
Typic Dystrocryepts	0-1	---	30-80	4.5-5.5
	1-3	20-30	---	5.1-6.0
	3-13	5.0-15	---	5.6-6.5
	13-51	1.0-5.0	---	5.6-7.3
	51+	---	---	---

Table 17.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
30:				
Saulich	0-10	---	30-80	4.5-5.5
	10-14	---	15-30	5.1-5.5
	14-27	1.0-5.0	---	5.6-6.5
	27-37	---	---	---
31:				
Typic Dystrocryepts	0-1	---	30-80	4.5-5.5
	1-3	20-30	---	5.1-6.0
	3-13	5.0-15	---	5.6-6.5
	13-51	1.0-5.0	---	5.6-7.3
	51+	---	---	---
Tetlin	0-7	---	30-80	4.5-5.5
	7-38	10-30	---	5.1-6.0
	38-60	---	---	---
Saulich	0-10	---	30-80	4.5-5.5
	10-14	---	15-30	5.1-5.5
	14-27	1.0-5.0	---	5.6-6.5
	27-37	---	---	---
32:				
Typic Cryopsamments	0-1	---	30-80	4.5-5.5
	1-2	10-20	---	5.1-6.0
	2-60	0.0-1.0	---	5.1-6.5
Typic Cryaquepts, flooded	0-2	---	30-80	4.5-5.5
	2-6	15-30	---	5.1-6.0
	6-42	1.0-5.0	---	5.6-6.5
	42-60	---	---	6.1-7.3
Bradway	0-1	---	30-80	4.5-5.5
	1-5	15-30	---	5.6-6.5
	5-15	1.0-10	---	7.4-7.8
	15-24	---	---	---
33:				
Zitziana	0-2	---	30-80	4.5-5.5
	2-3	20-30	---	6.1-7.3
	3-17	5.0-15	---	6.1-7.3
	17-60	1.0-5.0	---	6.1-7.3
34:				
Zitziana	0-2	---	30-80	4.5-5.5
	2-3	20-30	---	6.1-7.3
	3-17	5.0-15	---	6.1-7.3
	17-60	1.0-5.0	---	6.1-7.3
Kindanina	0-4	---	30-80	4.5-5.5
	4-6	---	30-50	5.1-5.5
	6-10	5.0-15	---	5.6-6.5
	10-22	1.0-5.0	---	5.6-6.5
	22-32	---	---	---
35:				
Water	---	---	---	---

Table 18.--Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Month	Wet soil: Upper limit	Wet soil: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
1, 2:									
Beales	B								
		Jan.-Dec.	---	---	---	---	None	---	None
3:									
Beales	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Zitziana	B								
		Jan.-Dec.	---	---	---	---	None	---	None
4:									
Typic Histoturbels	D								
		January	0.0-1.0	0.7-1.5	---	---	None	---	None
		February	0.0-1.0	0.7-1.5	---	---	None	---	None
		March	0.0-1.0	0.7-1.5	---	---	None	---	None
		April	0.0-1.0	0.7-1.5	---	---	None	Brief	Occasional
		May	0.0-1.0	0.7-1.5	0.5	---	Occasional	Brief	Occasional
		June	0.0-1.0	0.7-1.5	0.5	---	Occasional	Brief	Occasional
		July	0.0-1.0	0.7-1.5	0.5	---	Occasional	---	None
		August	0.0-1.0	0.7-1.5	0.5	---	Occasional	---	None
		September	0.0-1.0	0.7-1.5	0.5	---	Occasional	---	None
		October	0.0-1.0	0.7-1.5	---	---	None	---	None
		November	0.0-1.0	0.7-1.5	---	---	None	---	None
		December	0.0-1.0	0.7-1.5	---	---	None	---	None
Terric Hemistels	D								
		January	0.0-1.0	0.5-3.3	---	---	None	---	None
		February	0.0-1.0	0.5-3.3	---	---	None	---	None
		March	0.0-1.0	0.5-3.3	---	---	None	---	None
		April	0.0-1.0	0.5-3.3	---	---	None	Brief	Occasional
		May	0.0-1.0	0.5-3.3	0.5	---	Occasional	Brief	Occasional
		June	0.0-1.0	0.5-3.3	0.5	---	Occasional	Brief	Occasional
		July	0.0-1.0	0.5-3.3	0.5	---	Occasional	---	None
		August	0.0-1.0	0.5-3.3	0.5	---	Occasional	---	None
		September	0.0-1.0	0.5-3.3	0.5	---	Occasional	---	None
		October	0.0-1.0	0.5-3.3	---	---	None	---	None
		November	0.0-1.0	0.5-3.3	---	---	None	---	None
		December	0.0-1.0	0.5-3.3	---	---	None	---	None
Bradway	D								
		January	0.3-1.8	1.5-3.3	---	---	None	---	None
		February	0.3-1.8	1.5-3.3	---	---	None	---	None
		March	0.3-1.8	1.5-3.3	---	---	None	---	None
		April	0.3-1.8	1.5-3.3	---	---	None	---	None
		May	0.3-1.8	1.5-3.3	0.5	---	Occasional	---	None
		June	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		July	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		August	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		September	0.3-1.8	1.5-3.3	0.5	---	Occasional	---	None
		October	0.3-1.8	1.5-3.3	---	---	None	---	None
		November	0.3-1.8	1.5-3.3	---	---	None	---	None
		December	0.3-1.8	1.5-3.3	---	---	None	---	None
5, 6, 7:									
Iksgiza	D								
		January	0.8-2.3	1.6-3.3	---	---	None	---	None
		February	0.8-2.3	1.6-3.3	---	---	None	---	None
		March	0.8-2.3	1.6-3.3	---	---	None	---	None
		April	0.8-2.3	1.6-3.3	---	---	None	---	None
		May	0.8-2.3	1.6-3.3	0.5	---	Occasional	---	None
		June	0.8-2.3	1.6-3.3	0.5	---	Occasional	---	None
		July	0.8-2.3	1.6-3.3	0.5	---	Occasional	---	None
		August	0.8-2.3	1.6-3.3	0.5	---	Occasional	---	None
		September	0.8-2.3	1.6-3.3	0.5	---	Occasional	---	None
		October	0.8-2.3	1.6-3.3	---	---	None	---	None
		November	0.8-2.3	1.6-3.3	---	---	None	---	None
		December	0.8-2.3	1.6-3.3	---	---	None	---	None
8:									
Iksgiza	D								
		Jan.-Dec.	0.8-2.3	1.6-3.3	---	---	None	---	None
Beales	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Zitziana	B								
		Jan.-Dec.	---	---	---	---	None	---	None

Table 18.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Wet soil: Upper limit	Wet soil: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
9:									
Iksgiza	D								
		Jan.-Dec.	0.8-2.3	1.6-3.3	---	---	None	---	None
Nenana	B								
		Jan.-Dec.	---	---	---	---	None	---	None
10:									
Iksgiza	D								
		Jan.-Dec.	0.8-2.3	1.6-3.3	---	---	None	---	None
Terric Hemistels	D								
		January	0.0-1.0	0.5-3.3	---	---	None	---	None
		February	0.0-1.0	0.5-3.3	---	---	None	---	None
		March	0.0-1.0	0.5-3.3	---	---	None	---	None
		April	0.0-1.0	0.5-3.3	---	---	None	Brief	Occasional
		May	0.0-1.0	0.5-3.3	---	---	None	Brief	Occasional
		June	0.0-1.0	0.5-3.3	---	---	None	Brief	Occasional
		July	0.0-1.0	0.5-3.3	---	---	None	---	None
		August	0.0-1.0	0.5-3.3	---	---	None	---	None
		September	0.0-1.0	0.5-3.3	---	---	None	---	None
		October	0.0-1.0	0.5-3.3	---	---	None	---	None
		November	0.0-1.0	0.5-3.3	---	---	None	---	None
		December	0.0-1.0	0.5-3.3	---	---	None	---	None
11:									
Iksgiza	D								
		Jan.-Dec.	0.8-2.3	1.6-3.3	---	---	None	---	None
Zitziana	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Nenana	B								
		Jan.-Dec.	---	---	---	---	None	---	None
12, 13, 14:									
Kindanina	D								
		Jan.-Dec.	0.0-1.5	0.8-1.8	---	---	None	---	None
15:									
Kindanina	D								
		Jan.-Dec.	0.0-1.5	0.8-1.8	---	---	None	---	None
Beales	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Zitziana	B								
		Jan.-Dec.	---	---	---	---	None	---	None
16:									
Koyukuk	B								
		Jan.-Dec.	---	---	---	---	None	---	None
17, 18:									
Koyukuk	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Typic Aquiturbels	D								
		Jan.-Dec.	0.7-2.7	2.0-3.7	---	---	None	---	None
19, 20, 21:									
Nenana	B								
		Jan.-Dec.	---	---	---	---	None	---	None
22:									
Nenana	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Zitziana	B								
		Jan.-Dec	---	---	---	---	None	---	None

Table 18.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Wet soil: Upper limit	Wet soil: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
23:									
Terric Hemistels----------	D								
		January	0.0-1.0	0.5-3.3	---	---	None	---	None
		February	0.0-1.0	0.5-3.3	---	---	None	---	None
		March	0.0-1.0	0.5-3.3	---	---	None	---	None
		April	0.0-1.0	0.5-3.3	0.5	Brief	Occasional	---	None
		May	0.0-1.0	0.5-3.3	0.5	Brief	Occasional	---	None
		June	0.0-1.0	0.5-3.3	0.5	Brief	Occasional	---	None
		July	0.0-1.0	0.5-3.3	---	---	None	---	None
		August	0.0-1.0	0.5-3.3	---	---	None	---	None
		September	0.0-1.0	0.5-3.3	---	---	None	---	None
		October	0.0-1.0	0.5-3.3	---	---	None	---	None
		November	0.0-1.0	0.5-3.3	---	---	None	---	None
		December	0.0-1.0	0.5-3.3	---	---	None	---	None
24:									
Riverwash----------	---								
		Jan.-Dec.	---	---	---	---	None	Long	Frequent
25:									
Salchaket----------	B								
		January	---	---	---	---	None	---	None
		February	---	---	---	---	None	---	None
		March	---	---	---	---	None	---	None
		April	---	---	---	---	None	---	None
		May	---	---	---	---	None	Brief	Occasional
		June	---	---	---	---	None	Brief	Occasional
		July	---	---	---	---	None	Brief	Occasional
		August	---	---	---	---	None	Brief	Occasional
		September	---	---	---	---	None	Brief	Occasional
		October	---	---	---	---	None	---	None
		November	---	---	---	---	None	---	None
		December	---	---	---	---	None	---	None
Bradway----------	D								
		January	0.3-1.8	1.5-3.3	---	---	None	---	None
		February	0.3-1.8	1.5-3.3	---	---	None	---	None
		March	0.3-1.8	1.5-3.3	---	---	None	---	None
		April	0.3-1.8	1.5-3.3	---	---	None	---	None
		May	0.3-1.8	1.5-3.3	0.5	---	Occasional	---	None
		June	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		July	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		August	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		September	0.3-1.8	1.5-3.3	0.5	---	Occasional	---	None
		October	0.3-1.8	1.5-3.3	---	---	None	---	None
		November	0.3-1.8	1.5-3.3	---	---	None	---	None
		December	0.3-1.8	1.5-3.3	---	---	None	---	None
26, 27:									
Saulich----------	D								
		Jan.-Dec.	0.5-1.5	1.3-2.5	---	---	None	---	None
28:									
Typic Cryaquepts----------	B								
		Jan.-Dec.	1.5-3.0	---	---	---	None	---	None
29:									
Typic Dystrocryepts-------	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Lithic Dystrocryepts------	D								
		Jan.-Dec.	---	---	---	---	None	---	None
30:									
Typic Dystrocryepts-------	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Saulich----------	D								
		Jan.-Dec.	0.5-1.5	1.3-2.5	---	---	None	---	None

Table 18.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Wet soil: Upper limit	Wet soil: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
31:									
Typic Dystrocryepts-------	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Tetlin----------	D								
		Jan.-Dec.	0.7-2.5	0.9-5.0	---	---	None	---	None
Saulich----------	D								
		Jan.-Dec.	0.5-1.5	1.3-2.5	---	---	None	---	None
32:									
Typic Cryopsamments-------	A								
		January	---	---	---	---	None	---	None
		February	---	---	---	---	None	---	None
		March	---	---	---	---	None	---	None
		April	---	---	---	---	None	Brief	Frequent
		May	---	---	---	---	None	Brief	Frequent
		June	---	---	---	---	None	Brief	Frequent
		July	---	---	---	---	None	---	None
		August	---	---	---	---	None	---	None
		September	---	---	---	---	None	---	None
		October	---	---	---	---	None	---	None
		November	---	---	---	---	None	---	None
		December	---	---	---	---	None	---	None
Typic Cryaquepts, flooded----------	D								
		January	0.8-2.5	---	---	---	None	---	None
		February	0.8-2.5	---	---	---	None	---	None
		March	0.8-2.5	---	---	---	None	---	None
		April	0.8-2.5	---	---	---	None	Brief	Frequent
		May	0.8-2.5	---	---	---	None	Brief	Frequent
		June	0.8-2.5	---	---	---	None	Brief	Frequent
		July	0.8-2.5	---	---	---	None	---	None
		August	0.8-2.5	---	---	---	None	---	None
		September	0.8-2.5	---	---	---	None	---	None
		October	0.8-2.5	---	---	---	None	---	None
		November	0.8-2.5	---	---	---	None	---	None
		December	0.8-2.5	---	---	---	None	---	None
Bradway----------	D								
		January	0.3-1.8	1.5-3.3	---	---	None	---	None
		February	0.3-1.8	1.5-3.3	---	---	None	---	None
		March	0.3-1.8	1.5-3.3	---	---	None	---	None
		April	0.3-1.8	1.5-3.3	---	---	None	---	None
		May	0.3-1.8	1.5-3.3	0.5	---	Occasional	---	None
		June	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		July	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		August	0.3-1.8	1.5-3.3	0.5	---	Occasional	Brief	Occasional
		September	0.3-1.8	1.5-3.3	0.5	---	Occasional	---	None
		October	0.3-1.8	1.5-3.3	---	---	None	---	None
		November	0.3-1.8	1.5-3.3	---	---	None	---	None
		December	0.3-1.8	1.5-3.3	---	---	None	---	None
33:									
Zitziana----------	B								
		Jan.-Dec.	---	---	---	---	None	---	None
34:									
Zitziana----------	B								
		Jan.-Dec.	---	---	---	---	None	---	None
Kindanina----------	D								
		Jan.-Dec.	0.0-1.5	0.8-1.8	---	---	None	---	None
35:									
Water----------	---								
		Jan.-Dec.	---	---	---	---	None	---	None

Table 19.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
1, 2:									
Beales	---	---	---	---	0	---	Moderate	High	High
3:									
Beales	---	---	---	---	0	---	Moderate	High	High
Zitziana	---	---	---	---	0	---	Moderate	Moderate	Moderate
4:									
Typic Histoturbels	Permafrost	8-18	---	Indurated	1-6	6-12	High	High	High
Terric Hemistels	Permafrost	6-40	---	Indurated	5-20	15-40	High	High	High
Bradway	Permafrost	14-38	---	Indurated	1-3	3-6	High	Moderate	Moderate
5, 6, 7:									
Iksgiza	Permafrost	20-40	---	Indurated	1-5	5-10	High	High	High
8:									
Iksgiza	Permafrost	20-40	---	Indurated	0	---	High	High	High
Beales	---	---	---	---	0	---	Moderate	High	High
Zitziana	---	---	---	---	0	---	Moderate	Moderate	Moderate
9:									
Iksgiza	Permafrost	20-40	---	Indurated	1-5	5-10	High	High	High
Nenana	---	---	---	---	0	---	High	Moderate	Moderate
10:									
Iksgiza	Permafrost	20-40	---	Indurated	1-5	5-10	High	High	High
Terric Hemistels	Permafrost	6-40	---	Indurated	5-20	15-40	High	High	High
11:									
Iksgiza	Permafrost	20-40	---	Indurated	1-5	5-10	High	High	High
Zitziana	---	---	---	---	0	---	Moderate	Moderate	Moderate
Nenana	---	---	---	---	0	---	High	Moderate	Moderate
12, 13, 14:									
Kindanina	Permafrost	10-22	---	Indurated	0	---	High	High	High
15:									
Kindanina	Permafrost	10-22	---	Indurated	0	---	High	High	High
Beales	---	---	---	---	0	---	Moderate	High	High
Zitziana	---	---	---	---	0	---	Moderate	Moderate	Moderate
16:									
Koyukuk	---	---	---	---	0	---	High	Moderate	Moderate
17, 18:									
Koyukuk	---	---	---	---	0	---	High	Moderate	Moderate
Typic Aquiturbels	Permafrost	24-44	---	Indurated	0	---	High	High	High
19, 20, 21:									
Nnana	---	---	---	---	0	---	High	Moderate	Moderate
22:									
Nenana	---	---	---	---	0	---	High	Moderate	Moderate
Zitziana	---	---	---	---	0	---	Moderate	Moderate	Moderate
23:									
Terric Hemistels	Permafrost	6-40	---	Indurated	5-20	15-40	High	High	High
24:									
Riverwash	---	---	---	---	---	---	---	---	---

Table 19.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
25:									
Salchaket----------	---	---	---	---	0	---	Moderate	Moderate	Moderate
Bradway----------	Permafrost	14-38	---	Indurated	1-3	3-6	High	Moderate	Moderate
26, 27:									
Saulich----------	Permafrost	16-30	---	Indurated	4-8	6-12	High	High	High
28:									
Typic Cryaquepts---	---	---	---	---	0	---	High	Moderate	Moderate
29:									
Typic Dystrocryepts	Bedrock (lithic)	21-60	---	Indurated	0	---	Moderate	Moderate	Moderate
Lithic Dystrocryepts------	Bedrock (lithic)	7-20	---	Indurated	0	---	Moderate	Moderate	Moderate
30:									
Typic Dystrocryepts	Bedrock (lithic)	21-60	---	Indurated	0	---	Moderate	Moderate	Moderate
Saulich----------	Permafrost	16-30	---	Indurated	1-5	5-10	High	High	High
31:									
Typic Dystrocryepts	Bedrock (lithic)	21-60	---	Indurated	0	---	Moderate	Moderate	Moderate
Tetlin----------	Permafrost	11-60	---	Indurated	0	---	High	High	High
Saulich----------	Permafrost	16-30	---	Indurated	4-8	6-12	High	High	High
32:									
Typic Cryopsamments	---	---	---	---	0	---	Moderate	Moderate	Moderate
Typic Cryaquepts, flooded----------	---	---	---	---	0	---	High	High	High
Bradway----------	Permafrost	14-38	---	Indurated	1-3	3-6	High	Moderate	Moderate
33:									
Zitziana----------	---	---	---	---	0	---	Moderate	Moderate	Moderate
34:									
Zitziana----------	---	---	---	---	0	---	Moderate	Moderate	Moderate
Kindanina----------	Permafrost	10-22	---	Indurated	0	---	High	High	High
35:									
Water----------	---	---	---	---	---	---	---	---	---

Table 20.--Classification of the Soils

Soil name	Family or higher taxonomic class
Beales	Sandy, mixed Typic Dystrocryepts
Bradway	Coarse-loamy, mixed, superactive, subgelic Typic Aquiturbels
Iksgiza	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, subgelic Typic Histoturbels
Kindanina	Sandy, mixed, subgelic Typic Aquiturbels
Koyukuk	Coarse-silty, mixed, superactive Typic Dystrocryepts
Lithic Dystrocryepts	Lithic Dystrocryepts
Nenana	Coarse-silty over sandy or sandy-skeletal, mixed, superactive Typic Dystrocryepts
Salchaket	Coarse-loamy, mixed, superactive, nonacid Typic Cryofluvents
Saulich	Coarse-silty, mixed, superactive, subgelic Typic Histoturbels
Terric Hemistels	Terric Hemistels
Tetlin	Coarse-loamy, mixed, superactive, subgelic Typic Aquiturbels
Typic Aquiturbels	Typic Aquiturbels
Typic Cryaquepts	Typic Cryaquepts
Typic Cryopsamments	Typic Cryopsamments
Typic Dystrocryepts	Typic Dystrocryepts
Typic Histoturbels	Typic Histoturbels
Zitziana	Coarse-silty over sandy or sandy-skeletal, mixed, superactive Typic Dystrocryepts