United States Department of Agriculture
Natural Resources Conservation Service

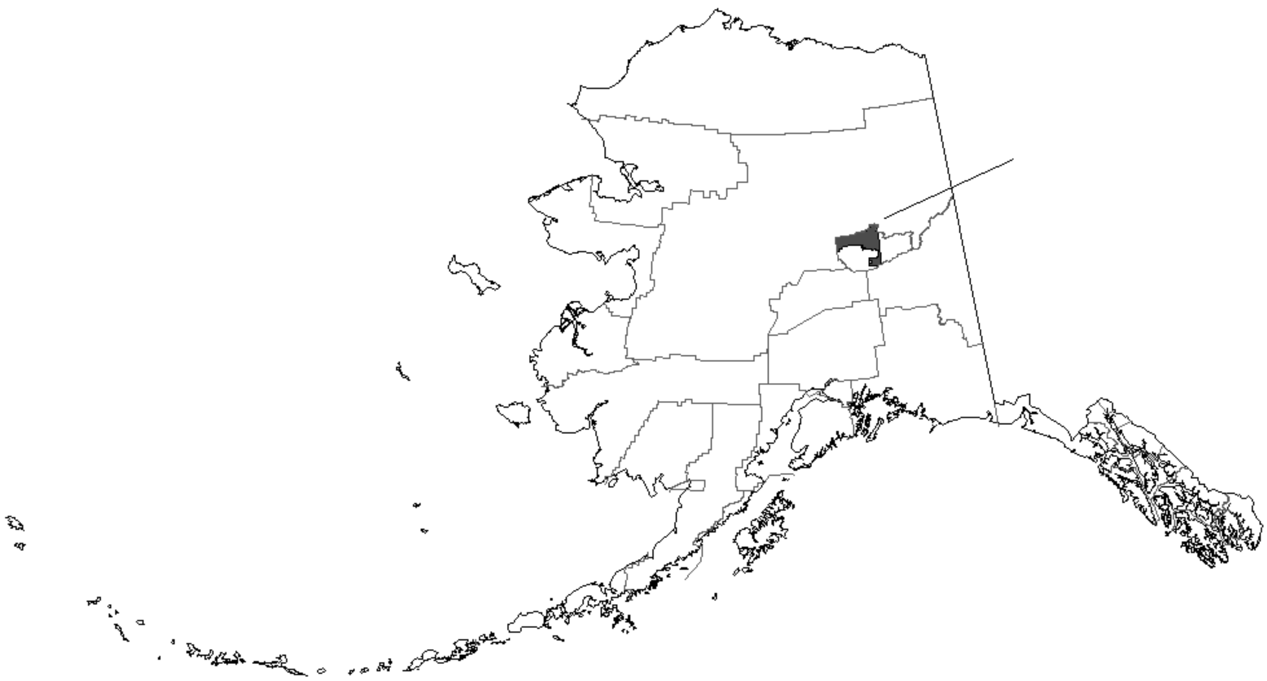
In cooperation with
Fairbanks North Star Borough,
Fairbanks and Salcha-Big Delta
Soil and Water Conservation Districts,
and University of Alaska Fairbanks
Agricultural and Forestry Experiment Station

Soil Survey of North Star Area, Alaska

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture (USDA) and other Federal agencies, State agencies, and local agencies. The Natural Resources Conservation Service (NRCS) (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 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the Survey Area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service, the University of Alaska Fairbanks Agricultural and Forestry Experiment Station, and the Fairbanks North Star Borough. The survey is part of the technical assistance furnished to the Fairbanks and Salcha-Big Delta Soil and Water Conservation District.

Cover: Bohica soils, in the foreground, have been cleared of forest vegetation to prepare for farming. Fairbanks soils are on the hillslopes.



Location of the North Star Soil Survey Area in Alaska

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ISSUED: APRIL 1999

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Foreword

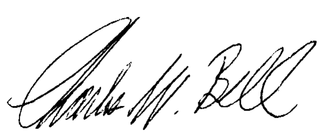
This soil survey contains information that can be used in land use planning in the North Star Area. The survey contains predictions of soil behavior for selected land uses, and highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

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

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations. These and many other soil properties that affect land use are described in this soil survey.

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



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Soil Survey of
North Star Area, Alaska

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United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with Fairbanks North Star Borough, Salcha-Big Delta Soil and Water Conservation District, and the University of Alaska Fairbanks Agricultural and Forestry Experiment Station

The North Star Area is located in Interior Alaska, near Fairbanks. The survey area covers the eastern one-half of the Fairbanks-North Star Borough (about 1,503,000 acres), excluding Fort Wainwright, Eielson Air Force Base, and areas covered by previous soil surveys (the Fairbanks Area—1963, the Salcha-Big Delta Area—1973, and the Goldstream-Nenana Area—1977). Much of the area is presently uninhabited; however, a number of homesites and a few farms and small businesses are located along the roads leading out of Fairbanks into the North Star Area.

The survey area lies mainly in the loess-covered hills and low mountains of the Yukon-Tanana Upland. The Chena and Chatanika Rivers and numerous small creeks drain this upland. A small portion of the Area also lies on the flood plain of the Tatalina River.

Permafrost (permanently frozen ground) underlies much of the North Star Area. Only moderately to steeply sloping south-facing hillsides, and areas on the active flood plains of the major rivers and their tributaries, are free of permafrost. In some soils, water is perched above the permafrost, resulting in poor soil drainage. Disturbance of the vegetation and removal of the organic mat on the soil surface cause the permafrost to melt and its upper boundary to recede to greater depths. This often improves soil drainage, but considerable subsidence of the ground surface can occur on silty soils that contain large buried ice masses.

The primary purpose of the North Star Soil Survey is to provide information about the soils for use in developing the growing city of Fairbanks and the North Star Borough. Steep slopes, poor drainage, shallow soil depth, and climate limit the potential for agricultural development; however, many areas are suitable for homesites and other small buildings, forestry, recreation, and wildlife habitat.

This survey is a suitable guide for general land use planning and management, but it does not provide enough detail to develop site-specific plans. Technical guides maintained by Natural Resources Conservation Service field offices contain additional information on soils for various conservation practices. Landowners or managers interested in the use and management of the soil and vegetation resources can obtain assistance from the local office of the Natural Resources Conservation Service. In addition, special publications on the use of soils are available.

A portion of the North Star Area is included in the "Fairbanks Area, Alaska" survey, published in 1963. This earlier survey was done at a broad, reconnaissance level. The present survey updates this earlier survey and provides additional information.

General Nature of the Survey Area

History and Development

Athabaskan people, traveling across the Bering Land Bridge from Asia sometime before 10,000 years ago (*Aigner 1986*), first colonized the North Star Area. They had a semi-nomadic lifestyle and depended on fishing, hunting, and gathering for their subsistence. To best utilize the local resources, they occupied various hunting and fishing camps throughout the course of the year.

Settlement of the North Star Area by European-Americans began in the late 1800s with the discovery of gold. The city of Fairbanks grew as area mining developed, and reached a population of over 10,000 by 1910 (*Cashen 1971; Cochrane 1982*). However, by 1920, when the easily accessible deposits of gold were exhausted, the population dwindled to about 3,000. After 1930, heavy mining equipment, such as dredges, was introduced and mining revitalized, although it never approached the pre-1910 peak.

By this time, Fairbanks had become important as the economic, information, and transportation hub of Interior Alaska. The opening of the Alaska Agricultural College and School of Mines in 1922, completion of the Alaska Railroad in 1923, and construction of Ladd Air Force Base (now Fort Wainwright) in 1940 all enhanced this role. Furthermore, Alaska's strategic location resulted in the establishment of Eielson Air Force Base in the Fairbanks vicinity.

In 1968, oil companies began developing Prudhoe Bay, again resulting in more people and more commerce for Fairbanks. The city became the support center for exploration and production activities on the North Slope and for construction of the Trans-Alaska Pipeline. Following completion of the pipeline in 1978, the population and revenue again declined; however, in 1979, placer gold mining was revitalized due to the rise in gold prices. Today, mining and defense are the main economic activities in the North Star Area, along with homesite construction, tourism, and limited agriculture (*Research Design Productions 1983*). Oil and gas development, education, and other industries also play major roles in the present economy.

The Alaska Highway, completed in 1942, connects the North Star Area with Canada and the contiguous 48 states. Roads also extend north to the Arctic Ocean and south to Anchorage and Valdez. Commercial airlines connect Fairbanks to Seattle and all principal points in Alaska.

Climate

(Prepared by the National Climatic Data Center, Asheville, NC)

The North Star Area has a distinctly continental climate, with large variations in temperature from winter to summer. Most precipitation falls during the growing season and is adequate for crops adapted to the temperature and duration of the season.

The data in Tables 1 through 6 were recorded at Fairbanks, Alaska and College, Alaska for the period 1949 to 1994. Tables 1 and 2 give data on temperature and precipitation. Tables 3 and 4 show probable dates of the first freeze in the fall and the last freeze in the spring. Tables 5 and 6 provide data on the length of the growing season.

The climate of the North Star Area is conditioned mainly by the response of the landmass to significant changes in solar heat received by the Area during the year. The sun is above the horizon from 18 to 21 hours in June and July. During this period, daily average maximum temperatures reach the low 70s (°F). Temperatures of 80°F or higher occur on about 10 days each summer. In contrast, from November to early March, when the period of daylight ranges from 10 to less than 4 hours per day, the lowest temperature readings normally fall below zero. Temperatures of -40°F or colder occur each winter. The range of temperatures in summer is comparatively low, from the low 30s (°F) to the mid 90s (°F). In winter, the range is high, from about 65°F below to 45°F above 0°F. The large range of temperatures during winter reflects the vast difference between frigid weather associated with dry northerly airflow from the Arctic, and mild temperatures associated with southerly airflow from the Gulf of Alaska, accompanied by Chinook winds off the Alaska Range, 80 miles (128 km) to the south.

Growing degree days, shown in Tables 5 and 6, are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40°F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Snow cover is usually persistent from October through April at low elevations (through May at higher elevations). Snowfalls of 4 inches (10 cm) or more in a day occur only three times during winter in the lowlands. Blizzard conditions are almost never seen in the lowlands, as winds in the Fairbanks area exceed 20 miles (32 km) per hour less than 1 percent of the time.

Precipitation normally reaches a minimum in spring and a maximum in August. During summer, thunderstorms occur in Fairbanks an average of about eight days. Thunderstorms are about three times more frequent over the uplands to the north and east of Fairbanks. Damaging hail or winds rarely accompany thunderstorms around Fairbanks. The heaviest one-day rainfall during the period of record was 3.42 inches (8.68 cm) at Fairbanks on August 12, 1967.

During winter, as cold air settles into the valley, the uplands to the north and east of Fairbanks are often warmer than Fairbanks. In some months, temperatures in the uplands will average more than 10°F warmer than Fairbanks. During summer, the uplands are a few degrees cooler than the city. Precipitation in the uplands is heavier than it is in the city by roughly 20 to 50 percent.

The average relative humidity in the North Star Area in mid-afternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 70 percent. The percentage of possible sunshine is 45 percent in summer and 35 percent in winter. The prevailing wind is from the north. Average windspeed is highest, 8 miles (12 km) per hour, in spring.

Freezing of local rivers normally begins in the first week of October. Rivers remain frozen and safe for travel until early April. Breakup of river ice usually occurs during the first week of May.

Physiography and Geology

Most of the North Star Area is part of the Yukon-Tanana Upland. However, a small portion is part of the flood plains of the Tanana River and a major tributary, the Chena River (*Mertie 1937*).

The Yukon-Tanana Upland in the North Star Area consists of hills and low mountains up to 4,400 feet (1,341 m) above sea level, separated by valleys as low as 400 feet (122 m). The predominant bedrock in the area is highly deformed Pre-Cambrian schist. The schist is highly weathered and fractured near the surface, and is intruded locally by igneous rock—mainly granite, quartz diorite, and basalt. Volcanic rocks and some Tertiary sedimentary rocks also occur in the Upland (*Péwé 1958; Williams 1959; Williams et al. 1969*). Except for a few small valley glaciers at the highest elevations, the Upland has never been glaciated (*Péwé 1975*).

The Yukon-Tanana Upland is almost completely covered by a mantle of mica-rich loess (silty, wind-deposited sediment) that blew in from the outwash plain of the Tanana Valley (*Péwé 1955*). On the high ridges, the loess is less than 1 foot (less than l/3 m) thick, while on the low hills near the Tanana River it is many feet (many meters) thick. Much of the loess has eroded from the hillsides to the lower slopes and narrow upland valleys. As a result, the lower ends of the valleys, along streams that flow into the Tanana River, now have more than 300 feet (more than 91 m) of colluvial silt. Lenses of organic material, known locally as muck, occur throughout the redeposited silt.

Along the Tanana River, the lowlands are a nearly level plain composed of sandy and gravelly glacial outwash sediments. These deposits are covered by fine sand and silt from a few inches (centimeters) to many feet (meters) thick.

Minor earthquakes, caused by movement along various active faults in the region, are fairly common in the North Star Area (*Péwé 1982*).

Permafrost

In the North Star Area, permafrost (perennially frozen ground) underlies alluvial fans, bottoms of drainageways in the uplands, north-facing slopes, and parts of flood plains. The upper limit of permafrost (permafrost table) is less than 1 foot (less than 1/3 m) from the surface where a thick organic mat is present. Depth to the permafrost table may exceed more than 40 feet (more than 12 m) where the native vegetation has been disturbed. Permafrost is absent on moderately to steeply sloping south-facing hillsides and in places on the flood plains along the Tanana, Chena, Tatalina and Chatanika Rivers.

In the gravelly flood plain deposits that contain permafrost, ice occurs as fine lenses and fillings between mineral grains. In the silty soils, however, ice commonly occurs as large, nearly pure masses within the redeposited loess (*Péwé 1982*). A perched water table and saturated conditions are common above the permafrost during the summer due to restricted drainage.

Depth to the permafrost table increases when the natural vegetation and the insulating mat of organic matter on the soil surface are disturbed by fire or clearing. As permafrost thaws, a large volume of water is released. Variation in the ice content of the permafrost and the rate of thawing result in differential subsidence of the soil surface and slumping on steeper slopes. Thermokarst topography develops when the large masses of underground ice that occur in silty soils melt. Steep-walled sinkholes, or an extremely hummocky soil surface, characterize this type of topography. The occurrence of permafrost requires special consideration when selecting lands for clearing and agriculture, and during construction of roads and buildings.

How This Survey Was Made

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

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

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

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

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

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

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

Because much of the area is inaccessible, helicopters were used to transport field personnel to and from, and within, the survey area. Soil observations, whether it be a pedon observation, traverse, or line transect, were planned to coincide with suitable helicopter landing sites. Muskegs, lake shores, open ridgetops, and gravel bars usually afforded access. Since availability of suitable helicopter landing sites controlled access, the intensity of ground truth data versus air-photo interpretation varies widely over the survey area.

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

General Soil Map Units

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

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

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

The general map units in this survey have been grouped for broad interpretive purposes. Each of the map units is described on the following pages.

Map Unit Descriptions

1—Jarvis-Salchaket-Fubar

This map unit makes up about 5 percent of the survey area. Slopes range from 0 to 7 percent; elevation ranges from 600 to 1300 feet (183 to 396 m). The vegetation is white spruce, balsam poplar, quaking aspen, paper birch, willow, and alder.

Nearly level Jarvis soils are shallow and moderately deep over sand and gravel, and are well drained. They are occasionally flooded. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer is very fine sandy loam over strata ranging from very fine sand to silt. Very gravelly sand is at a depth of 10 to 40 inches (25 to 102 cm).

Nearly level Salchaket soils are deep over sand and gravel and well drained. They are rarely flooded. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer is very fine sandy loam. The underlying material is strata ranging from fine sand to silt loam. Very gravelly sand is at a depth of more than 40 inches (more than 102 cm).

Nearly level and gently sloping Fubar soils are very shallow over sand and gravel and moderately well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface is fine sandy loam. The underlying material is extremely cobbly sand stratified with silt loam.

Minor components in this unit are Tanana soils with permafrost, abandoned channels and sloughs, and Riverwash.

The soils in this unit occur on flood plains and stream terraces, and are mainly used for recreation and wildlife habitat.

2—Goldstream-Saulich-Pergelic Cryohemists

This map unit makes up about 10 percent of the survey area. Elevation ranges from 600 to 1400 feet (183 to 427 m). The vegetation is black spruce, mosses, Labrador tea, dwarf birch, sedges, and willow.

Nearly level to gently sloping Goldstream soils are very shallow to shallow over permafrost and very poorly drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer is silt loam. Permafrost is at a depth of 4 to 13 inches (10 to 33 cm) below the mineral surface.

Gently sloping to moderately steep Saulich soils are very shallow to shallow over permafrost and very poorly drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer is silt loam. Permafrost is at a depth of 0 to 20 inches (0 to 51 cm) below the mineral surface.

Nearly level Pergelic Cryohemists are shallow to moderately deep over permafrost and very poorly drained. The surface layer is slightly decomposed organic matter; and subsurface layers are moderately decomposed organic matter. Permafrost is at a depth of 10 to 40 inches (25 to 102 cm) below the organic surface.

Minor components in this unit are well drained Fairbanks soils.

The soils in this unit occur on alluvial plains and toeslopes, and are used mainly for recreation and wildlife habitat. Scattered massive ice features that will result in local subsidence or pitting if allowed to thaw underlie the soils.

3—Gilmore-Steese-Fairbanks

This map unit makes up about 10 percent of the survey area. Slopes range from 3 to 45 percent; elevation ranges from 750 to 3100 feet (229 to 945 m). The vegetation is quaking aspen, paper birch, and white birch.

Gently sloping to steep Gilmore soils are very shallow to shallow and well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer and subsoil are silt loam. Fractured schist bedrock is at a depth of 5 to 20 inches (13 to 51 cm).

Strongly sloping to steep Steese soils are moderately deep and well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface and subsoil are silt loam. Fractured schist bedrock is at a depth of 20 to 40 inches (51 to 102 cm).

Gently sloping to moderately steep Fairbanks soils are very deep and well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface, subsoil, and substratum are silt loam.

Minor components in this unit are well drained Typic Cryochrept soils on ridgetops, very poorly drained Ester soils on north-facing slopes, Rock outcrop, and Rubble land.

The soils in this unit occur on south-facing hillslopes, and are mainly used for recreation, wildlife habitat, and homesites. The main limitations for homesites are slope, depth to fractured schist bedrock, restricted permeability, and frost heaving.

4—Ester-Gilmore-Typic Cryochrepts

This map unit makes up about 70 percent of the survey area. Slopes range from 3 to 45 percent; elevation ranges from 900 to 3100 feet (274 to 945 m). The vegetation is black spruce, mosses, and Labrador tea on Ester soil and white spruce, aspen, and birch on Typic Cryochrept soils.

Strongly sloping to steep Ester soils are very shallow to shallow over permafrost and very poorly drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer is silt loam. Permafrost is at a depth of 2 to 14 inches (5 to 36 cm) below the mineral surface.

Gently sloping to steep Gilmore soils are very shallow to shallow and well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer and subsoil are silt loam. Fractured schist bedrock is at a depth of 5 to 20 inches (13 to 51 cm).

Strongly sloping to steep Typic Cryochrepts are very shallow to moderately deep and moderately well to well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer is silt loam. Fractured schist bedrock is at a depth of 6 to 40 inches (15 to 102 cm).

Minor components in this unit are the well drained Fairbanks and Steese soils, Rock outcrop, and Rubble land.

The soils in this unit occur on hillslopes, and are mainly used for recreation, wildlife habitat, and homesites. The main limitations for homesites are depth to permafrost, a perched water table, fractured schist bedrock, slope, and frost heaving.

5—Gilmore-Typic Cryochrepts-Rock outcrop

This map unit makes up about 5 percent of the survey area. Slopes range from 6 to 35 percent; elevation ranges from 1300 to 4400 feet (396 to 1341 m). The vegetation is willow, mosses, lichens, and dwarf birch.

Gently sloping to steep Gilmore soils are very shallow and shallow and well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer and subsoil are silt loam. Fractured schist bedrock is at a depth of 5 to 20 inches (13 to 51 cm).

Strongly sloping to steep Typic Cryochrepts are very shallow to moderately deep and moderately well to well drained. The surface is covered with a mat of slightly decomposed organic matter. The mineral surface layer is silt loam. Fractured schist bedrock is at a depth of 6 to 40 inches (15 to 102 cm).

Rock outcrop consists of areas of exposed quartz schist or granitic bedrock.

Minor components in this unit are soils with permafrost, soils that are poorly or somewhat poorly drained, and Rubble land.

The soils in this unit occur on ridges and mountainsides, and are mainly used for recreation and wildlife habitat.

Detailed Soil Map Units

The map units delineated on the detailed maps included with 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 and plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

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

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

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into 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, but if intensive use of small areas is planned, on-site investigation is needed to define and locate the soils and miscellaneous areas.

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

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

Soils of one series can differ in texture of the surface layer or the underlying layers, slope, wetness, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Many of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Gilmore silt loam, 3 to 7 percent slopes, is a phase of the Gilmore series.

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Jarvis-Fubar complex, 0 to 3 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. Histic Pergelic Cryaquepts-Typic Cryochrepts association, 15 to 45 percent slopes, is an example.

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

Table 7 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

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

Map Unit Descriptions

101—Bohica silt loam, 0 to 3 percent slopes

Composition

Bohica and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Bohica Soil

Position on landscape: stream terraces
Slope range: 0 to 3 percent
Slope feature: plane
Organic mat on surface: 1 to 4 inches (3 to 10 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 6 inches (5 to 15 cm)—yellowish brown very fine sandy loam
*6 to 16 inches (15 to 41 cm)—gray very fine sandy loam
*16 to 60 inches (41 to 152 cm)—grayish brown stratified very fine sandy loam, loamy fine sand, and fine sandy loam

Drainage class: well drained
Permeability: moderate

Available water capacity: moderate
Runoff: very slow
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with sand and gravel at a depth of less than 60 inches (less than 152 cm)
*soils that have permafrost
*soils that have slopes greater than 3 percent

Major Uses

Current uses: cropland, hayland, pastureland, homesites, recreation, and wildlife habitat
Potential uses: forestland

Major Management Factors

Soil-related factors: restricted permeability, low fertility, frost heaving, and wind erosion
Elevation: 600 to 750 feet (183 to 229 m)

Cropland

General management considerations:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.

Suitable management practices:
*Reduce the risk of wind erosion by maintaining crop residue on the surface, planting field windbreaks, and stripcropping.
*Conserve moisture by conservation tillage.
*Rotate crops and use conservation tillage to maintain or improve fertility.

Forestland

Major tree species: quaking aspen, white spruce, and balsam poplar
Minor tree species: paper birch and black spruce
Major understory species: northern Labrador tea, lowbush cranberry, willow, horsetail, northern comandra, clubmoss, and feathermoss
Major vegetation type(s): open mixed forest, aspen-spruce
Minor vegetation type(s): open broadleaf forest, aspen; and open broadleaf forest, aspen-balsam-poplar
Estimated site index for stated species:
*white spruce—79 feet (at 100 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable

*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: quaking aspen—readily; white spruce, balsam poplar, paper birch, and black spruce—periodically
Trees to plant for timber production: white spruce
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Cutbanks are not stable and are subject to slumping.
*Septic absorption fields are subject to degradation of soil structure and reduced permeability upon addition of effluent.
*Excavation can expose soil material that is highly susceptible to wind erosion.

Suitable management practices:
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Establish gently sloping grades to reduce the risk of caving.
*Consider the depth to which frost penetrates in designing footings and road bases.
*Increase the size of septic absorption fields to compensate for the restricted permeability.

102—Bohica silt loam, 3 to 7 percent slopes

Composition

Bohica and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Bohica Soil

Position on landscape: stream terraces
Slope range: 3 to 7 percent
Slope features: plane, convex
Organic mat on surface: 1 to 4 inches (3 to 10 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 6 inches (5 to 15 cm)—yellowish brown very fine sandy loam
*6 to 16 inches (15 to 41 cm)—gray very fine sandy loam
*16 to 60 inches (41 to 152 cm)—grayish brown stratified very fine sandy loam, loamy fine sand, and fine sandy loam

Drainage class: well drained

Permeability: moderate
Available water capacity: moderate
Runoff: slow
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, moderate if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with sand and gravel at a depth of less than 60 inches (less than 152 cm)
*soils that have permafrost
*soils with slopes greater than 7 percent

Major Uses

Current uses: cropland, hayland, pastureland, homesites, recreation, and wildlife habitat
Potential uses: forestland

Major Management Factors

Soil-related factors: restricted permeability, low fertility, frost heaving, and wind erosion
Elevation: 600 to 750 feet (183 to 229 m)

Cropland

General management considerations:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.

Suitable management practices:
*Reduce the risk of wind erosion by maintaining crop residue on the surface, planting field windbreaks, and stripcropping.
*Conserve moisture by conservation tillage, conservation cropping sequence, and contour farming.
*Construct grassed waterways in cultivated areas that are subject to overland flow.
*Rotate crops and use conservation tillage to maintain or improve fertility.
*Reduce the risk of water erosion by cultivating and seeding on the contour or across the slope, and by maintaining crop residue on or near the surface.

Forestland

Major tree species: quaking aspen, white spruce, and balsam poplar
Minor tree species: paper birch and black spruce
Major understory species: northern Labrador tea, lowbush cranberry, willow, horsetail, northern comandra, clubmoss, and feathermoss
Major vegetation type(s): open mixed forest, aspen-spruce
Minor vegetation type(s): open broadleaf forest, aspen; and open broadleaf forest, aspen-balsam poplar
Estimated site index for stated species:
*white spruce—79 feet (at 100 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness

*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: quaking aspen—readily; white spruce, balsam poplar, paper birch, and black spruce—periodically
Trees to plant for timber production: white spruce
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Excavation increases the risk of wind erosion and water erosion.
*Cutbanks are not stable and are subject to slumping.
*Septic tank absorption fields function poorly because of degraded soil structure and reduced permeability upon addition of effluent.

Suitable management practices:
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Establish gently sloping grades to reduce the risk of caving.
*Consider the depth to which frost penetrates in designing footings and road bases.
*Increase the size of septic tank absorption fields to compensate for the restricted permeability.

103—Dumps, mine

Composition

Mine tailings: 95 percent
Included soils: 5 percent

Position on landscape: flood plains
Slope range: 0 to 45 percent
*This map unit consists of unreclaimed spoils from placer mining activities. They are adjacent to streams and rivers where alluvial material is sidecast after sluicing.
*Composition is mostly gravel and cobbles. These areas support scattered sparse stands of willow, alder, and poplar.

104—Ester peat, 7 to 15 percent slopes

Composition

Ester and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Ester Soil

Position on landscape: north-facing mountain and hill slopes
Slope range: 7 to 15 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: black spruce, willows, alder, mosses, and Labrador tea

Typical profile:
*10 inches to 0 (25 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 4 inches (5 to 10 cm)—very dark brown channery silt loam
*4 to 12 inches (10 to 30 cm)—perennially frozen very dark brown channery silt loam
*12 inches (30 cm)—perennially frozen fractured schist bedrock

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 2 to 14 inches (5 to 36 cm) below the surface of the mineral soil
Depth to fractured schist bedrock: 12 to 20 inches (30 to 51 cm) below the surface of the mineral soil
Runoff: rapid
Depth to perched water table: January through December—0 to 10 inches (0 to 25 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with organic mats thicker than 16 inches (41 cm)
*soils with fractured schist bedrock at a depth of less than 12 inches (less than 30 cm)

Major Uses

Current uses: recreation and wildlife habitat

Major Management Factors

Soil-related factors: depth to perched water table, depth to permafrost, depth to fractured schist bedrock, restricted permeability, frost action, and slope
Elevation: 950 to 1400 feet (290 to 427 m)

Forestland

Major tree species: black spruce
Minor tree species: paper birch and white spruce

Major understory species: Labrador tea, lowbush cranberry, bog blueberry, American green alder, woodland horsetail, feathermoss, sphagnum, and lichen
Major vegetation type(s): needleleaf woodland and open needleleaf forest, black spruce; and open dwarf tree forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

Building Site Development

General management considerations:
*Permafrost hampers excavation.
*Excavation increases the risk of water erosion and can expose material that is highly susceptible to wind erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*Road cutbanks are subject to slumping.
*Local roads may require a special base to prevent permafrost damage.
*Septic tank absorption fields function poorly because of wetness and limited depth to permafrost and fractured schist bedrock, which restrict the movement and filtration of the effluent.
*On-site sewage disposal is not recommended on this unit.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steep slopes.
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Construct buildings on thick gravel pads or pilings to reduce subsidence caused by the melting of permafrost.
*Locate roads in more gently sloping areas and design drainage systems to minimize the risk of slumping.
*Underlay roads with gravel to minimize frost action.

105—Ester peat, 15 to 45 percent slopes

Composition

Ester and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Ester Soil

Position on landscape: north-facing mountain and hill slopes
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: black spruce, willows, alder, mosses, and Labrador tea

Typical profile:
*10 inches to 0 (25 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 4 inches (5 to 10 cm)—very dark brown channery silt loam
*4 to 12 inches (10 to 30 cm)—perennially frozen very dark brown channery silt loam
*12 inches (30 cm)—perennially frozen fractured schist bedrock

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 2 to 14 inches (5 to 36 cm) below the surface of the mineral soil
Depth to fractured schist bedrock: 12 to 20 inches (30 to 51 cm) below the surface of the mineral soil
Runoff: rapid
Depth to perched water table: in January through December—0 to 10 inches (0 to 25 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with organic mats thicker than 16 inches (41 cm)
*soils with fractured schist bedrock at a depth of less than 12 inches (less than 30 cm)

Major Uses

Current uses: recreation and wildlife habitat

Major Management Factors

Soil-related factors: depth to perched water table, depth to permafrost, depth to fractured schist bedrock, and slope
Elevation: 950 to 1400 feet (290 to 427 m)

Forestland

Major tree species: black spruce
Minor tree species: paper birch and white spruce
Major understory species: Labrador tea, lowbush cranberry, bog blueberry, American green alder, woodland horsetail, feathermoss, sphagnum, and lichen
Major vegetation type(s): needleleaf woodland and open needleleaf forest, black spruce; and open dwarf tree forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

Building Site Development

General management considerations:
*Permafrost hampers excavation.
*Excavation increases the risk of water erosion and can expose material that is highly susceptible to wind erosion.
*Frost action limits construction of access roads, driveways, and buildings.
*Road cutbanks are subject to slumping.
*Local roads may require a special base to prevent permafrost damage.
*Septic tank absorption fields function poorly because of wetness and limited depth to permafrost and fractured schist bedrock, which restrict the movement and filtration of the

effluent.
*On-site sewage disposal is not recommended on this unit.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steep slopes.
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Construct buildings on thick gravel pads or pilings to reduce subsidence caused by the melting of permafrost.
*Locate roads in more gently sloping areas and design drainage systems to minimize the risk of slumping.
*Underlay roads with gravel to minimize frost action.

106—Ester-Gilmore complex, 15 to 45 percent slopes

Composition

Ester and similar inclusions: 50 percent
Gilmore and similar inclusions: 30 percent
Contrasting inclusions: 20 percent

Characteristics of Ester Soil

Position on landscape: north-facing mountain and hill slopes
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: black spruce, willows, alder, mosses, and Labrador tea

Typical profile:
*10 inches to 0 (25 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown mucky silt loam
*2 to 4 inches (5 to 10 cm)—very dark brown silt loam
*4 to 12 inches (10 to 30 cm)—permafrost; very dark brown gravelly silt loam
*12 inches (30 cm)—permafrost; fractured schist bedrock

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 2 to 14 inches (5 to 36 cm) below the surface of the mineral soil
Depth to fractured schist bedrock: 12 to 25 inches (30 to 64 cm) below the surface of the mineral soil
Runoff: rapid
Depth to perched water table: in January through December—0 to 10 inches (0 to 25 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Gilmore Soil

Position on landscape: ridgetops and south-facing hillsides and mountainsides
Slope range: 15 to 40 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, aspen, birch, alder, mosses, and Labrador tea

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 9 inches (5 to 23 cm)—dark yellowish brown silt loam
*9 to 17 inches (23 to 43 cm)—light olive brown very channery silt loam
*17 inches (43 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the fractured schist bedrock—moderate
Available water capacity: low
Depth to skeletal material: 9 to 16 inches (23 to 41 cm)
Depth to fractured schist bedrock: 10 to 20 inches (25 to 51 cm)
Runoff: rapid
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*Steese and Fairbanks soils
*soils that have fractured schist bedrock at a depth of less than 9 inches (less than 23 cm)
*soils that are deeper to bedrock
*soils that are moderately well and somewhat poorly drained
*Rock outcrops

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to permafrost, depth to fractured schist bedrock, depth to perched water table, and slope
Elevation: 1100 to 1800 feet (335 to 549 m)

Forestland

Ester Soil
Major tree species: black spruce
Minor tree species: paper birch and white spruce
Major understory species: Labrador tea, lowbush cranberry, bog blueberry, American green alder, woodland horsetail, feathermoss, sphagnum, and lichen
Major vegetation type(s): needleleaf woodland and open needleleaf forest, black spruce; and open dwarf tree forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated

Management considerations:
*The Ester soil has low potential for forestry due to the presence of permafrost and

associated perched water table, which results in stunted tree growth and low soil productivity.

Gilmore Soil

Major tree species: paper birch, quaking aspen, white spruce, and black spruce
Major understory species: northern Labrador tea, bog blueberry, lowbush cranberry, American green alder, willow, northern comandra, clubmoss, feathermoss, starmoss, and lichen
Major vegetation type(s): closed broadleaf forest, birch-aspen; and open and closed mixed forest, spruce-birch-aspen
Minor vegetation type(s): open and closed needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—68 feet (at 100 years)
*paper birch—38 feet (at 50 years)
*quaking aspen—44 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—steepness of slope, muddy conditions caused by seasonal soil wetness; severe on slopes greater than 35 percent
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases compaction.
Surface erosion hazard: moderate—steepness of slope, soil texture; severe on slopes greater than 35 percent
*Reduce erosion and sedimentation by avoiding excessive soil disturbance; installing water bars and culverts; and seeding cuts and fills and abandoned roads, trails, and landings.
*Soil erosion and compaction increase if yarding and skid trails converge.
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable on slopes less than 35 percent; unsafe, excessive soil damage, and erosion on slopes greater than 35 percent
*cable yarding—suitable
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

107—Fairbanks silt loam, 3 to 7 percent slopes

Composition

Fairbanks and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Fairbanks Soil

Position on landscape: hill and mountain backslopes and footslopes
Slope range: 3 to 7 percent
Slope features: convex
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick

Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 5 inches (5 to 13 cm)—dark brown silt loam
*5 to 15 inches (13 to 38 cm)—dark yellowish brown silt loam
*15 to 60 inches (38 to 152 cm)—dark grayish brown silt loam

Drainage class: well drained
Permeability: moderate
Available water capacity: high
Runoff: slow
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, moderate if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*Steese and Gilmore soils
*soils that have permafrost
*soils with slopes greater than 7 percent

Major Uses

Current uses: cropland, hayland, pastureland, homesites, recreation, and wildlife habitat
Potential uses: forestland

Major Management Factors

Soil-related factors: low fertility, frost heaving, load-supporting capacity, permeability, and slope
Elevation: 750 to 1300 feet (229 to 396 m)

Cropland

General management considerations:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.

Suitable management practices:
*Conserve moisture by conservation tillage, conservation cropping sequence, and contour farming.
*Construct grassed waterways in cultivated areas that are subject to overland flow.
*Rotate crops and use conservation tillage to maintain or improve fertility.
*Reduce the risk of water erosion by cultivating and seeding on the contour or across the slope, and by maintaining crop residue on or near the surface.

Forestland

Major tree species: paper birch, white spruce, and quaking aspen

Minor tree species: black spruce
Major understory species: prickly rose, lowbush cranberry, currant, American green alder, horsetail, bunchberry dogwood, reedgrass, and feathermoss
Major vegetation type(s): open and closed mixed forest, spruce-birch; and closed broadleaf forest, paper birch
Minor vegetation type(s): open and closed broadleaf forest, aspen; and open and closed broadleaf forest, birch-aspen
Estimated site index for stated species:
*white spruce—88 feet (at 100 years)
*paper birch—62 feet (at 50 years)
*quaking aspen—59 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Excavation increases the risk of wind erosion and water erosion.
*Cutbanks are not stable and are subject to slumping.
*The quality of roadbeds and road surfaces are adversely affected by limited soil strength and frost action.
*Septic tank absorption fields are subject to degradation of soil structure and reduced permeability upon addition of effluent.

Suitable management practices:
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Establish gently sloping grades to reduce the risk of caving.
*Provide suitable base material to increase the strength of roads and streets.
*Use structures to divert runoff on sites for buildings and roads.
*Consider the depth to which frost penetrates in designing footings and road bases.
*Increase the size of septic tank absorption fields to compensate for the restricted permeability.

108—Fairbanks silt loam, 7 to 12 percent slopes

Composition

Fairbanks and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Fairbanks Soil

Position on landscape: south-facing hill and mountain backslopes and footslopes
Slope range: 7 to 12 percent
Slope features: convex to concave
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 5 inches (5 to 13 cm)—dark brown silt loam
*5 to 15 inches (13 to 38 cm)—dark yellowish brown silt loam
*15 to 60 inches (38 to 152 cm)—dark grayish brown silt loam

Drainage class: well drained
Permeability: moderate
Available water capacity: high
Runoff: medium
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*Steese and Gilmore soils
*soils that have permafrost
*soils with slopes greater than 12 percent

Major Uses

Current uses: hayland, pastureland, homesites, recreation, and wildlife habitat
Potential uses: cropland and forestland

Major Management Factors

Soil-related factors: slope, low fertility, frost heaving, load-supporting capacity, and restricted permeability
Elevation: 750 to 1300 feet (229 to 396 m)

Cropland

General management considerations:
*Crops suitable for planting are climatically adapted vegetables, short season grain varieties, potatoes, and hay.
*Limited late spring precipitation may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.

Suitable management practices:
*Conserve moisture by conservation tillage, conservation cropping sequence, and contour farming.
*Construct grassed waterways in cultivated areas that are subject to overland flow.
*Rotate crops and use conservation tillage to maintain or improve fertility.
*Reduce the risk of water erosion by cultivating and seeding on the contour or across the slope, and by maintaining crop residue on or near the surface.

Forestland

Major tree species: paper birch, white spruce, and quaking aspen
Minor tree species: black spruce
Major understory species: prickly rose, lowbush cranberry, currant, American green alder, horsetail, bunchberry dogwood, reedgrass, and feathermoss
Major vegetation type(s): open and closed mixed forest, spruce-birch; and closed broadleaf forest, paper birch
Minor vegetation type(s): open and closed broadleaf forest, aspen; and open and closed broadleaf forest, birch-aspen
Estimated site index for stated species:
*white spruce—88 feet (at 100 years)
*paper birch—62 feet (at 50 years)
*quaking aspen—59 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Excavation increases the risk of wind erosion and water erosion.
*Cutbanks are not stable and are subject to slumping.
*The quality of roadbeds and road surfaces are adversely affected by limited soil strength and frost action.
*Septic tank absorption fields are subject to degradation of soil structure and reduced

permeability upon addition of effluent.

Suitable management practices:
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Establish gently sloping grades to reduce the risk of caving.
*Provide suitable base material to increase the strength of roads and streets.
*Design and construct buildings and access roads to compensate for steep slopes.
*Use structures to divert runoff on sites for buildings and roads.
*Consider the depth to which frost penetrates in designing footings and road bases.
*Increase the size of septic tank absorption fields to compensate for the restricted permeability.
*Alter slopes by cutting and filling or install septic tank absorption fields in adjacent areas that are less sloping.

109—Fairbanks silt loam, 12 to 20 percent slopes

Composition

Fairbanks and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Fairbanks Soil

Position on landscape: south-facing hill and mountain backslopes
Slope range: 12 to 20 percent
Slope features: convex to concave
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 5 inches (5 to 13 cm)—dark brown silt loam
*5 to 15 inches (13 to 38 cm)—dark yellowish brown silt loam
*15 to 60 inches (38 to 152 cm)—dark grayish brown silt loam

Drainage class: well drained
Permeability: moderate
Available water capacity: high
Runoff: rapid
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*Steese and Gilmore soils
*soils that have permafrost
*soils with slopes greater than 20 percent

Major Uses

Current uses: homesites, recreation, and wildlife habitat

Potential uses: hayland, pastureland, and forestland

Major Management Factors

Soil-related factors: slope, low fertility, load supporting capacity, restricted permeability, and frost heaving
Elevation: 800 to 1150 feet (244 to 351 m)

Hayland and Pastureland

General management considerations:
*Steep slopes limit suitable crops to permanent hay and pasture.
*Hay crops respond well to fertilizer applications if precipitation is adequate.
Suitable management practices:
*Seedbeds should be prepared on the contour or across the slope where practical.

Forestland

Major tree species: paper birch, white spruce, and quaking aspen
Minor tree species: black spruce
Major understory species: prickly rose, lowbush cranberry, currant, American green alder, horsetail, bunchberry dogwood, reedgrass, and feathermoss
Major vegetation type(s): open and closed mixed forest, spruce-birch; and closed broadleaf forest, paper birch
Minor vegetation type(s): open and closed broadleaf forest, aspen; and open and closed broadleaf forest, birch-aspen
Estimated site index for stated species:
*white spruce—88 feet (at 100 years)
*paper birch—62 feet (at 50 years)
*quaking aspen—59 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—steepness of slope; muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: moderate—steepness of slope, soil texture; slight on slopes less than 15 percent
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Excavation increases the risk of wind erosion and water erosion.
*Cutbanks are not stable and are subject to slumping.
*The quality of roadbeds and road surfaces are adversely affected by limited soil strength and frost action.
*Septic tank absorption fields function poorly because of steepness of slope, and are subject to degradation of soil structure and reduced permeability upon addition of effluent.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steepness of slopes.
*Provide suitable base material to increase the strength of roads and streets.
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Use structures to divert runoff on sites for buildings and roads.
*Consider the depth to which frost penetrates in designing footings and road bases.
*Increase the size of septic tank absorption fields to compensate for the restricted permeability.
*Alter slopes by cutting and filling or install septic absorption fields in adjacent areas that are less sloping.

110—Gilmore silt loam, 3 to 7 percent slopes

Composition

Gilmore and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Gilmore Soil

Position on landscape: ridgetops and south-facing hillsides and mountainsides
Slope range: 3 to 7 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, quaking aspen, and black spruce

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 9 inches (5 to 23 cm)—dark yellowish brown silt loam
*9 to 17 inches (23 to 43 cm)—light olive brown very channery silt loam
*17 inches (43 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the fractured schist bedrock—moderate
Available water capacity: low
Depth to skeletal material: 4 to 16 inches (10 to 41 cm)
Depth to fractured schist bedrock: 5 to 20 inches (13 to 51 cm)
Runoff: slow
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, moderate if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with fractured schist bedrock at a depth of less than 5 inches (less than 13 cm)
*soils that have slopes greater than 7 percent
*soils that have permafrost
*soils that are moderately well drained or somewhat poorly drained

Major Uses

Current uses: recreation, wildlife habitat, and homesites
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to fractured schist bedrock and frost heaving
Elevation: 1600 to 2300 feet (488 to 701 m)

Forestland

Major tree species: paper birch, quaking aspen, white spruce, and black spruce
Major understory species: northern Labrador tea, bog blueberry, lowbush cranberry, American green alder, willow, northern comandra, clubmoss, feathermoss, starmoss, and lichen
Major vegetation type(s): closed broadleaf forest, birch-aspen; and open and closed mixed forest, spruce-birch-aspen
Minor vegetation type(s): open and closed needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—68 feet (at 100 years)
*paper birch—38 feet (at 50 years)
*quaking aspen—44 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
Natural regeneration: quaking aspen and paper birch—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:

*The fractured bedrock is rippable and does not seriously limit most construction.
*Excavation can expose soil material that is highly susceptible to wind erosion.
*Local roads and streets may require a special base to prevent frost heave damage.
*Septic tank absorption fields can be expected to function poorly because of the limited depth to fracture schist bedrock.

Suitable management practices:
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Consider the depth to which frost penetrates in designing footings and road bases.
*Modify septic tank absorption fields to compensate for the limited depth to fractured schist bedrock.

111—Gilmore silt loam, 7 to 12 percent slopes

Composition

Gilmore and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Gilmore Soil

Position on landscape: ridgetops and south-facing hillsides and mountainsides
Slope range: 7 to 12 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, quaking aspen, and black spruce

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 9 inches (5 to 23 cm)—dark yellowish brown silt loam
*9 to 17 inches (23 to 43 cm)—light olive brown very channery silt loam
*17 inches (43 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the bedrock—moderate
Available water capacity: low
Depth to skeletal material: 4 to 16 inches (10 to 41 cm)
Depth to fractured schist bedrock: 5 to 20 inches (13 to 51 cm)
Runoff: medium
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, moderate if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with fractured schist bedrock at a depth of less than 5 inches (less than 13 cm)
*soils that have slopes greater than 12 percent
*soils that have permafrost
*soils that are moderately well or somewhat poorly drained

Major Uses

Current uses: recreation, wildlife habitat, and homesites

Potential uses: forestland

Major Management Factors

Soil-related factors: depth to fractured schist bedrock, slope, and frost heaving
Elevation: 1600 to 2300 feet (488 to 701 m)

Forestland

Major tree species: paper birch, quaking aspen, white spruce, and black spruce
Major understory species: northern Labrador tea, bog blueberry, lowbush cranberry, American green alder, willow, northern comandra, clubmoss, feathermoss, starmoss, and lichen
Major vegetation type(s): closed broadleaf forest, birch-aspen; and open and closed mixed forest, spruce-birch-aspen
Minor vegetation type(s): open and closed needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—68 feet (at 100 years)
*paper birch—38 feet (at 50 years)
*quaking aspen—44 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
Natural regeneration: quaking aspen and paper birch—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*The fractured bedrock is rippable and does not seriously limit most construction.
*Excavation increases the risk of water erosion and can expose soil material that is highly susceptible to wind erosion.
*Local roads and streets may require a special base to prevent frost heave damage.
*Septic systems will function poorly because of the limited depth to fractured schist bedrock.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steep slopes.
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.

*Consider the depth to which frost penetrates in designing road bases.
*Modify septic tank absorption fields to compensate for the limited depth to fractured schist bedrock.

112—Gilmore silt loam, 12 to 45 percent slopes

Composition

Gilmore and similar inclusions: 85 percent
Contrasting inclusions: 5 percent

Characteristics of Gilmore Soil

Position on landscape: ridgetops and south-facing hillsides and mountainsides
Slope range: 12 to 45 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, quaking aspen, and black spruce

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 9 inches (5 to 23 cm)—dark yellowish brown silt loam
*9 to 17 inches (23 to 43 cm)—light olive brown very channery silt loam
*17 inches (43 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the fractured schist bedrock—moderate
Available water capacity: low
Depth to skeletal material: 4 to 16 inches (10 to 41 cm)
Depth to fractured schist bedrock: 5 to 20 inches (13 to 51 cm)
Runoff: rapid
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with fractured schist bedrock at a depth of less than 5 inches (less than 13 cm)
*soils that have permafrost

Major Uses

Current uses: recreation, wildlife habitat, and homesites
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to fractured schist bedrock, slope, and frost heaving
Elevation: 1000 to 2300 feet (305 to 701 m)

Forestland

Major tree species: paper birch, quaking aspen, white spruce, and black spruce
Major understory species: northern Labrador tea, bog blueberry, lowbush cranberry,

American green alder, willow, northern comandra, clubmoss, feathermoss, starmoss, and lichen

Major vegetation type(s): closed broadleaf forest, birch-aspen; and open and closed mixed forest, spruce-birch-aspen

Minor vegetation type(s): open and closed needleleaf forest, black spruce-white spruce

Estimated site index for stated species:

*white spruce—68 feet (at 100 years)

*paper birch—38 feet (at 50 years)

*quaking aspen—44 feet (at 50 years)

Soil limitation(s) for equipment use: moderate—steepness of slope, muddy conditions caused by seasonal soil wetness; severe on slopes greater than 35 percent

*Using wheeled and tracked equipment when the soil is wet produces ruts and increases compaction.

Surface erosion hazard: moderate—steepness of slope, soil texture; severe on slopes greater than 35 percent

*Reduce erosion and sedimentation by avoiding excessive soil disturbance; installing water bars and culverts; and seeding cuts and fills and abandoned roads, trails, and landings.

*Soil erosion and compaction increase if yarding and skid trails converge.

Snowpack: occasionally limiting in winter

Suitability of logging systems:

*wheeled and tracked equipment—suitable on slopes less than 35 percent; unsafe, excessive soil damage, and erosion on slopes greater than 35 percent

*cable yarding—suitable

Roads, trails, and landings:

*condition of unsurfaced roads and skid trails when wet—soft, slippery

Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically

Trees to plant for timber production: white spruce and paper birch

Seedling mortality: slight

Windthrow hazard: moderate—shallow rooted trees

Plant competition: slight

Management considerations:

*If seed trees are in the stand, reforestation occurs naturally in cutover areas.

*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:

*The fractured bedrock is rippable and does not seriously limit most construction.

*Excavation increases the risk of water erosion and can expose soil material that is highly susceptible to wind erosion.

*Local roads and streets may require a special base to prevent frost heave damage.

*Septic systems will function poorly because of the limited depth to fractured schist bedrock.

*Cut slopes generally are stable, but slumping can occur where the bedrock is highly fractured or where rock layers are parallel to the slope.

Suitable management practices:

*Design and construct buildings and access roads to compensate for steep slopes.

*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.

*Consider the depth to which frost penetrates in designing road bases.

*Modify septic tank absorption fields to compensate for the limited depth to fractured schist bedrock.

*Alter slopes by cutting and filling or install septic absorption fields in adjacent areas that are less sloping.

*Locate roads in more gently sloping areas and design drainage systems to minimize the risk of slumping.

113—Gilmore-Ester complex, 15 to 45 percent slopes

Composition

Gilmore and similar inclusions: 50 percent
Ester and similar inclusions: 30 percent
Contrasting inclusions: 20 percent

Characteristics of Gilmore Soil

Position on landscape: south-facing hill and mountain slopes
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, quaking aspen, and black spruce

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 9 inches (5 to 23 cm)—dark yellowish brown silt loam
*9 to 17 inches (23 to 43 cm)—light olive brown very channery silt loam
*17 inches (43 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the fractured schist bedrock—moderate
Available water capacity: low
Depth to skeletal material: 4 to 16 inches (10 to 41 cm)
Depth to fractured schist bedrock: 5 to 20 inches (13 to 51 cm)
Runoff: rapid
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Ester Soil

Position on landscape: north-facing hillsides and mountainsides
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: black spruce, willows, alder, mosses, and Labrador tea

Typical profile:
*10 inches to 0 (25 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 4 inches (5 to 10 cm)—very dark brown channery silt loam
*4 to 12 inches (10 to 30 cm)—perennially frozen very dark brown channery silt loam
*12 inches (30 cm)—perennially frozen fractured schist bedrock

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable

Available water capacity: low
Runoff: rapid
Depth to permafrost: 2 to 14 inches (5 to 36 cm) below the surface of the mineral soil
Depth to perched water table: in January through December—0 to 10 inches (0 to 25 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*Steese and Fairbanks soils
*soils that are moderately well and somewhat poorly drained
*soils that have fractured schist bedrock at a depth of less than 5 inches (less than 13 cm)
*soils that have organic mats thicker than 16 inches (41 cm)
*Rock outcrops

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to permafrost, depth to fractured schist bedrock, depth to perched water table, permeability, and slope
Elevation: 950 to 2100 feet (280 to 640 m)

Forestland

Gilmore Soil
Major tree species: paper birch, quaking aspen, white spruce, and black spruce
Major understory species: northern Labrador tea, bog blueberry, lowbush cranberry, American green alder, willow, northern comandra, clubmoss, feathermoss, starmoss, and lichen
Major vegetation type(s): closed broadleaf forest, birch-aspen; and open and closed mixed forest, spruce-birch-aspen
Minor vegetation type(s): open and closed needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—68 feet (at 100 years)
*paper birch—38 feet (at 50 years)
*quaking aspen—44 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—steepness of slope, muddy conditions caused by seasonal soil wetness; severe on slopes greater than 35 percent
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases compaction.
Surface erosion hazard: moderate—steepness of slope, soil texture; severe on slopes greater than 35 percent
*Reduce erosion and sedimentation by avoiding excessive soil disturbance; installing water bars and culverts; and seeding cuts and fills and abandoned roads, trails, and landings.
*Soil erosion and compaction increase if yarding and skid trails converge.
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable on slopes less than 35 percent; unsafe, excessive soil damage, and erosion on slopes greater than 35 percent

*cable yarding—suitable
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Ester Soil
Major tree species: black spruce
Minor tree species: paper birch and white spruce
Major understory species: Labrador tea, lowbush cranberry, bog blueberry, American green alder, woodland horsetail, feathermoss, sphagnum, and lichen
Major vegetation type(s): needleleaf woodland and open needleleaf forest, black spruce; and open dwarf tree forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*The Ester soil has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

114—Gilmore-Steese complex, 3 to 15 percent slopes

Composition

Gilmore and similar inclusions: 50 percent
Steese and similar inclusions: 35 percent
Contrasting inclusions: 15 percent

Characteristics of Gilmore Soil

Position on landscape: ridgetops and south-facing hill and mountain slopes
Slope range: 3 to 15 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, quaking aspen, and black spruce

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 9 inches (5 to 23 cm)—dark yellowish brown silt loam
*9 to 17 inches (23 to 43 cm)—light olive brown very channery silt loam
*17 inches (43 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the fractured schist bedrock—moderate
Available water capacity: low
Depth to skeletal material: 4 to 16 inches (10 to 41 cm)
Depth to fractured schist bedrock: 5 to 20 inches (13 to 51 cm)
Runoff: medium

Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Steese Soil

Position on landscape: hillsides and mountainsides
Slope range: 3 to 15 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark yellowish brown silt loam
*2 to 10 inches (5 to 25 cm)—yellowish brown silt loam
*10 to 26 inches (25 to 66 cm)—dark yellowish brown silt loam
*26 to 32 inches (66 to 81 cm)—light olive brown very channery silt loam
*32 inches (81 cm)—fractured schist bedrock
Drainage class: well drained
Permeability: moderate
Available water capacity: moderate
Depth to fractured schist bedrock: 20 to 40 inches (51 to 102 cm)
Runoff: medium
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils that have fractured schist bedrock at a depth of less than 5 inches (less than 13 cm)
*soils that are moderately well and somewhat poorly drained
*soils that have slopes greater than 15 percent

Major Uses

Current uses: recreation, wildlife habitat, and homesites
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to fractured schist bedrock, slope, and frost heaving
Elevation: 1400 to 2300 feet (427 to 701 m)

Forestland

Gilmore Soil
Major tree species: paper birch, quaking aspen, white spruce, and black spruce
Major understory species: northern Labrador tea, bog blueberry, lowbush cranberry, American green alder, willow, northern comandra, clubmoss, feathermoss, starmoss, and lichen
Major vegetation type(s): closed broadleaf forest, birch-aspen; and open and closed mixed forest, spruce-birch-aspen

Minor vegetation type(s): open and closed needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—68 feet (at 100 years)
*paper birch—38 feet (at 50 years)
*quaking aspen—44 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
Natural regeneration: quaking aspen and paper birch—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Steese Soil

Major tree species: paper birch, quaking aspen, and white spruce
Minor tree species: black spruce
Major understory species: northern Labrador tea, lowbush cranberry, American green alder, bog blueberry, prickly rose, willow, clubmoss, northern comandra, American twinflower, feathermoss, starmoss, and lichen
Major vegetation type(s): open and closed broadleaf forest, birch-aspen; and open mixed forest, spruce-birch
Minor vegetation type(s): open needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—78 feet (at 100 years)
*paper birch—51 feet (at 50 years)
*quaking aspen—43 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees

Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*The fractured bedrock is rippable and does not seriously limit most construction.
*Excavation increases the risk of water erosion and can expose soil material that is highly susceptible to wind erosion.
*Local roads and streets may require a special base to prevent frost heave damage.
*Septic systems will function poorly because of the limited depth to fractured schist bedrock.
*Cut slopes generally are stable, but slumping can occur where the bedrock is highly fractured or where rock layers are parallel to the slope.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steep slopes.
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Consider the depth to which frost penetrates in designing road bases.
*Modify septic tank absorption fields to compensate for the limited depth to fractured schist bedrock.
*Locate roads in more gently sloping areas and design drainage systems to minimize the risk of slumping.

115—Goldstream peat, 0 to 3 percent slopes

Composition

Goldstream and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of Goldstream Soil

Position on landscape: alluvial plains
Slope range: 0 to 3 percent
Slope features: plane, concave
Organic mat on surface: 8 to 14 inches (20 to 36 cm) thick
Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Typical profile:
*13 inches to 0 (33 cm to 0)—peat
*0 to 6 inches (0 to 15 cm)—very dark grayish brown mucky silt loam
*6 to 13 inches (15 to 33 cm)—dark gray and dark grayish brown silt loam
*13 to 23 inches (33 to 58 cm)—perennially frozen dark gray silt loam

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low

Depth to permafrost: 4 to 13 inches (10 to 33 cm) below the surface of the mineral soil
Runoff: very slow
Depth to perched water table: in January through December—0 to 6 inches (0 to 15 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe, depending on drainage, if the mat is removed
Hazard of flooding: none

Included Areas

*soils with slopes greater than 3 percent
*soils that are ponded
*soils with organic mats greater than 16 inches (greater than 41 cm) thick

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: on-site investigation is required to determine the possibility of thawed potential

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, ponding, lack of drainage outlets upon thawing, and pitting
Elevation: 650 to 1000 feet (198 to 305 m)

Forestland

Major tree species: black spruce
Minor tree species: paper birch and white spruce
Major understory species: Labrador tea, resin birch, dwarf arctic birch, bog blueberry, willow, American green alder, lowbush cranberry, cottongrass, woodland horsetail, cloudberry, feathermoss, sphagnum, starmoss, and lichen
Major vegetation type(s): open dwarf tree forest, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

116—Goldstream peat, 3 to 7 percent slopes

Composition

Goldstream and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of Goldstream Soil

Position on landscape: alluvial plains and toeslopes
Slope range: 3 to 7 percent

Slope features: plane, concave
Organic mat on surface: 8 to 14 inches (20 to 36 cm) thick
Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Typical profile:
*13 inches to 0 (33 cm to 0)—peat
*0 to 6 inches (0 to 15 cm)—very dark grayish brown mucky silt loam
*6 to 13 inches (15 to 33 cm)—dark gray and dark grayish brown silt loam
*13 to 23 inches (33 to 58 cm)—perennially frozen dark gray silt loam

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 4 to 12 inches (10 to 30 cm) below the surface of the mineral soil
Runoff: slow
Depth to perched water table: in January through December—0 to 6 inches (0 to 15 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with slopes greater than 7 percent or less than 3 percent
*soils that are ponded
*soils with organic mats greater than 16 inches (greater than 41 cm) thick

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: cropland, hayland, and pastureland

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, and wind erosion
Elevation: 650 to 800 feet (198 to 244 m)

Cropland

General management considerations with permafrost:
*This unit is suitable for cropland, hayland, and pastureland only when thawed.
*Clearing and thawing of the soil lowers the water table only if adequate drainage outlets are available and the clearing is large enough to overcome seepage from adjacent uncleared areas.
*Before clearing a permafrost soil, on-site investigation is needed to determine if massive ice features are present, if adequate drainage outlets are available, and the variability of substratum materials.

General management considerations when thawed and drained:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation and frequent late summer frosts may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.
*Differential subsidence may occur after clearing in areas where massive ice features are present, requiring continued land smoothing and maintenance.

Suitable management practices:
*Develop diversions and grassed waterways to improve surface drainage and reduce the risk of water erosion.
*Conserve moisture by conservation tillage, conservation cropping sequence, and contour farming.
*Rotate crops and use conservation tillage to maintain or improve fertility.
*Reduce the risk of wind erosion by planting crops in narrow strips at right angles to the prevailing wind, maintaining crop residue on the surface, using conservation tillage, and limiting the width of strips of unprotected soil.

Forestland

Major tree species: black spruce
Minor tree species: paper birch and white spruce
Major understory species: Labrador tea, resin birch, dwarf arctic birch, bog blueberry, willow, American green alder, lowbush cranberry, cottongrass, woodland horsetail, cloudberry, feathermoss, sphagnum, starmoss, and lichen
Major vegetation type(s): open dwarf tree forest, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

117—Goldstream-Pergelic Cryohemists complex, 0 to 2 percent slopes

Composition

Goldstream and similar inclusions: 60 percent
Pergelic Cryohemists and similar inclusions: 30 percent
Contrasting inclusions: 10 percent

Characteristics of Goldstream Soil

Position on landscape: alluvial plains
Slope range: 0 to 2 percent
Slope features: plane, concave
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: mosses, sedges, dwarf birch, willows, and black spruce

Typical profile:
*13 inches to 0 (33 cm to 0)—peat
*0 to 6 inches (0 to 15 cm)—very dark grayish brown mucky silt loam
*6 to 13 inches (15 to 33 cm)—dark gray and dark grayish brown silt loam
*13 to 23 inches (33 to 58 cm)—perennially frozen dark gray silt loam

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral layers above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 4 to 12 inches (10 to 30 cm) below the surface of the mineral soil
Runoff: very slow
Depth to perched water table: in January through December—0 to 6 inches (0 to 15 cm)

below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe, depending on drainage, if the mat is removed
Hazard of flooding: none

Characteristics of Pergelic Cryohemists

Position on landscape: alluvial plains
Slope range: 0 to 2 percent
Slope features: plane, concave
Native vegetation: mosses, sedges, and dwarf birch

Reference profile:
*0 to 10 inches (0 to 25 cm)—brown fibrous peat
*10 to 22 inches (25 to 56 cm)—dark brown and brown fibrous peat
*22 to 28 inches (56 to 71 cm)—dark brown moderately decomposed mucky peat
*28 to 38 inches (71 to 97 cm)—perennially frozen dark brown mucky peat

Drainage class: very poorly drained
Permeability: above the permafrost—very rapid; below this—impermeable
Available water capacity: low
Runoff: ponded and very slow
Depth to permafrost: 10 to 30 inches (25 to 76 cm)
Depth to perched water table: +6 to 6 inches (+15 to 15 cm)
Hazard of erosion: none
Hazard of flooding: none to rare

Included Areas

*soils that are ponded

Major Uses

Current uses: recreation and wildlife habitat

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, ponding, lack of drainage outlets upon thawing, and pitting
Elevation: 650 to 1000 feet (198 to 305 m)

Forestland

Goldstream Soil
Major tree species: black spruce
Minor tree species: paper birch and white spruce
Major understory species: Labrador tea, resin birch, dwarf arctic birch, bog blueberry, willow, American green alder, lowbush cranberry, cottongrass, woodland horsetail, cloudberry, feathermoss, sphagnum, starmoss, and lichen
Major vegetation type(s): open dwarf tree scrub, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*The Goldstream soil has low potential for forestry while frozen because of permafrost and

associated perched water table, resulting in stunted tree growth and low soil productivity.

Pergelic Cryohemist Soil

Major tree species: black spruce

Minor tree species: tamarack

Major understory species: Labrador tea, arctic dwarf birch, bog blueberry, lowbush cranberry, cottongrass, horsetail, cloudberry, sphagnum, and feathermoss

Major vegetation type(s): dwarf tree woodland, black spruce

Minor vegetation type(s): open low shrub, mixed shrub-sedge tussock bog

Site index and growth of principal trees: not estimated

General management considerations:

*The Pergelic Cryohemist soil has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

118—Histic Pergelic Cryaquepts, fans, 1 to 20 percent slopes

Composition

Histic Pergelic Cryaquepts and similar inclusions: 90 percent

Contrasting inclusions: 10 percent

Characteristics of Histic Pergelic Cryaquepts

Position on landscape: toeslopes and fans

Slope range: 1 to 20 percent

Slope features: plane, concave

Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick

Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Reference profile:

*13 inches to 0 (33 cm to 0)—peat

*0 to 5 inches (0 to 13 cm)—dark brown gravelly silt loam

*5 to 15 inches (13 to 38 cm)—perennially frozen dark brown gravelly silt loam

Drainage class: very poorly drained

Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable

Available water capacity: low

Depth to permafrost: 0 to 12 inches (0 to 30 cm) below the surface of the mineral soil

Runoff: moderate to rapid

Depth to perched water table: in January through December—0 to 6 inches (0 to 15 cm) below the surface of the mineral soil

Hazard of erosion: by water—none if organic mat is not removed, none to severe if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe if the mat is removed

Hazard of flooding: none

Included Areas

*soils with slopes greater than 20 percent

*soils with organic mats greater than 16 inches (greater than 41 cm) thick

Major Uses

Current uses: recreation and wildlife habitat

Potential uses: on-site investigation is required to determine the possibility of thawed potential

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, and slope
Elevation: 600 to 1400 feet (183 to 427 m)

Forestland

Major tree species: black spruce
Minor tree species: paper birch, balsam poplar, and white spruce
Major understory species: Labrador tea, bog blueberry, dwarf arctic birch, resin birch, lowbush cranberry, willow, alder, cottongrass, woodland horsetail, cloudberry, feathermoss, and sphagnum
Major vegetation type(s): open dwarf tree forest, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open low shrub, mixed shrub-sedge tussock bog; and open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

119—Histic Pergelic Cryaquepts, 15 to 45 percent slopes

Composition

Histic Pergelic Cryaquepts and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of Histic Pergelic Cryaquepts

Position on landscape: north-facing mountain and hill slopes
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: black spruce, willows, alder, mosses, and Labrador tea

Reference profile:
*10 inches to 0 (25 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 4 inches (5 to 10 cm)—very dark brown silt loam
*4 to 12 inches (10 to 30 cm)—perennially frozen very dark brown gravelly silt loam
*12 to 22 inches (30 to 56 cm)—perennially frozen fractured schist bedrock

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 2 to 14 inches (5 to 36 cm) below the surface of the mineral soil
Depth to fractured schist bedrock: 12 to 25 inches (30 to 64 cm) below the surface of the mineral soil
Runoff: rapid
Depth to perched water table: in January through December—2 to 10 inches (5 to 25 cm)

below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe, depending on drainage, if the mat is removed
Hazard of flooding: none

Included Areas

*soils with organic mats thicker than 16 inches (41 cm)
*soils with fractured schist bedrock at a depth of less than 12 inches (less than 30 cm)

Major Uses

Current uses: recreation and wildlife habitat

Major Management Factors

Soil-related factors: depth to perched water table, depth to permafrost, depth to fractured schist bedrock, and slope
Elevation: 1500 to 2000 feet (457 to 610 m)

Forestland

Major tree species: black spruce
Minor tree species: paper birch and quaking aspen
Major understory species: Labrador tea, lowbush cranberry, bog blueberry, American green alder, woodland horsetail, feathermoss, sphagnum, and lichen
Major vegetation type(s): needleleaf woodland and open needleleaf forest, black spruce; and open dwarf tree forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

120—Histic Pergelic Cryaquepts-Fubar complex, 3 to 7 percent slopes

Composition

Histic Pergelic Cryaquepts and similar inclusions: 70 percent
Fubar and similar inclusions: 20 percent
Contrasting inclusions: 10 percent

Characteristics of Histic Pergelic Cryaquepts

Position on landscape: flood plains and toeslopes
Slope range: 3 to 7 percent
Slope features: plane, concave
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Reference profile:

*13 inches to 0 (33 cm to 0)—peat
*0 to 6 inches (0 to 15 cm)—very dark grayish brown mucky silt loam
*6 to 13 inches (15 to 33 cm)—dark gray and dark grayish brown silt loam
*13 to 23 inches (33 to 58 cm)—perennially frozen silt loam

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 0 to 12 inches (0 to 30 cm) below the surface of the mineral soil
Runoff: slow
Depth to perched water table: in January through December—0 to 6 inches (0 to 15 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe if the mat is removed
Hazard of flooding: none

Characteristics of Fubar Soil

Position on landscape: flood plains
Slope range: 3 to 7 percent
Slope features: plane, concave
Organic mat on surface: 1 to 4 inches (3 to 10 cm) thick
Native vegetation: willow and alder

Typical profile:
*0 to 6 inches (0 to 15 cm)—olive brown fine sandy loam
*6 to 60 inches (15 to 152 cm)—grayish brown stratified extremely cobbly sand and silt loam

Drainage class: moderately well drained
Permeability: above the sand and gravel—moderate; below this—rapid
Available water capacity: very low
Depth to sand and gravel: 1 to 8 inches (3 to 20 cm)
Runoff: very slow
Depth to water table: in June through August—36 to 60 inches (91 to 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: frequent

Included Areas

*somewhat poorly, poorly, and very poorly drained soils without permafrost
*soils with slopes greater than 7 percent or less than 3 percent
*soils that are ponded
*soils with organic mats greater than 16 inches (greater than 41 cm) thick

Major Uses

Current uses: wildlife habitat and recreation

Major Management Factors

Soil-related factors: depth to sand and gravel, depth to water table, flooding, and depth to permafrost

Elevation: 1300 to 1800 feet (396 to 549 m)

Forestland

Histic Pergelic Cryaquept Soil
Major tree species: black spruce
Minor tree species: paper birch and white spruce
Major understory species: Labrador tea, resin birch, dwarf arctic birch, bog blueberry, willow, American green alder, lowbush cranberry, cottongrass, woodland horsetail, cloudberry, feathermoss, sphagnum, starmoss, and lichen
Major vegetation type(s): open dwarf tree forest, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*The Histic Pergelic Cryaquept soil has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

Fubar Soil
Major tree species: white spruce
Minor tree species: quaking aspen, balsam poplar, paper birch, and black spruce
Major understory species: prickly rose, highbush cranberry, alder, lowbush cranberry, northern Labrador tea, reedgrass, horsetail, bunchberry dogwood, American twinflower, and feathermoss
Major vegetation type(s): open and closed needleleaf forest, white spruce
Minor vegetation type(s): open mixed forest, aspen-spruce
Estimated site index for stated species:
*white spruce—79 feet (at 100 years)
Soil limitation(s) for equipment use: slight
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—firm
*availability of rock for roads—readily
Natural regeneration: white spruce and quaking aspen—readily; balsam poplar, paper birch, and black spruce—periodically
Trees to plant for timber production: white spruce
Seedling mortality: moderate—droughty conditions caused by large volume of coarse fragments
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

121—Histic Pergelic Cryaquepts-Typic Cryochrepts association, 15 to 45 percent slopes

Composition

Histic Pergelic Cryaquepts and similar inclusions: 55 percent

Typic Cryochrepts and similar inclusions: 35 percent
Contrasting inclusions: 10 percent

Characteristics of Histic Pergelic Cryaquepts

Position on the landscape: north-facing mountain and hill slopes
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: black spruce, willows, dwarf birch, Labrador tea, mosses, and sedges

Reference profile:
*13 inches to 0 (33 cm to 0)—peat
*0 to 5 inches (0 to 13 cm)—dark brown gravelly loam
*5 to 15 inches (13 to 38 cm)—perennially frozen dark brown gravelly loam

Drainage class: very poorly and poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 2 to 14 inches (5 to 36 cm) below the surface of the mineral soil
Depth to fractured schist bedrock: 12 to 60 inches (30 to 152 cm) below the surface of the mineral soil
Runoff: rapid
Depth to perched water table: 2 to 16 inches (5 to 41 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Typic Cryochrepts

Position on landscape: ridgetops and south-facing hillsides and mountainsides
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Reference profile:
*0 to 3 inches (0 to 8 cm)—dark brown channery silt loam
*3 to 15 inches (8 to 38 cm)—dark yellowish brown channery silt loam
*15 to 26 inches (38 to 66 cm)—dark yellowish brown very channery very fine sandy loam
*26 inches (66 cm)—weathered fractured schist bedrock

Drainage class: moderately well and well drained
Permeability: moderate above the bedrock
Available water capacity: low
Depth to skeletal material: 0 to 16 inches (0 to 41 cm)
Depth to fractured schist bedrock: 6 to 36 inches (15 to 91 cm)
Runoff: rapid
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*Rock outcrops
*somewhat poorly drained soils without permafrost

Major Uses

Current uses: recreation and wildlife habitat and homesites on the Typic Cryochrepts
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to fractured schist bedrock, slope, frost heaving, permafrost, depth to perched water table, and restricted permeability
Elevation: 1500 to 2000 feet (457 to 610 m)

Forestland

Histic Pergelic Cryaquept Soil
Major tree species: black spruce
Minor tree species: paper birch and quaking aspen
Major understory species: Labrador tea, lowbush cranberry, bog blueberry, American green alder, woodland horsetail, feathermoss, sphagnum, and lichen
Major vegetation type(s): needleleaf woodland and open needleleaf forest, black spruce; and open dwarf tree forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*The Histic Pergelic Cryaquept soil has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

Typic Cryochrept Soil
Major tree species: paper birch, quaking aspen, and black spruce
Minor tree species: white spruce
Major understory species: bog blueberry, northern Labrador tea, American green alder, lowbush cranberry, black crowberry, clubmoss, northern comandra, feathermoss, starmoss, and lichen
Major vegetation type(s): open and closed mixed forest, spruce-birch; open and closed broadleaf forest, birch-aspen; and open and closed needleleaf forest, black spruce
Minor vegetation type(s): open mixed forest, aspen-spruce; and open needleleaf forest, white spruce
Site index and growth of principal trees: not estimated

Building Site Development

General management considerations:
*Homesites are not recommended on the Histic Pergelic Cryaquepts.
*The fractured bedrock is rippable and does not seriously limit most construction.
*Excavation increases the risk of water erosion and can expose soil material that is highly susceptible to wind erosion.
*Local roads and streets may require a special base to prevent frost heave damage.
*Septic systems will function poorly because of the limited depth to fractured schist bedrock and restricted permeability.
*Cut slopes generally are stable, but slumping can occur where the bedrock is highly fractured or where rock layers are parallel to the slope.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steep slopes.
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Consider the depth to which frost penetrates in designing road bases.
*Modify septic tank absorption fields to compensate for the limited depth to fractured schist bedrock and restricted permeability.
*Alter slopes by cutting and filling or install septic absorption fields in adjacent areas that are less sloping.
*Locate roads in more gently sloping areas and design drainage systems to minimize the risk of slumping.

122—Histic Pergelic Cryaquepts-Typic Cryochrepts complex, 15 to 45 percent slopes

Composition

Histic Pergelic Cryaquepts and similar inclusions: 55 percent
Typic Cryochrepts and similar inclusions: 35 percent
Contrasting inclusions: 10 percent

Characteristics of Histic Pergelic Cryaquepts

Position on landscape: mountains and hill slopes
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: black spruce, willows, alder, mosses, and Labrador tea

Reference profile:
*10 inches to 0 (25 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown mucky silt loam
*2 to 4 inches (5 to 10 cm)—very dark brown silt loam
*4 to 14 inches (10 to 36 cm)—permafrost; very dark brown gravelly silt loam

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 2 to 17 inches (5 to 43 cm) below the surface of the mineral soil
Runoff: rapid
Depth to perched water table: in January through December—0 to 10 inches (0 to 25 cm) below the surface of the mineral soil
Hazard of erosion: by water—slight if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Typic Cryochrepts

Position on landscape: ridgetops, hillsides, and mountainsides
Slope range: 15 to 45 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, aspen, birch, alder, mosses, and Labrador tea

Reference profile:
*0 to 3 inches (0 to 8 cm)—dark brown channery silt loam
*3 to 15 inches (8 to 38 cm)—dark yellowish brown channery silt loam
*15 to 26 inches (38 to 66 cm)—dark yellowish brown very channery very fine sandy loam
*26 inches (66 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the fractured schist bedrock—moderate
Available water capacity: low
Depth to skeletal material: 0 to 16 inches (0 to 41 cm)
Depth to fractured schist bedrock: 6 to 36 inches (15 to 91 cm)
Runoff: rapid
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils without permafrost that are moderately well and somewhat poorly drained
*Rock outcrops

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to permafrost, depth to fractured schist bedrock, depth to perched water table, and slope
Elevation: 1400 to 2000 feet (427 to 610 m)

Forestland

Histic Pergelic Cryaquept Soil
Major tree species: black spruce
Minor tree species: paper birch and quaking aspen
Major understory species: Labrador tea, lowbush cranberry, bog blueberry, American green alder, woodland horsetail, feathermoss, sphagnum, and lichen
Major vegetation type(s): needleleaf woodland and open needleleaf forest, black spruce; and open dwarf tree forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*The Histic Pergelic Cryaquept soil has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

Typic Cryochrept Soil
Major tree species: paper birch, quaking aspen, and black spruce
Minor tree species: white spruce

Major understory species: bog blueberry, northern Labrador tea, American green alder, lowbush cranberry, black crowberry, clubmoss, northern comandra, feathermoss, starmoss, and lichen
Major vegetation type(s): open and closed mixed forest, spruce-birch; open and closed broadleaf forest, birch-aspen; and open and closed needleleaf forest, black spruce
Minor vegetation type(s): open mixed forest, aspen-spruce; and open needleleaf forest, white spruce
Site index and growth of principal trees: not estimated

123—Jarvis-Fubar complex, 0 to 3 percent slopes

Composition

Jarvis and similar inclusions: 50 percent
Fubar and similar inclusions: 35 percent
Contrasting inclusions: 15 percent

Characteristics of Jarvis Soil

Position on landscape: flood plains
Slope range: 0 to 3 percent
Slope features: plane
Organic mat on surface: 1 to 7 inches (3 to 18 cm) thick
Native vegetation: alder, willow, white spruce, and paper birch

Typical profile:
*0 to 2 inches (0 to 5 cm)—very dark grayish brown very fine sandy loam
*2 to 8 inches (5 to 20 cm)—dark grayish brown very fine sandy loam
*8 to 18 inches (20 to 46 cm)—variegated stratified fine sandy loam and silt
*18 to 60 inches (46 to 152 cm)—variegated gravelly sand

Drainage class: well drained
Permeability: above the sand and gravel—moderate; below this—rapid
Available water capacity: moderate and low
Depth to sand and gravel: 10 to 39 inches (25 to 99 cm)
Runoff: very slow
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: occasional

Characteristics of Fubar Soil

Position on landscape: flood plains
Slope range: 0 to 3 percent
Slope features: plane
Organic mat on surface: 1 to 4 inches (3 to 10 cm) thick
Native vegetation: willow, alder, and white spruce

Typical profile:
*0 to 6 inches (0 to 15 cm)—olive brown very fine sandy loam
*6 to 60 inches (15 to 152 cm)—grayish brown stratified extremely cobbly sand and silt loam

Drainage class: moderately well drained

Permeability: above the sand and gravel—moderate; below this—rapid
Depth to sand and gravel: 1 to 8 inches (3 to 20 cm)
Available water capacity: very low
Runoff: very slow
Depth to water table: 36 to 60 inches (91 to 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: frequent

Included Areas

*soils with water tables within 36 inches (91 cm)
*soils that have permafrost and a perched water table
*soils that are very poorly drained and poorly drained in abandoned channels and sloughs

Major Uses

Current uses: recreation, wildlife habitat, and homesites
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to sand and gravel, depth to water table, flooding, excessive permeability, and frost heaving
Elevation: 800 to 1400 feet (244 to 427 m)

Forestland

Jarvis Soil
Major tree species: paper birch and white spruce
Minor tree species: balsam poplar, quaking aspen, and black spruce
Major understory species: prickly rose, highbush cranberry, alder, lowbush cranberry, northern Labrador tea, reedgrass, horsetail, bunchberry dogwood, American twinflower, and feathermoss
Major vegetation type(s): open and closed mixed forest, spruce-birch
Minor vegetation type(s): open and closed needleleaf forest, white spruce
Mean site index for stated species:
*white spruce—80 feet (100 year site curve; *Farr 1967*)
Estimated site index for stated species:
*paper birch—50 feet (at 50 years)
Soil limitation(s) for equipment use: slight
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—firm
*availability of rock for roads—readily
Natural regeneration: paper birch and white spruce—readily; balsam poplar, quaking aspen, and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual

development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Fubar Soil
Major tree species: white spruce
Minor tree species: quaking aspen, balsam poplar, paper birch, and black spruce
Major understory species: prickly rose, highbush cranberry, alder, lowbush cranberry, northern Labrador tea, reedgrass, horsetail, bunchberry dogwood, American twinflower, and feathermoss
Major vegetation type(s): open and closed needleleaf forest, white spruce
Minor vegetation type(s): open mixed forest, aspen-spruce
Estimated site index for stated species:
*white spruce—79 feet (at 100 years)
Soil limitation(s) for equipment use: moderate—frequent flooding
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—firm
*availability of rock for roads—readily
Natural regeneration: white spruce and quaking aspen—readily; balsam poplar, paper birch, and black spruce—periodically
Trees to plant for timber production: white spruce
Seedling mortality: moderate—droughty conditions caused by large volume of coarse fragments
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Flooding may limit selection of homesites.
*Septic tank absorption fields can be expected to perform poorly because of wetness during periods of flooding and a high water table.
*Cutbanks are not stable and are subject to slumping.
*Local roads and streets are subject to flooding.
*On-site sewage disposal is not recommended on this unit due to the risk of seepage and the hazard of polluting the ground water.

Suitable management practices:
*Locate structures above the expected flood level to reduce the risk of flooding.
*Establish gently sloping grades to reduce the risk of caving.
*Add fill to increase the elevation of roads and streets, and provide adequate drainage.

124—Jarvis-Salchaket complex, 0 to 3 percent slopes

Composition

Jarvis and similar inclusions: 60 percent
Salchaket and similar inclusions: 30 percent
Contrasting inclusions: 10 percent

Characteristics of Jarvis Soil

Position on landscape: flood plains
Slope range: 0 to 3 percent
Slope features: plane
Organic mat on surface: 1 to 7 inches (3 to 18 cm) thick
Native vegetation: alder, willow, white spruce, and paper birch

Typical profile:
*0 to 2 inches (0 to 5 cm)—very dark grayish brown very fine sandy loam
*2 to 8 inches (5 to 20 cm)—dark grayish brown very fine sandy loam
*8 to 18 inches (20 to 46 cm)—variegated stratified fine sandy loam and silt
*18 to 60 inches (46 to 152 cm)—variegated gravelly sand

Drainage class: well drained
Permeability: above the sand and gravel—moderate; below this—rapid
Available water capacity: low and moderate
Depth to sand and gravel: 10 to 39 inches (25 to 99 cm)
Runoff: very slow
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: occasional

Characteristics of Salchaket Soil

Position on landscape: flood plains
Slope range: 0 to 3 percent
Slope features: plane
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: white spruce, paper birch, quaking aspen, and alder

Typical profile:
*0 to 1 inch (0 to 3 cm)—very dark grayish brown very fine sandy loam
*1 to 20 inches (3 to 51 cm)—brown stratified silt, very fine sandy loam, and very fine sand
*20 to 22 inches (51 to 56 cm)—dark brown and black silt loam
*22 to 44 inches (56 to 112 cm)—dark grayish brown stratified silt loam and very fine sandy loam
*44 to 60 inches (112 to 152 cm)—dark grayish brown very gravelly sand

Drainage class: well drained
Permeability: above the very gravelly sand—moderate; below this—rapid
Available water capacity: high
Depth to sand and gravel: greater than 40 inches (greater than 102 cm)
Runoff: very slow
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: rare

Included Areas

*Fubar soils
*soils with water tables within 36 inches (91 cm)
*soils that have permafrost and a perched water table
*abandoned channels and sloughs

Major Uses

Current uses: recreation, wildlife habitat, forestland, homesites, cropland, hayland, and pastureland.

Major Management Factors

Soil-related factors: depth to sand and gravel, flooding, and frost heaving
Elevation: 450 to 1000 feet (137 to 305 m)

Cropland

General management considerations:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.

Suitable management practices:
*Conserve moisture through the use of conservation tillage and conservation cropping sequences.
*Construct grassed waterways in cultivated areas that are subject to overland flow.
*Rotate crops and use conservation tillage to maintain or improve fertility.

Forestland

Jarvis Soil
Major tree species: paper birch and white spruce
Major understory species: prickly rose, highbush cranberry, alder, lowbush cranberry, northern Labrador tea, reedgrass, horsetail, bunchberry dogwood, American twinflower, and feathermoss
Major vegetation type(s): open and closed mixed forest, spruce-birch
Minor vegetation type(s): open and closed needleleaf forest, white spruce
Mean site index for stated species:
*white spruce—80 feet (100 year site curve; *Farr 1967*)
Estimated site index for stated species:
*paper birch—50 feet (at 50 years)
Soil limitation(s) for equipment use: slight
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—firm
*availability of rock for roads—readily
Trees to plant for timber production: white spruce and paper birch.
Seedling mortality: slight.
Windthrow hazard: moderate—shallow rooted trees.

Plant Competition:
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Salchaket Soil
Major tree species: white spruce, paper birch, and quaking aspen
Minor tree species: balsam poplar and black spruce
Major understory species: prickly rose, willow, alder, highbush cranberry, Labrador tea, lowbush cranberry, reedgrass, horsetail, bunchberry dogwood, and feathermoss
Major vegetation type(s): open and closed mixed forest, spruce-birch
Minor vegetation type(s): open and closed needleleaf forest, white spruce; and open broadleaf forest, quaking aspen
Estimated site index for stated species:
*white spruce—73 feet (at 100 years)
*paper birch—49 feet (at 50 years)
Soil limitation(s) for equipment use: slight
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—firm
*availability of rock for roads—readily
Natural regeneration: paper birch and white spruce—readily; quaking aspen, balsam poplar, and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Flooding may limit the choice of homesites.
*Septic tank absorption fields can be expected to perform poorly because of wetness during periods of flooding.
*Cutbanks are not stable and are subject to slumping.
*Local roads and streets are subject to flooding.

Suitable management practices:
*Locate structures above the expected flood level to reduce the risk of flooding.
*Locate septic tank absorption fields on rarely flooded areas.
*Establish gently sloping grades to reduce the risk of caving.
*Add fill to increase the elevation of roads and provide adequate drainage.

125—Pergelic Cryohemists

Composition

Pergelic Cryohemists and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of Pergelic Cryohemists

Position on landscape: alluvial plains
Slope range: 0 to 2 percent
Slope features: plane, concave
Native vegetation: mosses, sedges, and dwarf birch

Reference profile:
*0 to 10 inches (0 to 25 cm)—brown fibrous peat
*10 to 22 inches (25 to 56 cm)—dark brown and brown fibrous peat
*22 to 28 inches (56 to 71 cm)—dark brown moderately decomposed mucky peat
*28 to 38 inches (71 to 97 cm)—perennially frozen dark brown moderately decomposed mucky peat

Drainage class: very poorly drained
Permeability: above the permafrost—assumed to be rapid; below this—impermeable
Available water capacity: low
Runoff: ponded and very slow
Depth to permafrost: 10 to 40 inches (25 to 102 cm)
Depth to perched water table: +6 to 6 inches (+15 to 15 cm)
Hazard of erosion: none
Hazard of flooding: none to rare

Included Areas

*small ponds

Major Uses

Current uses: recreation and wildlife habitat

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, ponding, and lack of drainage outlets
Elevation: 650 to 1000 feet (198 to 305 m)

Forestland

Major tree species: black spruce
Minor tree species: tamarack
Major understory species: Labrador tea, arctic dwarf birch, bog blueberry, lowbush cranberry, cottongrass, horsetail, cloudberry, sphagnum, and feathermoss
Major vegetation type(s): dwarf tree woodland, black spruce
Minor vegetation type(s): open low shrub, mixed shrub-sedge tussock bog
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry due to the presence of permafrost and

associated perched water table, resulting in stunted tree growth and low soil productivity.

126—Pits, gravel

Composition

Gravel pits: 95 percent
Included soils: 5 percent

Position on landscape: flood plains and terraces
Slope range: 0 to 15 percent
*This map unit consists of areas that have been mined for gravel. The material consists of unsorted sands, gravel, and cobbles. The map unit is usually barren, but willows and alders establish in areas that have not been recently mined. Ponds occur where the gravel has been mined below the water table.

127—Riverwash

Composition

Riverwash: 90 percent
Included soils: 10 percent

Position on landscape: flood plains
Slope range: 0 to 3 percent
Hazard of flooding: frequent
*This map unit consists of frequently flooded, unsorted sandy, gravelly, and cobbly alluvial sediments. The configuration and location of these sediments in the flood plains are affected by flooding and can be expected to change. In addition to spring and summer flooding hazard, intense freezing causes a winter flooding hazard. This map unit usually is barren, but some areas may have a sparse growth of willows, alders, or fireweed.

128—Rubble land

Composition

Rubble land: 90 percent
Included soils: 10 percent

Position on landscape: mountainsides
Slope range: 20 to 100 percent
*This map unit consists of fractured schist channers that have been transported downslope by creep. These areas support a sparse scattered cover of lichens, mosses, and small shrubs.

129—Salchaket very fine sandy loam, 0 to 2 percent slopes

Composition

Salchaket and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Salchaket Soil

Position on landscape: flood plains
Slope range: 0 to 2 percent
Slope features: plane
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: white spruce, paper birch, quaking aspen, and alder

Typical profile:
*0 to 1 inch (0 to 3 cm)—very dark grayish brown very fine sandy loam
*1 to 20 inches (3 to 51 cm)—brown stratified silt, very fine sandy loam, and very fine sand
*20 to 22 inches (51 to 56 cm)—dark brown and black silt loam
*22 to 44 inches (56 to 112 cm)—dark grayish brown stratified silt loam and very fine sandy loam
*44 to 60 inches (112 to 152 cm)—dark grayish brown very gravelly sand

Drainage class: well drained
Permeability: above the very gravelly sand—moderate; below this—rapid
Available water capacity: high
Runoff: very slow
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: rare

Included Areas

*Jarvis soils
*soils that have permafrost and a perched water table

Major Uses

Current uses: cropland, hayland, pastureland, homesites, recreation, and wildlife habitat

Major Management Factors

Soil-related factors: flooding and frost heaving
Elevation: 600 to 750 feet (183 to 229 m)

Cropland

General management considerations:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.

Suitable management practices:
*Conserve moisture through the use of conservation tillage and conservation cropping sequences.
*Rotate crops and use conservation tillage to maintain or improve fertility.

Forestland

Major tree species: white spruce, paper birch, and quaking aspen
Minor tree species: balsam poplar and black spruce
Major understory species: prickly rose, willow, alder, highbush cranberry, Labrador tea,

lowbush cranberry, reedgrass, horsetail, bunchberry dogwood, and feathermoss

Major vegetation type(s): open and closed mixed forest, spruce-birch

Minor vegetation type(s): open and closed needleleaf forest, white spruce; and open broadleaf forest, quaking aspen

Estimated site index for stated species:

*white spruce—73 feet (at 100 years)

*paper birch—49 feet (at 50 years)

Soil limitation(s) for equipment use: slight

Surface erosion hazard: slight

Snowpack: occasionally limiting in winter

Suitability of logging systems:

*wheeled and tracked equipment—suitable

*cable yarding—optional

Roads, trails, and landings:

*condition of unsurfaced roads and skid trails when wet—firm

*availability of rock for roads—readily

Natural regeneration: paper birch and white spruce—readily; quaking aspen, balsam poplar, and black spruce—periodically

Trees to plant for timber production: white spruce and paper birch

Seedling mortality: slight

Windthrow hazard: moderate—shallow rooted trees

Plant competition: moderate—high available soil moisture

*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

Management considerations:

*If seed trees are in the stand, reforestation occurs naturally in cutover areas.

*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:

*Flooding may limit the choice of homesites.

*Septic tank absorption fields can be expected to perform poorly because of wetness during periods of flooding.

*Cutbanks are not stable and are subject to slumping.

*Local roads and streets are subject to flooding.

Suitable management practices:

*Locate structures above the expected flood level to reduce the risk of flooding.

*Locate septic tank absorption fields on rarely flooded areas.

*Establish gently sloping grades to reduce the risk of caving.

*Add fill to increase the elevation of roads and provide adequate drainage.

*Consider the depth to which frost penetrates in designing footings and road bases.

130—Saulich peat, 3 to 7 percent slopes

Composition

Saulich and similar inclusions: 90 percent

Contrasting inclusions: 10 percent

Characteristics of Saulich Soil

Position on landscape: toeslopes and alluvial fans

Slope range: 3 to 7 percent
Slope features: plane, concave
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Typical profile:
*8 inches to 0 (20 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 7 inches (5 to 18 cm)—grayish brown silt loam
*7 to 17 inches (18 to 43 cm)—perennially frozen dark grayish brown silt loam

Drainage class: very poorly drained and poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 6 to 19 inches (15 to 48 cm) below the surface of the mineral soil
Runoff: medium
Depth to perched water table: in January through December—6 to 18 inches (15 to 46 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, moderate if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with slopes greater than 7 percent or less than 3 percent
*soils with organic mats greater than 16 inches (greater than 41 cm) thick

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: cropland, hayland, and pastureland

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, wind erosion, and pitting
Elevation: 800 to 1200 feet (244 to 366 m)

Cropland

General management considerations with permafrost:
*This unit is suitable for cropland, hayland, and pastureland only when thawed.
*Clearing and thawing of the soil lowers the water table only if adequate drainage outlets are available and the clearing is large enough to overcome seepage from adjacent uncleared areas.
*Before clearing a permafrost soil, on-site investigation is needed to determine if massive ice features are present, if adequate drainage outlets are available, and the variability of substratum materials.

General management considerations when thawed and drained:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation and frequent late summer frosts may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.

*Differential subsidence may occur after clearing in areas where massive ice features are present, requiring continued land smoothing and maintenance.

Suitable management practices:
*Develop diversions and grassed waterways to improve surface drainage and reduce the risk of water erosion.
*Conserve moisture through the use of conservation tillage, conservation cropping sequences, and contour farming.
*Construct grassed waterways in cultivated areas that are subject to overland flow.
*Rotate crops and use conservation tillage to maintain or improve fertility.
*Plant crops in narrow strips at right angles to the prevailing wind, maintain crop residue on the surface, use conservation tillage, and limit the width of strips of unprotected soil to reduce the risk of wind erosion.
*Cultivate and seed on the contour or across the slope, and maintain crop residue on or near the surface during establishment to reduce the risk of water erosion.

Forestland

Major tree species: black spruce
Minor tree species: paper birch, balsam poplar, and white spruce
Major understory species: Labrador tea, bog blueberry, dwarf arctic birch, resin birch, lowbush cranberry, willow, alder, cottongrass, woodland horsetail, cloudberry, feathermoss, and sphagnum
Major vegetation type(s): open dwarf tree forest, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open low shrub, mixed shrub-sedge tussock bog; and open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

131—Saulich peat, 7 to 12 percent slopes

Composition

Saulich and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of Saulich Soil

Position on landscape: toeslopes and alluvial fans
Slope range: 7 to 12 percent
Slope features: plane, concave
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Typical profile:
*8 inches to 0 (20 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 7 inches (5 to 18 cm)—grayish brown silt loam
*7 to 17 inches (18 to 43 cm)—perennially frozen dark grayish brown silt loam

Drainage class: very poorly drained and poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the

permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 6 to 19 inches (15 to 48 cm) below the surface of the mineral soil
Runoff: medium
Depth to perched water table: in January through December—6 to 18 inches (15 to 46 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, moderate if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with slopes greater than 12 percent
*soils with organic mats greater than 16 inches (greater than 41 cm) thick

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: hayland and pastureland

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, wind erosion, and pitting
Elevation: 800 to 1200 feet (244 to 366 m)

Hayland and Pastureland

General management considerations with permafrost:
*This unit is suitable for hayland and pastureland only when thawed.
*Clearing and thawing of the soil lowers the water table only if adequate drainage outlets are available and the clearing is large enough to overcome seepage from adjacent uncleared areas.
*Before clearing a permafrost soil, on-site investigation is needed to determine if massive ice features are present, if adequate drainage outlets are available, and the variability of substratum materials.

General management considerations when thawed and drained:
*Crops suitable for planting are climatically adapted hay and pasture grasses and legumes.
*Limited late spring precipitation and frequent late summer frosts may reduce crop yields
*Crops respond well to fertilizer applications if precipitation is adequate.
*Differential subsidence may occur after clearing in areas where massive ice features are present, requiring continued land smoothing and maintenance.

Suitable management practices:
*Reduce the risk of water erosion by seeding on the contour or across the slope during establishment.

Forestland

Major tree species: black spruce
Minor tree species: paper birch, balsam poplar, and white spruce
Major understory species: Labrador tea, bog blueberry, dwarf arctic birch, resin birch, lowbush cranberry, willow, alder, cottongrass, woodland horsetail, cloudberry, feathermoss, and sphagnum
Major vegetation type(s): open dwarf tree forest, black spruce; and needleleaf woodland

and open needleleaf forest, black spruce
Minor vegetation type(s): open low shrub, mixed shrub-sedge tussock bog; and open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen due to the presence of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

132—Saulich peat, 12 to 20 percent slopes

Composition

Saulich and similar inclusions: 90 percent
Contrasting inclusions: 10 percent

Characteristics of Saulich Soil

Position on landscape: toeslopes and alluvial fans
Slope range: 12 to 20 percent
Slope features: plane, concave
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Typical profile:
*8 inches to 0 (20 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark brown silt loam
*2 to 7 inches (5 to 18 cm)—grayish brown silt loam
*7 to 17 inches (18 to 43 cm)—perennially frozen dark grayish brown silt loam

Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 6 to 19 inches (15 to 48 cm) below the surface of the mineral soil
Runoff: rapid
Depth to perched water table: in January through December—6 to 18 inches (15 to 46 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with slopes greater than 20 percent
*soils with organic mats greater than 16 inches (greater than 41 cm) thick

Major Uses

Current uses: recreation and wildlife habitat

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, and slope

Elevation: 800 to 1200 feet (244 to 366 m)

Forestland

Major tree species: black spruce
Minor tree species: paper birch, balsam poplar, and white spruce
Major understory species: Labrador tea, bog blueberry, dwarf arctic birch, resin birch, lowbush cranberry, willow, alder, cottongrass, woodland horsetail, cloudberry, feathermoss, and sphagnum
Major vegetation type(s): open dwarf tree scrub, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open low shrub, mixed shrub-sedge tussock bog; and open mixed forest, spruce-birch
Site index and growth of principal trees: not estimated
General management considerations:
*This map unit has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

133—Saulich-Fairbanks complex, 3 to 12 percent slopes

Composition

Saulich and similar inclusions: 60 percent
Fairbanks and similar inclusions: 35 percent
Contrasting inclusions: 5 percent

Characteristics of Saulich Soil

Position on landscape: interfluves on south-facing footslopes
Slope range: 3 to 12 percent
Slope features: plane, convex
Organic mat on surface: 8 to 16 inches (20 to 41 cm) thick
Native vegetation: mosses, sedges, willow, dwarf birch, black spruce, and Labrador tea

Typical profile:
*8 inches to 0 (20 cm to 0)—peat
*0 to 2 inches (0 to 5 cm)—very dark grayish brown mucky silt loam
*2 to 7 inches (5 to 18 cm)—grayish brown silt loam
*7 to 17 inches (18 to 43 cm)—perennially frozen dark grayish brown silt loam

Drainage class: very poorly drained and poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Available water capacity: low
Depth to permafrost: 6 to 19 inches (15 to 48 cm) below the surface of the mineral soil
Runoff: medium
Depth to perched water table: in January through December—6 to 18 inches (15 to 46 cm) below the surface of the mineral soil
Hazard of erosion: by water—none if organic mat is not removed, moderate if the organic mat is removed; by wind—none if the organic mat is not removed, none to severe if the mat is removed
Hazard of flooding: none

Characteristics of Fairbanks Soil

Position on landscape: interfluves on south-facing footslopes
Slope range: 3 to 12 percent
Slope features: convex to concave
Organic mat on surface: 2 to 6 inches (5 to 15 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 5 inches (5 to 13 cm)—brown to dark brown silt loam
*5 to 15 inches (13 to 38 cm)—dark yellowish brown silt loam
*15 to 60 inches (38 to 152 cm)—dark grayish brown silt loam

Drainage class: well drained
Permeability: moderate
Available water capacity: high
Runoff: medium
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with slopes greater than 12 percent
*soils with fractured schist bedrock within 40 to 60 inches (102 to 152 cm)
*Steese soils

Major Uses

Current uses: recreation and wildlife habitat
Potential uses: forestland, hayland, pastureland, and homesites

Major Management Factors

Soil-related factors: slope, low fertility, depth to permafrost, depth to perched water table, wind erosion, and pitting
Elevation: 900 to 1100 feet (274 to 335 m)

Hayland and Pastureland

General management considerations:
*Clearing and thawing of the Saulich component of this unit results in lowering the water table only if adequate drainage outlets are available and the clearing is large enough to overcome seepage from adjacent uncleared areas.
*Before clearing, on-site investigation of the Saulich component is needed to determine if massive ice features are present, if adequate drainage outlets are available, and the variability of substratum materials.
*Differential subsidence may occur after clearing in areas where massive ice features are present, requiring continued land smoothing and maintenance.
*Crops suitable for planting are improved pasture and hay.
*Limited late spring precipitation may reduce yields.
*Crops respond well to fertilizer applications if precipitation is adequate

Suitable management practices:
*Prepare seedbeds on the contour or across the slope where practical.

Forestland

Saulich Soil

Major tree species: black spruce
Minor tree species: paper birch, balsam poplar, and white spruce
Major understory species: Labrador tea, resin birch, dwarf arctic birch, bog blueberry, willow, American green alder, lowbush cranberry, cottongrass, woodland horsetail, cloudberry, feathermoss, sphagnum, starmoss, and lichen
Major vegetation type(s): open dwarf tree forest, black spruce; and needleleaf woodland and open needleleaf forest, black spruce
Minor vegetation type(s): open mixed forest, spruce-birch; and open low shrub, mixed shrub-sedge tussock bog
Site index and growth of principal trees: not estimated
General management considerations:
*The Saulich soil has low potential for forestry while frozen because of permafrost and associated perched water table, resulting in stunted tree growth and low soil productivity.

Fairbanks Soil

Major tree species: paper birch, white spruce, and quaking aspen
Minor tree species: black spruce
Major understory species: prickly rose, lowbush cranberry, currant, American green alder, horsetail, bunchberry dogwood, reedgrass, and feathermoss
Major vegetation type(s): open and closed mixed forest, spruce-birch; and closed broadleaf forest, paper birch
Minor vegetation type(s): open and closed broadleaf forest, aspen; and open and closed broadleaf forest, birch-aspen
Estimated site index for stated species:
*white spruce—88 feet (at 100 years)
*paper birch—62 feet (at 50 years)
*quaking aspen—59 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Due to the high risk of differential subsidence from melt of buried massive ice, extensive on-site investigation is required before planning any development.

134—Steese silt loam, 7 to 12 percent slopes

Composition

Steese and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Steese Soil

Position on landscape: hillsides, mountainsides, and ridgetops
Slope range: 7 to 12 percent
Slope features: convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark yellowish brown silt loam
*2 to 10 inches (5 to 25 cm)— yellowish brown silt loam
*10 to 26 inches (25 to 66 cm)—dark yellowish brown silt loam
*26 to 32 inches (66 to 81 cm)—light olive brown very channery silt loam
*32 inches (81 cm)—fractured schist bedrock

Drainage class: well drained
Permeability: moderate
Available water capacity: moderate
Depth to fractured schist bedrock: 20 to 40 inches (51 to 102 cm)
Runoff: medium
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with fractured schist bedrock at a depth of less than 20 inches (less than 51 cm)
*soils that have permafrost
*soils that have slopes greater than 12 percent

Major Uses

Current uses: recreation, wildlife habitat, and homesites
Potential uses: forestry

Major Management Factors

Soil-related factors: depth to fractured schist bedrock, slope, and frost heaving
Elevation: 1000 to 1400 feet (305 to 427 m)

Forestland

Major tree species: paper birch, quaking aspen, and white spruce
Minor tree species: black spruce
Major understory species: northern Labrador tea, lowbush cranberry, American green alder, bog blueberry, prickly rose, willow, clubmoss, northern comandra, American twinflower, feathermoss, starmoss, and lichen
Major vegetation type(s): open and closed broadleaf forest, birch-aspen; and open mixed forest, spruce-birch
Minor vegetation type(s): open needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—78 feet (at 100 years)
*paper birch—51 feet (at 50 years)
*quaking aspen—43 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*The fractured bedrock is rippable and does not seriously limit most construction.
*Excavation increases the risk of water erosion and can expose soil material that is highly susceptible to wind erosion.
*Local roads and streets may require a special base to prevent frost heave damage.
*Septic systems will function poorly because of the limited depth to fractured schist bedrock.
*Cut slopes generally are stable, but slumping can occur where the bedrock is highly fractured or where rock layers are parallel to the slope.

Suitable management practices:
*Design and construct buildings and access roads to compensate for steep slopes.
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Consider the depth to which frost penetrates in designing road bases.
*Modify septic tank absorption fields to compensate for the limited depth to fractured schist

bedrock.

135—Steese silt loam, 12 to 45 percent slopes

Composition

Steese and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Steese Soil

Position on landscape: hillsides and mountainsides
Slope range: 12 to 45 percent
Slope features: convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark yellowish brown silt loam
*2 to 10 inches (5 to 25 cm)—yellowish brown silt loam
*10 to 26 inches (25 to 66 cm)—dark yellowish brown silt loam
*26 to 32 inches (66 to 81 cm)—light olive brown very channery silt loam
*32 inches (81 cm)—fractured schist bedrock

Drainage class: well drained
Permeability: moderate
Available water capacity: moderate
Depth to fractured schist bedrock: 20 to 40 inches (51 to 102 cm)
Runoff: rapid
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils with fractured schist bedrock at a depth of less than 20 inches (less than 51 cm)
*soils that have permafrost

Major Uses

Current uses: recreation, wildlife habitat, and homesites
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to fractured schist bedrock, slope, and frost heaving
Elevation: 1000 to 1400 feet (305 to 427 m)

Forestland

Major tree species: paper birch, quaking aspen, and white spruce
Minor tree species black spruce
Major understory species: northern Labrador tea, lowbush cranberry, American green alder,

bog blueberry, prickly rose, willow, clubmoss, northern comandra, American twinflower, feathermoss, starmoss, and lichen

Major vegetation type(s): open and closed broadleaf forest, birch-aspen; and open mixed forest, spruce-birch

Minor vegetation type(s): open needleleaf forest, black spruce-white spruce

Estimated site index for stated species:

*white spruce—78 feet (at 100 years)

*paper birch—51 feet (at 50 years)

*quaking aspen—43 feet (at 50 years)

Soil limitation(s) for equipment use: moderate—steepness of slope, muddy conditions caused by seasonal soil wetness; severe on slopes greater than 35 percent

*Using wheeled and tracked equipment when the soil is wet produces ruts and increases compaction.

Surface erosion hazard: moderate—steepness of slope, soil texture; severe on slopes greater than 35 percent

*Reduce erosion and sedimentation by avoiding excessive soil disturbance; installing water bars and culverts; and seeding cuts and fills and abandoned roads, trails, and landings.

*Soil erosion and compaction increase if yarding and skid trails converge.

Snowpack: occasionally limiting in winter

Suitability of logging systems:

*wheeled and tracked equipment—suitable on slopes less than 35 percent; unsafe, excessive soil damage, and erosion on slopes greater than 35 percent

*cable yarding—suitable

Roads, trails, and landings:

*condition of unsurfaced roads and skid trails when wet—soft, slippery

*availability of rock for roads—not readily

Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically

Trees to plant for timber production: white spruce and paper birch

Seedling mortality: slight

Windthrow hazard: moderate—shallow rooted trees

Plant competition: moderate—high available soil moisture

*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

Management considerations:

*If seed trees are in the stand, reforestation occurs naturally in cutover areas.

*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:

*The fractured bedrock is rippable and does not seriously limit most construction.

*Excavation increases the risk of water erosion and can expose soil material that is highly susceptible to wind erosion.

*Local roads and streets may require a special base to prevent frost heave damage.

*Septic systems will function poorly because of the limited depth to fractured schist bedrock and steep slopes.

*Cut slopes generally are stable, but slumping can occur where the bedrock is highly fractured or where rock layers are parallel to the slope.

Suitable management practices:

*Design and construct buildings and access roads to compensate for steep slopes.

*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.

*Consider the depth to which frost penetrates in designing road bases.

*Modify septic tank absorption fields to compensate for the limited depth to fractured schist bedrock.
*Alter slopes by cutting and filling or install septic absorption fields in adjacent areas that are less sloping.
*Locate roads in more gently sloping areas and design drainage systems to minimize the risk of slumping.

136—Steese-Gilmore complex, 10 to 45 percent slopes

Composition

Steese and similar inclusions: 50 percent
Gilmore and similar inclusions: 40 percent
Contrasting inclusions: 10 percent

Characteristics of Steese Soil

Position on landscape: hillsides and mountainsides
Slope range: 10 to 45 percent
Slope features: plane, convex
Organic mat on surface: 1 to 9 inches (3 to 23 cm) thick
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark yellowish brown silt loam
*2 to 10 inches (5 to 25 cm)—yellowish brown silt loam
*10 to 26 inches (25 to 66 cm)—dark yellowish brown silt loam
*26 to 32 inches (66 to 81 cm)—light olive brown very channery silt loam
*32 inches (81 cm)—fractured schist bedrock

Drainage class: well drained
Permeability: moderate
Available water capacity: moderate
Depth to fractured schist bedrock: 20 to 40 inches (51 to 102 cm)
Runoff: rapid and very rapid
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Gilmore Soil

Position on landscape: ridgetops and south-facing hillsides and mountainsides
Slope range: 10 to 45 percent
Slope features: plane, convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm)
Native vegetation: white spruce, paper birch, and quaking aspen

Typical profile:
*0 to 2 inches (0 to 5 cm)—dark brown silt loam
*2 to 9 inches (5 to 23 cm)—dark yellowish brown silt loam
*9 to 17 inches (23 to 43 cm)—light olive brown very channery silt loam
*17 inches (43 cm)—weathered fractured schist bedrock

Drainage class: well drained
Permeability: above the fractured schist bedrock—moderate
Available water capacity: low
Depth to skeletal material: 4 to 16 inches (10 to 41 cm)
Depth to fractured schist bedrock: 5 to 20 inches (13 to 51 cm)
Runoff: rapid
Depth to water table: greater than 60 inches (greater than 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Included Areas

*soils that have fractured schist bedrock at a depth of less than 5 inches (less than 13 cm)

Major Uses

Current uses: recreation, wildlife habitat, and homesites
Potential uses: forestland

Major Management Factors

Soil-related factors: depth to bedrock, slope, frost heaving, and restricted permeability
Elevation: 750 to 1600 feet (229 to 488 m)

Forestland

Steese Soil
Major tree species: paper birch, quaking aspen, and white spruce
Minor tree species: black spruce
Major understory species: northern Labrador tea, lowbush cranberry, American green alder, bog blueberry, prickly rose, willow, clubmoss, northern comandra, American twinflower, feathermoss, starmoss, and lichen
Major vegetation type(s): open and closed broadleaf forest, birch-aspen; and open mixed forest, spruce-birch
Minor vegetation type(s): open needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—78 feet (at 100 years)
*paper birch—51 feet (at 50 years)
*quaking aspen—43 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—steepness of slope, muddy conditions caused by seasonal soil wetness; severe on slopes greater than 35 percent
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases soil compaction.
Surface erosion hazard: moderate—steepness of slope, soil texture; severe on slopes greater than 35 percent
*Reduce erosion and sedimentation by avoiding excessive soil disturbance; installing water bars and culverts; and seeding cuts and fills and abandoned roads, trails, and landings.
*Soil erosion and compaction increase if yarding and skid trails converge.
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable on slopes less than 35 percent; unsafe, excessive soil damage, and erosion on slopes greater than 35 percent
*cable yarding—suitable
Roads, trails, and landings:

*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Gilmore Soil

Major tree species: paper birch, quaking aspen, and black spruce
Minor tree species: white spruce
Major understory species: northern Labrador tea, bog blueberry, lowbush cranberry, American green alder, willow, northern comandra, clubmoss, feathermoss, starmoss, and lichen
Major vegetation type(s): closed broadleaf forest, birch-aspen; and open and closed mixed forest, spruce-birch-aspen
Minor vegetation type(s): open and closed needleleaf forest, black spruce-white spruce
Estimated site index for stated species:
*white spruce—68 feet (at 100 years)
*paper birch—38 feet (at 50 years)
*quaking aspen—44 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—steepness of slope, muddy conditions caused by seasonal soil wetness; severe on slopes greater than 35 percent
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases compaction.
Surface erosion hazard: moderate—steepness of slope, soil texture; severe on slopes greater than 35 percent
*Reduce erosion and sedimentation by avoiding excessive soil disturbance; installing water bars and culverts; and seeding cuts and fills and abandoned roads, trails, and landings.
*Soil erosion and compaction increase if yarding and skid trails converge.
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable on slopes less than 35 percent; unsafe, excessive soil damage, and erosion on slopes greater than 35 percent
*cable yarding—suitable
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and quaking aspen—readily; white spruce and black spruce—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: slight
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*The fractured bedrock is rippable and does not seriously limit most construction.
*Excavation increases the risk of water erosion and can expose soil material that is highly susceptible to wind erosion.
*Local roads and streets may require a special base to prevent frost heave damage.
*Septic systems will function poorly because of the limited depth to fractured schist bedrock and steep slopes.
*Cut slopes generally are stable, but slumping can occur where the bedrock is highly fractured or where rock layers are parallel to the slope.

Suitable management practices:
*Revegetate disturbed areas at construction sites as soon as possible to reduce erosion hazard.
*Consider the depth to which frost penetrates in designing road bases.
*Modify septic tank absorption fields to compensate for the limited depth to fractured schist bedrock and restricted permeability.
*Alter slopes by cutting and filling or install septic absorption fields in adjacent areas that are less sloping.
*Locate roads in more gently sloping areas and design drainage systems to minimize the risk of slumping.

137—Tanana silt loam, moderately wet, 0 to 3 percent slopes

Composition

Tanana and similar inclusions: 85 percent
Contrasting inclusions: 15 percent

Characteristics of Tanana Soil

Position on landscape: alluvial plains and outwash plains
Slope range: 0 to 3 percent
Slope features: plane
Organic mat on surface: 4 to 7 inches (10 to 18 cm) thick
Native vegetation: black spruce, white spruce, paper birch, alder, willows, and mosses

Typical profile:
*0 to 4 inches (0 to 10 cm)—very dark brown silt loam
*4 to 18 inches (10 to 46 cm)—dark gray and light olive brown silt loam
*18 to 35 inches (46 to 89 cm)—dark grayish brown and grayish brown silt loam
*35 to 45 inches (89 to 114) cm)—perennially frozen dark grayish brown and grayish brown silt loam

Drainage class: altered—drainage has improved due to disturbance of organic mat
Permeability: above the permafrost—moderate; below this—impermeable
Available water capacity: moderate
Depth to permafrost: 30 to 60 inches (76 to 152 cm)
Runoff: very slow
Depth to perched water table: 30 to 60 inches (76 to 152 cm)
Hazard of erosion: by water—none if organic mat is not removed, slight if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none to rare

Included Areas

*soils with permafrost at a depth of less than 15 inches (less than 38 cm)
*soils with a water table at a depth of less than 30 inches (less than 76 cm)
*soils with organic mats more than 7 inches (more than 18 cm) thick

Major Uses

Current uses: recreation, wildlife habitat, and forestland
Potential uses: when thawed and drained—cropland, hayland, pastureland, and homesites

Major Management Factors

Soil-related factors: depth to permafrost, depth to perched water table, low fertility, substratum properties, frost heaving, and restricted permeability
Elevation: 600 to 700 feet (183 to 213 m)

Cropland

General management considerations with permafrost:
*This unit is suitable for cropland, hayland, and pastureland only when thawed.
*Clearing and thawing of the soil lowers the water table only if adequate drainage outlets are available and the clearing is large enough to overcome seepage from adjacent uncleared areas.
*Before clearing a permafrost soil, on-site investigation is needed to determine if massive ice features are present, if adequate drainage outlets are available, and the variability of substratum materials.

General management considerations when thawed and drained:
*Crops suitable for planting are climatically adapted vegetables, short-season grain varieties, potatoes, and hay.
*Limited late spring precipitation and frequent late summer frosts may reduce crop yields.
*Crops respond well to fertilizer applications if precipitation is adequate.
*Differential subsidence may occur after clearing in areas where massive ice features are present, requiring continued land smoothing and maintenance.

Suitable management practices:
*Conserve moisture through the use of conservation tillage, conservation cropping sequences, and contour farming.
*Rotate crops and use conservation tillage to maintain or improve fertility.

Forestland

Major tree species: white spruce and paper birch
Minor tree species: quaking aspen, balsam poplar, black spruce, and tamarack
Major understory species: northern Labrador tea, bog blueberry, willow, highbush cranberry, lowbush cranberry, horsetail, reedgrass, and feathermoss
Major vegetation type(s): open and closed needleleaf forest, white spruce; and open and closed mixed forest, spruce-birch
Minor vegetation type(s): open and closed needleleaf forest, white spruce-black spruce
Estimated site index for stated species:
*white spruce—79 feet (at 100 years)
*paper birch—53 feet (at 50 years)
Soil limitation(s) for equipment use: moderate—muddy conditions caused by seasonal soil wetness
*Using wheeled and tracked equipment when the soil is wet produces ruts and increases

compaction.
Surface erosion hazard: slight
Snowpack: occasionally limiting in winter
Suitability of logging systems:
*wheeled and tracked equipment—suitable
*cable yarding—optional
Roads, trails, and landings:
*condition of unsurfaced roads and skid trails when wet—soft, slippery
*availability of rock for roads—not readily
Natural regeneration: paper birch and white spruce—readily; quaking aspen, balsam poplar, black spruce, and tamarack—periodically
Trees to plant for timber production: white spruce and paper birch
Seedling mortality: slight
Windthrow hazard: moderate—shallow rooted trees
Plant competition: moderate—high available soil moisture
*Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Management considerations:
*If seed trees are in the stand, reforestation occurs naturally in cutover areas.
*Leaving buffer strips of natural vegetation along major watercourses helps to maintain streambank stability, fish and wildlife habitat, and good water quality.

Building Site Development

General management considerations:
*Excavation is hampered by permafrost.
*Frost action limits construction of access roads, driveways, and buildings.
*Local roads may require a special base to prevent permafrost damage.
*On-site sewage disposal is not recommended on this unit.
*On-site investigation is needed to determine if massive ice features are present and the variability of the substratum.

Suitable management practices:
*Construct buildings on thick gravel pads or pilings to reduce subsidence caused by the melting of permafrost.
*Underlay roads with gravel to minimize frost action.

138—Typic Cryochrepts-Rock outcrop complex, 6 to 35 percent slopes

Composition

Typic Cryochrepts and similar inclusions: 35 percent
Typic Cryochrepts, stony, and similar inclusions: 35 percent
Rock outcrop: 15 percent
Contrasting inclusions: 15 percent

Characteristics of Typic Cryochrepts

Position on the landscape: ridgetops and shoulder slopes of mountains
Slope range: 6 to 35 percent
Slope features: convex
Organic mat on surface: 1 to 6 inches (3 to 15 cm) thick
Native vegetation: willow, mosses, lichens, and dwarf birch

Reference Profile:

*0 to 1 inch (0 to 3 cm)—dark brown gravelly silt loam
*1 to 8 inches (3 to 20 cm)—strong brown extremely channery very fine sandy loam
*8 to 21 inches (20 to 53 cm)—olive brown extremely channery very fine sandy loam
*21 inches (53 cm)—fractured schist bedrock

Drainage class: moderately well and well drained
Permeability: moderate
Available water capacity: low
Depth to skeletal material: 0 to 16 inches (0 to 41 cm)
Depth to fractured schist bedrock: 6 to 40 inches (15 to 102 cm)
Runoff: slow to very rapid
Hazard of erosion: by water—none if organic mat is not removed, slight to severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Typic Cryochrepts, Stony

Position on the landscape: ridgetops and shoulder slopes of mountains
Slope range: 6 to 35 percent
Slope features: convex
Organic mat on surface: 1 to 4 inches (3 to 10 cm) thick
Native vegetation: willow, mosses, lichens, and dwarf birch

Reference profile:
*0 to 6 inches (0 to 15 cm)—dark brown very stony silt loam
*6 to 18 inches (15 to 46 cm)—olive brown extremely channery very fine sandy loam
*18 inches (46 cm)—fractured schist bedrock

Drainage class: moderately well and well drained
Permeability: moderate
Available water capacity: low
Depth to fractured schist bedrock: 6 to 24 inches (15 to 61 cm)
Runoff: slow to very rapid
Hazard of erosion: by water—none if organic mat is not removed, slight to severe if the organic mat is removed; by wind—none if the organic mat is not removed, severe if the mat is removed
Hazard of flooding: none

Characteristics of Rock Outcrop

*Rock outcrop consists of areas of exposed quartz schist or granitic bedrock.

Included Areas

*soils that have permafrost
*soils that are poorly or somewhat poorly drained
*Rubble land

Major Uses

Current uses: recreation and wildlife habitat

Major Management Factors

Soil-related factors: surface stones, slope, depth to fractured schist bedrock, and frost heaving

Elevation: 1300 to 4420 feet (396 to 1347 m)

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, and to help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. Field experience and data collected on soil properties, such as erosion, droughtiness, flooding, and other factors that affect various soil uses and management, 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 woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the suitability 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 the environment in all or part of the survey area. The survey can help planners 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; and to identify areas where bedrock, wetness, or permafrost can cause difficulty in excavation. Health officials, highway officials, engineers, and others may find this survey useful in planning the safe disposal of wastes and locating sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Prepared by Ann Rippy, District Conservationist, Fairbanks, Alaska

Soils with Agricultural Potential

The soils with the highest potential for agricultural development are primarily along rivers above the annual flood plain. Soils with gentle south-facing slopes and good drainage are ideal for annual crops. Steeper slopes may be suitable for hay and pasture, but erosion hazard makes these soils less suitable for annual tillage. Soils, such as Fubar, which are very shallow to sand or gravel will have low moisture holding capacity and may require irrigation to produce acceptable yields. Many soils with permafrost can be productive once cleared and drained. However, permafrost soils must be closely evaluated for wetland characteristics prior to development.

Land Clearing

Most of the soils in the North Star Area are forested. When cleared, many are suitable for pasture and crop production. Harvest of merchantable trees for lumber, house logs, fence posts, and firewood is recommended before clearing. When trees are harvested, 3 to 4 feet (0.9 to 1.2 m) of stump should be left to facilitate clearing with bulldozers.

Permafrost soils should be cleared in late fall, winter, or spring while the soil surface is frozen. Small trees and shrubs can be sheared at ground level by a bulldozer equipped with a shearing blade. If shearing is used where trees are greater than 6 inches (greater than 15 cm) in diameter, stumps and large roots will be difficult to remove. Debris left after clearing is likely to interfere with cultivation for many years. Fall clearing is recommended over spring clearing, as shearing is difficult if there is a heavy snow layer.

Poorly drained, permafrost soils commonly have a thick mat of undecomposed mosses or sedges at the surface. This mat acts as insulation and prevents thawing of the permafrost. Thick vegetation mats can be removed with an angled shearing blade. The blade rolls the vegetation into small windrows, which are left in place to dry. The material will dry slowly if pushed into large berms. The small windrows can usually be burned in place after one or two years of drying.

If soils are not frozen, a bulldozer with a root rake blade works well for removing trees. Large teeth along the bottom of the blade pull up roots during clearing. Fewer roots are left to interfere with tillage and less soil is pushed into berms. Berms should never be pushed into standing green timber. Keeping berms away from wooded areas helps prevent wildfires. All necessary fire permits should be obtained before burning debris.

Fertilizer Requirements

Soils in the North Star Area generally have a low natural fertility. Addition of nitrogen, phosphorus, and potassium are needed to produce high crop yields. Micronutrients, such as sulfur and boron, may also increase yield and quality of crops. Specific fertilizer recommendations based on soil tests are available from the Alaska Cooperative Extension.

Recommended Crops

Crop potential in the survey area is variable due to micro-climatic conditions. Suitable crops include cool season vegetables such as cole crops, lettuce, peas, zucchini, carrots, and potatoes. Strawberries, raspberries, and other small fruits have been grown commercially in the area. Short season grains including oats, rye, and barley will mature most years. The University of Alaska Fairbanks Agricultural and Forestry Experiment Station continues to test new varieties to find early maturing, high yielding cultivars suitable to the climate of Alaska's interior.

Forest Productivity and Management

Prepared by Darrell Kautz, Plant Ecologist, Wasilla, Alaska

The North Star Area is located within the boreal forest zone of Interior Alaska. Approximately 90 percent of the Area is forested. The forest mosaic on well drained uplands, flood plains, and stream terraces consists of pure and mixed stands of white spruce, paper birch, quaking aspen, and balsam poplar. Stunted forests of black spruce, and occasional paper birch and tamarack, are found on lowlands, north-facing hillslopes, toeslopes, and stream terraces—all with shallow permafrost and restricted soil drainage. Where soil and site conditions inhibit tree growth, muskegs, scrub, sedge marshes, grass meadows, and alpine tundra predominate. Herbaceous vegetation and willow scrub develop where forest fires have destroyed the forest canopy.

Much of the forestland in the survey area is incapable of yielding crops of industrial wood because of low productivity due to permafrost and restricted soil drainage. On the more productive soils, excellent stands of pure and mixed white spruce, paper birch, quaking aspen, and balsam poplar support a limited wood products industry in and around Fairbanks. Numerous small sawmills operate on an intermittent basis to produce small timbers, rough-cut lumber, and house logs, mainly from white spruce. One Fairbanks sawmill, operating full-time in 1987, produced 3 million board feet of white spruce lumber, some of which was air-dried and planed (*Alaska Department of Commerce and Economic Development 1988*). Total production in 1987 within 150 miles of Fairbanks was estimated to be about 4.5 million board feet (*Setzer 1989*). In 1988, approximately 500,000 board feet of white spruce logs were exported from the area to Korea (*Sampson 1989*).

Another important wood product is fuel wood. In 1983, about 20,000 cords of fuel wood were harvested in the Fairbanks area. In 1988, fuel wood harvest dropped to about 9,000 cords, partly due to declining prices for fuel oil (*Lee and Fortune 1989*).

The six tree species that occur in the survey area have varying potential for supplying wood products. White spruce provides good lumber for general construction purposes and is preferred for house logs. Paper birch provides quality veneer and small dimension lumber for furniture, cabinets, and finish materials. Quaking aspen and balsam poplar can be used for small dimension lumber as well but are of generally poorer quality than paper birch. White and black spruce and tamarack make good posts and poles. Paper birch and, to a lesser extent, tamarack are the preferred sources of fuel wood, being far superior to other species in terms of heat content. White and black spruce provide adequate fuel wood, while quaking aspen and balsam poplar are low in heat content and tend to generate a large quantity of ashes. All local tree species can be processed for use in particleboard, pulp, and fuel chips.

Forestry-Soils Interpretations

Soil surveys are becoming increasingly more important to land owners and forest managers as they seek ways to improve the productivity and management of their lands, and for planning the most efficient use of forest and wood lot resources. Certain soils have a higher potential productivity; some are more susceptible to erosion during and after harvesting; and others require special efforts to reforest. The forestry section of the soil map unit descriptions contains information describing forest vegetation, forest-soil productivity, and management considerations and limitations. The methods and procedures used by foresters and soil scientists to develop this information are contained in the Natural Resources Conservation Service's "National Forestry Manual, National Soils Handbook," and applicable state supplements. Vegetation type names listed in the map units are based on "The 1986 Revision of the Alaska Vegetation Classification" (*Viereck et al. 1986*). Technical terms used in the type names are defined in the Glossary.

Table 8 summarizes much of the forestry information given in the map unit descriptions and serves as a quick reference for the more important forestry interpretations. Map unit symbols are listed and the *ordination symbol* for each is given. The ordination system is a uniform system that groups and labels soils based on potential productivity and principal soil properties in relation to any hazards or limitations of that soil. All soils having the same ordination symbol have about the same potential productivity and require the same general kinds of forest management.

The first element of the ordination symbol, the *productivity class*, is a number that denotes potential productivity in terms of cubic meters per hectare per year for the indicator species (the major species with the highest productivity listed in the soil map unit). For example, a number 1 would mean the soil has the potential for producing 1 cubic meter of wood per hectare per year (14.3 cubic feet per acre per year) and 2 would mean 2 cubic meters of wood per hectare per year (28.6 cubic feet per acre per year) and so on.

The second element of the symbol, the *subclass*, is a letter that indicates the major kind of soil limitation for forest management or tree growth. 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 *F* indicates restrictions due to the large amount of coarse fragments within the soil profile. The letter *A* indicates few or no limitations or restrictions.

In Table 8, the soils are 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 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 non-compacted, bare soil surface for a 2-to-5-year period following a major ground disturbance. A rating of *slight* indicates that expected soil loss is small and no particular preventive measures are needed under ordinary conditions; *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 down slope. The velocity and volume of runoff increase, as does erosion hazard, as the gradient and length of slope increase. Soils with high amounts of silt and fine sand, low amounts of organic matter, weak structure, and slow permeability are susceptible to erosion problems. Saturated soil conditions, which occur as seasonal frost thaws in late spring, increase erosion hazard. Unusually frequent or intense rainstorms can also increase erosion hazard.

Certain forest management practices can minimize erosion problems. Maintaining adequate soil cover during harvesting and road building, revegetating cut and fill slopes and other disturbances, and promoting rapid reforestation and biomass accumulation reduce the extent and time period of bare soil areas. Developing water management structures along roads and landings concentrates and directs runoff away from disturbed slopes. Avoiding the use of wheeled and tracked equipment on wet or saturated soils minimizes soil compaction and erosion hazard.

Equipment limitation ratings refer to the operability and use of wheeled and tracked equipment for skidding logs during harvesting. *Slight* indicates that equipment use is not normally restricted in kind or time of year 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 a hazard in the use of equipment.

The most obvious limitation to the use of equipment is slope. As slope gradient increases, the operability of wheeled equipment becomes restricted and tracked equipment must be used. Very steep slopes may require the use of more sophisticated harvesting systems. Even on level and gently sloping areas, equipment use may be limited by soil wetness, especially in combination with silty and organic surface textures. Equipment getting stuck in mud and severe soil disturbance contribute to soil compaction and erosion. Other factors that account for equipment limitations include bedrock outcrops; boulders, stones, and cobbles on or below the soil surface; and deep snowpack in winter.

Seedling mortality ratings refer to the probability of death of naturally occurring and planted seedlings as influenced by soil properties. The ratings apply to healthy, dormant seedlings of the indicator species that are naturally established or properly planted; plant competition is not considered. *Slight* indicates that no problem is expected under normal conditions; *moderate* indicates some mortality can be expected and extra precautions are advisable; *severe* indicates that mortality will be high and extra precautions are essential for successful reforestation. Seed source availability and dispersal may be of greater importance to successful reforestation and the composition of the resulting forest than seedling mortality.

Excessive soil wetness due to a high water table or saturated soil conditions is one factor contributing to seedling mortality problems. Seedlings in wet soils may also be susceptible to frost heaving during periods of diurnal freeze-thaw cycles, particularly at higher elevations. Another factor leading to mortality is soil droughtiness due to the low available water capacity of coarse textured soils and soils with high amounts of coarse fragments. Mortality problems associated with dry soil conditions are compounded on convex slope positions such as ridges and shoulder slopes. Shallow or restricted rooting depth due to bedrock, contrasting layers, compact layers, or permafrost also contributes to seedling mortality problems. Special site preparation or reinforcement plantings may be needed on soils with a *moderate* or *severe* seedling mortality hazard.

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 depends largely on the frequency and duration of strong winds; turbulence and wind funneling created by topography, orographic effects, and cutting boundary patterns; and tree heights and density. Restricted rooting depth is the principal reason for increased windthrow hazard. In Alaska, low soil temperatures and soil wetness restrict root growth, and supporting roots of all tree species typically are concentrated in the upper soil horizons. Shallow bedrock also limits rooting depth, although in many instances fractures in bedrock enhance wind firmness by favoring the anchoring of roots.

Because of the shallow rooting characteristics of Alaska trees, *slight* ratings are not used. *Moderate* indicates that an occasional tree may blow down during periods of excessive wetness combined with moderate or strong winds; and *severe* indicates that many trees may be expected to blow down during such periods. Soils with *moderate* and *severe* ratings require more caution in thinning operations; more attention to wind occurrence, direction, and speed when designing timber sales and cuts; and contingency plans calling for periodic salvage of windthrown trees.

Plant competition ratings refer to the likelihood of invasion or growth of understory plants that inhibit reforestation and stand development following logging or other soil disturbances. The rating varies considerably depending on the occurrence and proximity of competitive species. A nearby seed source of the indicator tree species is assumed. 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 consideration of occurrence and competitiveness of understory vegetation from pre-harvest planning through post-harvest clean up in preparation for reforestation. Biological, mechanical or chemical treatments may be needed to retard growth of undesirable plants.

In Table 8, 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 major tree species (*Farr 1967; Gregory and Haack 1965*). Site index applies to fully stocked, even-aged, unmanaged stands found on a particular soil. The most rapid tree growth and greatest yields of a particular tree 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, however, varies from stand to stand and must be measured in the field. The *productivity class*, described previously in relation to the ordination symbol and indicator tree species, is also listed for each common tree in Table 8.

Trees to plant are those native species 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. The most valuable species is listed first, based on present local preference. The choice of trees to use for reforestation, however, varies depending upon the desired product, topographic position of the planting site, and personal preference of the landowner or forest manager. A few non-native tree species, which have been planted in various locations in and around Fairbanks, may someday prove to be valuable for reforestation.

Wildlife Habitat

Wildlife habitat refers to an area that produces the water, food, and cover necessary for survival of a particular wildlife species. Different species require varying amounts of each of these components; the same species may require different amounts of any component in one season versus another. The availability of the required components in a given area determines the productivity of that area as wildlife habitat. Most areas have environmental conditions that allow many species to inhabit it.

Soil, which provides the basic medium for the growth of vegetation, and climate determine the kinds of vegetation that grow. Natural plant communities undergo gradual changes, called succession, starting at a pioneer seral stage progressing to one of maturity or climax. Fire can modify this succession and can, in fact, halt the process and cause it to revert to any of the previous stages depending upon the intensity of the burn.

Openland wildlife inhabit the edge or actual open areas of land. Species in this group include snowshoe hares, fox, coyotes, voles, shrews, and other similar animals. Woodland wildlife prefer scattered to heavily wooded land. This group includes martin, red squirrels, grouse, moose, and wolves. Wetland wildlife species, including waterfowl, beaver, otter, and mink, prefer marshes or other riparian habitats. Rangeland wildlife travel great distances searching for food, or migrate from breeding to wintering grounds. Herbivores, including moose, black and grizzly bears, wolves, and many kinds of birds, forage on brush, grass, forbs, and similar items.

Moose is the most visible of the species present and may also be the most important in economic terms. Moose are browsers, preferring willows, aspen sprouts and shoots, and young birch in the winter. In summer, they graze the grasses, forbs, and aquatic plants that are abundant during that season. Bulls generally migrate to higher elevations for the summer, leaving the cows behind to raise the calves born in early spring. To minimize stress during the winter, both migrate to the lower areas, where there is less snow, for food and shelter.

Black and grizzly bears are omnivorous and feed on grasses, forbs, roots, berries, insects, small animals, and carrion. Black bears are most frequently encountered in forested areas along the Chena, Chatanika, and Tatalina Rivers. Grizzly bears can be found anywhere in the area but prefer higher elevations near timberline.

Upland fur bearing animals present in the Area include wolves, coyotes, fox, lynx, wolverines, and martin. These species are meat eaters but live in or close to aspen, birch, and spruce to be near their prey. Common wetland furbearers include otter, mink, and beaver. Smaller mammals present throughout most of the Area include red squirrels, porcupines, weasels, snowshoe hares, voles, and shrews.

Diverse populations of birds use the survey area, some to nest and others to pass through during their long migration between nesting and wintering grounds. Inhabiting the Area are common raptors including rough-legged hawks, bald eagles, peregrine falcons, great-horned owls, and marsh hawks; wetland birds including sandhill cranes, mallards, Canadian geese, loons, and grebes; common perching birds including ravens, black-billed magpies, white-crowned and tree sparrows, gray jays, black-capped chickadees, robins, Bohemian waxwings, and several species of warblers; and upland game birds including sharp-tailed, ruffed, and spruce grouse that nest in wooded areas.

The many streams and small lakes in the Area support good populations of Arctic grayling, the most common fish in the Interior. Northern pike are in some of the larger lakes and in the slower channels of the Chatanika River. Rainbow trout are stocked and readily caught in some lakes.

Like much of Interior Alaska, the survey area is a haven for many types of biting insects such as mosquitoes, black and white-sock flies, plus other nonbiting flies, ants, and bees. These insects are often pests to humans; however, they are an important source of food for fish, birds, and many omnivorous mammals.

Recreation

Table 9 rates the soils of the survey area according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features such as wetness, slope, texture of the surface layer, and susceptibility to flooding. 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, the ability of the soil to support vegetation, access to water, potential water impoundment sites, and either access to public sewer lines or the capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degrees, for recreational uses by the duration of flooding and the season when it occurs. On-site assessment of the height, duration, intensity, and frequency of flooding is essential in planning recreational facilities.

The degree of soil limitation in Table 9 is expressed as *slight*, *moderate*, or *severe*. *Slight* indicates that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* indicates that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* indicates that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures. This information can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in Table 11, and interpretations for dwellings without basements and for local roads and streets in Table 10.

Camp areas are tracts of land used intensively as sites for tents, trailers, and campers and for outdoor activities that accompany such sites. These areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soils are rated on soil properties that influence the ease of developing camp areas and performance of the areas after development. The soil properties that influence trafficability and promote the growth of vegetation after heavy use are also considered.

Picnic areas are natural or landscaped tracts of land subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The soils are rated on soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation after development. The surface of picnic areas should readily absorb rainfall, remain firm under heavy foot traffic, and not be dusty when dry.

Playgrounds are areas used intensively for baseball, football, or similar activities. These areas require a nearly level soil that is free of stones and that can withstand heavy foot traffic and maintain an adequate cover of vegetation. The soils are rated on soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation. Slope and stoniness are the main concerns in developing playgrounds. The surface of playgrounds should readily absorb rainfall, remain firm under heavy foot traffic, and not be dusty when dry.

Paths and trails are areas used for hiking and horseback riding. These areas should require little or no cutting and filling during site preparation. The soils are rated on soil properties that influence trafficability and erodibility. Paths and trails should remain firm under foot traffic and not be dusty when dry.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in the ratings.

Engineering

This section provides information for planning land uses related to urban development and water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. Ratings ratings are based on observed performance of the soils and the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, evaluating land use alternatives, and planning site investigations prior to design and construction. However, the information has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for on-site 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 this section. Local ordinances and regulations should be considered in planning, site selection, and design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. Depth to a seasonal high water table and the susceptibility of the soil to flooding affect the time of the year excavations can be made. Soil texture and depth to the water table affect the resistance of the excavation walls or banks to sloughing or caving.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for dwellings without basements, dwellings with basements, and small commercial buildings without basements; and are based on soil properties, site features, and observed soil performance. A high water table, flooding, shrinking and swelling, and organic layers can cause movement of footings. A high water table, depth to bedrock or a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, potential for frost action, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, and the available water capacity in the upper 40 inches (102 cm) affect plant growth. Flooding; wetness; slope; stoniness; and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for use, and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for use, and that one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for use, and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches (61 and 183 cm) is evaluated. Most absorption fields in the survey area are below 72 inches (183 cm). Ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones, bedrock, or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. Unsaturated soil material must be located beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments, and utilize compacted, relatively impervious soil material for the floor and sides to minimize seepage and contamination of local ground water. Generally, aerobic lagoons hold the sewage with a depth of 2 to 5 feet (0.6 to 1.5 m).

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer, and generally 1 or 2 feet (0.3 or 0.6 m) of soil material below the surface layer, are excavated to provide material for the embankments. Ratings are based on soil properties, site features, and observed performance of the soils. Slope, permeability, a high water table, depth to bedrock or permafrost, flooding, large stones, and content of organic matter are considered in the ratings.

Excessive seepage resulting from rapid permeability in the soil, or a water table that is high enough to raise the level of sewage in the lagoon, cause a lagoon to function unsatisfactorily and can result in pollution. A high content of organic matter inhibits aerobic activity and also is detrimental to proper functioning of the lagoon. Slope, bedrock, and permafrost can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench and spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil and spread, compacted, and covered daily with a thin layer of soil from a source away from the site. Both types of landfill must be able to bear heavy vehicular traffic, and both involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in Table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, and soil reaction affect trench-type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. On-site investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained off-site, transported to the landfill, and spread over the waste. Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is excavated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments. The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. Soil performance after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed soil performance. The thickness of suitable material is a major consideration. Large stones, a high water table, and slope affect the ease of excavation. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have one or more of the following characteristics: a plasticity index of more than 10, a high shrink-swell potential, many stones, slopes of more than 25 percent, or a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction, and specifications for each use vary widely. In Table 12, only the probability of finding material in suitable quantity in or below the soil is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a *probable* source has a layer of clean sand or gravel, or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an *improbable* source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches (102 cm) of a soil are evaluated for use as topsoil. The reclamation potential of the borrow area is also evaluated.

Toxic material and such properties as soil reaction, available water capacity, and fertility affect plant growth. Rock fragments, slope, a water table, soil texture, and thickness of suitable material affect the ease of excavating, loading, and spreading. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches (102 cm). They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in soluble salt content, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils; loamy soils that are relatively high in clay; soils that have only 20 to 40 inches (51 to 102 cm) of suitable material; soils that have an appreciable amount of gravel, stones, or soluble salts; or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey; have less than 20 inches (less than 51 cm) of suitable material; have a large amount of gravel, stones, or soluble salts; have slopes of more than 15 percent; or have a seasonal high water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features affecting water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

Also listed in this table, are the restrictive features for each soil that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches (152 cm). The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction. The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper on-site investigation is needed to determine these properties.

Soil material in embankments must resist seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table and permeability of the aquifer. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, permafrost, or other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; ice content of permafrost; and the potential for frost action. Depth to bedrock, large stones, slope, and the hazard of cutbanks caving affect excavating and grading and the stability of ditchbanks. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. An irrigation system's design and management are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. Large stones and depth to bedrock affect the construction of a system. Depth of the root zone and soil reaction affect the performance of a system.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. Restricted rooting depth, severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. This data, the estimates of soil and water features in Tables 16 and 18, and the hydric soils criteria in Table 17 are explained on the following pages.

Soil properties are determined by field examination of the soils and 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 delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, laboratory tests of samples from the survey area, and 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 characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Key soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series, Higher Taxa, and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*American Association of State Highway and Transportation Officials 1982*) and the Unified soil classification system (*American Society for Testing and Materials 1988*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than

3 inches in diameter is classified in one of seven groups, from A-1 through A-7, based on grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 based on visual inspection.

Rock fragments larger than 10 inches in diameter, and 3 to 10 inches in diameter, are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

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

The estimates of grain-size distribution, liquid limit, and plasticity index are 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 omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth, and information on other properties of each layer, are given in the series descriptions in this survey.

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

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 °C. In Table 15, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Bulk densities of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems 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 major soil layer, and varies depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests, and for many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, evaluating soil amendments for fertility and stabilization, and determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs primarily due to the interaction of clay minerals with water, and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the kind and amount of clay minerals in the soil and on measurements of similar soils. If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent), and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

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

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. Soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. 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 greater than 35 percent clay or greater than 15 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*.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In Table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects available water capacity, infiltration rate, and tilth, and is a source of nitrogen and other nutrients for crops.

Water Features

Table 16 gives estimates of several important water features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Hydrologic soil groups are groups of soils that, when saturated, have the same runoff potential under similar storm and ground cover conditions. The soil properties that affect the runoff potential are those that influence the minimum rate of infiltration in a bare soil after prolonged wetting and when the soil is not frozen. These properties include depth to a seasonal high water table, intake rate, permeability after prolonged wetting, and depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

In the definitions of the hydrologic soil groups, the infiltration rate is the rate at which water enters the soil at the surface and is controlled by surface conditions. The transmission rate is the rate at which water moves through the soil and is controlled by properties of the soil layers. The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of very 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 or well drained soils that have a moderately fine 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 that have a moderately fine 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 soils that have a permanent high water table and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams or runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur. Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none*, *rare*, *occasional*, or *frequent*. *None* means flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding is nearly 0 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); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is 50 percent in any year). The term *common* includes both frequent and occasional flooding.

Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 to 30 days), and *very long* (more than 30 days). The time of year that flooding is most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Local information about the extent and level of flooding and the relationship of each soil on the landscape to historic floods are also considered. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Table 16 indicates the depth to the seasonal high water table; the kind of water table—perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated.

An *apparent* water table is indicated by the level at which water stands in a freshly dug, unlined borehole after adequate time for adjustments in the surrounding soil.

A *perched* water table is one that is above an unsaturated zone in the soil. The basis for determining that a water table is perched may be general knowledge of the area. The water table proves to be perched if the water level in a borehole is observed to fall when the borehole is extended.

An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Hydric Soils

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and hydrology (*Cowardin et al. 1979, Environmental Laboratory 1987, National Research Council 1995, and 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 which 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" (*Soil Survey Staff 1975 and 1994*) and in the "Soil Survey Manual" (*Soil Survey Division Staff 1993*).

If soils are wet 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 that can be used to make on-site determinations of hydric soils in the North Star Area are specified in "Field Indicators of Hydric Soils in the United States" (*U.S. Department of Agriculture 1996*).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described as deep as necessary to understand the redoximorphic processes. Then, using the completed soil description, 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 one or more of the approved indicators is present.

This survey can be used to locate probable areas of hydric soils. Table 17 indicates the hydric soil status for each map unit. Each dominant soil component as well as each inclusion is rated. The criteria used to rate each soil component and inclusion is also given. This information can help in planning land uses; however, on-site investigation is recommended to determine the hydric soils on a specific site.

Soil Features

Table 18 gives estimates of several important soil features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Depth to bedrock is given if bedrock is within a depth of 60 inches (152 cm). The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Subsidence is the settlement of organic soils or 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. Table 18 shows the expected initial subsidence that usually is a result of drainage, and total subsidence that results from a combination of factors.

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

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a *moderate* potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength; and a *high* potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*Soil Survey Staff 1975*). 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 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders, primarily based on 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 Aquept (*Aqu*, meaning water, 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 Cryaquepts (*Cry*, meaning cold, plus *aquept*, the suborder of the Inceptisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. 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-loamy, mixed Typic Cryaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series, Higher Taxa, and Their Morphology

In this section, each soil series or higher taxa recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each soil series or higher taxa. The detailed description of each soil horizon follows standards in the

"Soil Survey Manual" (*Soil Survey Division Staff 1993*). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (*Soil Survey Staff 1975*). Unless otherwise stated, colors in the descriptions are for moist soil. A pedon, a small three-dimensional area of soil that is typical of the series in the survey area, is described. 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."

Bohica Series

Taxonomic class: coarse-loamy, mixed Typic Cryochrepts
Depth class: very deep (greater than 60 inches or 152 cm)
Drainage class: well drained
Permeability: moderate
Position on landscape: stream terraces
Parent material: fluvial sediments reworked by wind
Slope range: 0 to 7 percent

Typical Pedon

Bohica silt loam—on a 1 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—2 inches to 0 (5 cm to 0); black (10YR 2/1) forest litter; a mixture of silt; many roots; strongly acid (pH 5.3); abrupt smooth boundary

A—0 to 2 inches (0 to 5 cm); dark brown (7.5YR 4/2) silt loam; weak very fine granular structure; very friable, nonsticky and nonplastic; common fine and medium roots; common mica flakes; slightly acid (pH 6.4); clear smooth boundary

Bw—2 to 6 inches (5 to 15 cm); yellowish brown (10YR 4/4) very fine sandy loam; common medium distinct brown (7.5YR 4/4) mottles; weak thin platy structure; very friable, nonsticky and nonplastic; common fine roots; common mica flakes; slightly acid (pH 6.4); clear smooth boundary

BC—6 to 16 inches (15 to 41 cm); gray (10YR 5/1) very fine sandy loam; common medium distinct yellowish brown (10YR 5/4, 5/6) mottles; weak thin platy structure; very friable, nonsticky and nonplastic; few fine roots; common mica flakes; neutral (pH 6.8); gradual smooth boundary

C—16 to 60 (41 to 152 cm); grayish brown (2.5Y 5/2) stratified very fine sandy loam, loamy fine sand, and fine sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; massive; very friable, nonsticky and nonplastic; common mica flakes; neutral (pH 6.8)

Typical Pedon Location

Map unit in which located: 101—Bohica silt loam, 0 to 3 percent slopes
Location in survey area: SE1/4, NW1/4, Sec. 25, T.1N, R.4E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 4 inches (3 to 10 cm)
Depth to sand and gravel: greater than 40 inches (greater than 102 cm)

A horizon:
Color: hue of 7.5YR or 10YR; value moist of 2, 3, 4, or 5; chroma moist of 2, 3, or 4
Texture: silt loam or very fine sandy loam
Reaction: strongly acid to neutral

Bw horizon:
Color: hue of 10YR or 2.5Y; value moist of 3, 4, 5, or 6; chroma moist of 2, 3, 4, 5, or 6
Texture: silt loam or very fine sandy loam Reaction: moderately acid to neutral

BC horizon:
Color: hue of 10YR or 2.5Y; value moist of 3, 4, or 5; chroma moist of 1, 2, 3, or 4
Texture: strata of fine sandy loam, very fine sandy loam, and loamy fine sand
Gravel content: 0 to 70 percent
Reaction: moderately acid to neutral

Ester Series

Taxonomic class: loamy, mixed, acid Histic Pergelic Cryaquepts
Depth class: very shallow and shallow (less than 20 inches or 51 cm) over permafrost
Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral soil above the permafrost—moderate; below this—impermeable
Position on landscape: north-facing mountain and hill slopes
Parent material: micaceous loess over bedrock
Slope range: 7 to 45 percent

Typical Pedon

Ester peat—on a 23 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—10 to 4 inches (25 to 10 cm); peat; slightly decomposed organic matter; clear smooth boundary
Oe—4 inches to 0 (10 cm to 0); black (2.5Y 2/2) mucky peat; moderately decomposed organic matter; many very fine to fine roots; extremely acid (pH 4.2); abrupt smooth boundary
A—0 to 2 inches (0 to 5 cm); very dark brown (7.5YR 2/2) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; few very fine and common medium and coarse roots; 10 percent gravel; very strongly acid (pH 5.0); abrupt smooth boundary
C1—2 to 4 inches (5 to 10 cm); very dark brown (10YR 2/2) channery silt loam; massive; friable, nonsticky and nonplastic; 25 percent gravel and 5 percent cobbles; strongly acid (pH 5.5); abrupt smooth boundary
C2f—4 to 12 inches (10 to 30 cm); perennially frozen very dark brown (10YR 2/2) channery silt loam; strongly acid (pH 5.5); clear wavy boundary
2Crf—12 inches (30 cm); perennially frozen fractured schist bedrock over consolidated rock

Typical Pedon Location

Map unit in which located: 105—Ester peat, 15 to 45 percent slopes
Location in survey area: SW1/4, NW1/4, Sec. 7, T.2N, R.1W, Fairbanks Meridian

Range in Characteristics

Depth to bedrock: 12 to 20 inches (30 to 51 cm) below the mineral soil surface
Thickness of the organic mat: 8 to 16 inches (20 to 41 cm)
Depth to permafrost: 2 to 14 inches (5 to 36 cm) below the mineral surface

A horizon:
Color: hue of 7.5YR or 10YR; value moist of 2 or 3; chroma moist of 1 or 2
Texture: silt loam or very fine sandy loam

Rock fragments: 0 to 25 percent
Reaction: very strongly acid to strongly acid

B horizon:
Color: hue of 10YR or 2.5Y; value moist of 3 or 4; chroma moist of 2, 3, or 4
Texture: silt loam or very fine sandy loam
Rock fragments: 0 to 30 percent
Reaction: strongly acid to moderately acid

C horizon:
Color: hue of 10YR or 2.5Y; value moist of 2, 3, or 4; chroma moist of 2, 3, or 4
Texture: silt loam or very fine sandy loam
Rock fragments: 0 to 70 percent
Gravel content: 0 to 60 percent
Cobble content: 0 to 30 percent
Reaction: strongly acid to slightly acid

Fairbanks Series

Taxonomic class: coarse-silty, mixed Typic Cryochrepts
Depth class: very deep (more than 60 inches or 152 cm)
Drainage class: well drained
Permeability: moderate
Position on landscape: hill and mountain backslopes and footslopes
Parent material: loess
Slope range: 3 to 20 percent

Typical Pedon

Fairbanks silt loam—on a 8 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—3 inches to 1 inch (8 to 3 cm); slightly decomposed forest litter
Oe—1 inch to 0 (3 cm to 0); dark reddish brown (5YR 2/2) moderately decomposed organic matter; many fine and coarse roots; mycelia; abrupt smooth boundary
A—0 to 2 inches (0 to 5 cm); dark brown (7.5YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; very friable, many very fine and fine roots; strongly acid (pH 5.2); clear wavy boundary
E—2 to 5 inches (5 to 13 cm); dark brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; weak thin platy structure; very friable, many very fine and fine roots; moderately acid (pH 6.0); clear wavy boundary
Bw—5 to 15 inches (13 to 38 cm); dark yellowish brown (10YR 4/4) silt loam, yellowish brown (10YR 5/4) dry; few fine distinct dark brown to brown (7.5YR 4/4) mottles; weak thin platy structure; very friable, common fine roots; neutral (pH 6.6); gradual smooth boundary
C1—15 to 25 inches (38 to 64 cm); dark grayish brown (2.5Y 4/2) silt loam, grayish brown (2.5Y 5/2) dry; common fine faint light gray (2.5Y 5/4) mottles; weak medium platy structure; very friable, few fine roots; neutral (pH 6.6); gradual smooth boundary
C2—25 to 60 inches (64 to 152 cm); dark grayish brown (2.5Y 4/2) silt loam, grayish brown (2.5Y 5/2) dry; few fine distinct yellowish brown (10YR 5/8) mottles; massive; very friable, few fine roots; neutral (pH 6.8)

Typical Pedon Location

Map unit in which located: 108—Fairbanks silt loam, 7 to 12 percent slopes

Location in survey area: SW1/4, SE1/4, Sec. 32, T.2N, R.1W, Fairbanks Meridian

Range in Characteristics

Texture: silt loam, very fine sandy loam, or silt
Thickness of organic mat: 2 to 6 inches (5 to 15 cm)
Thickness of solum: 10 to 30 inches (25 to 76 cm)

Cambic horizon:
Thickness: 3 to 16 inches (8 to 41 cm)

A horizon:
Color: hue of 7.5YR or 10YR; value moist of 3 or 4; chroma moist of 2, 3, 4, or 5
Reaction: strongly acid to moderately acid

E horizon:
Color: hue of 10YR or 2.5Y; value moist of 4, 5, or 6; chroma moist of 2, 3, or 4
Reaction: strongly acid to slightly acid

Bw horizon:
Color: hue of 10YR or 2.5Y; value moist of 4 or 5; chroma moist of 2, 3, 4, 5, or 6
Reaction: strongly acid to neutral

C horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 4 or 5; chroma moist of 2, 3, or 4
Reaction: moderately acid to moderately alkaline

Fubar Series

Taxonomic class: sandy-skeletal, mixed Typic Cryofluvents
Depth class: very shallow (less than 10 inches or 25 cm) over sand and gravel
Drainage class: moderately well drained
Permeability: above the sand and gravel—moderate; below this—rapid
Position on landscape: flood plains and stream terraces
Parent material: stratified sand, silt, and gravel alluvium
Slope range: 0 to 7 percent

Typical Pedon

Fubar very fine sandy loam—on a 2 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—2 inches to 0 (5 cm to 0); slightly decomposed leaves, twigs, moss, and lichens; abrupt smooth boundary

A—0 to 6 inches (0 to 15 cm); olive brown (2.5Y 4/4) very fine sandy loam; weak thin platy structure; very friable, nonsticky and nonplastic; many very fine and fine roots; moderately acid (pH 6.0); abrupt wavy boundary

2C—6 to 60 inches (15 to 152 cm); grayish brown (2.5Y 5/2) stratified extremely cobbly sand and silt loam; single grain; loose, nonsticky and nonplastic; 40 percent gravel, 30 percent cobble; slightly acid (pH 6.5)

Typical Pedon Location

Map unit in which located: 123—Jarvis-Fubar complex, 0 to 3 percent slopes
Location in survey area: SW1/4, NW1/4, Sec. 19, T.1N, R.7E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 6 inches (3 to 15 cm)
Depth to sand and gravel: 1 to 8 inches (3 to 20 cm)

A horizon:
Color: hue of 10YR or 2.5Y; value moist of 3, 4, or 5; chroma moist of 2, 3, or 4
Texture: silt loam, fine sandy loam, or very fine sandy loam
Reaction: very strongly acid to slightly acid

2C horizon:
Color: variegated
Texture: sand with strata of silt loam and fine sandy loam
Rock fragments: 35 to 70 percent
Gravel content: 25 to 40 percent
Cobble content: 10 to 30 percent
Reaction: strongly acid to neutral

Gilmore Series

Taxonomic class: loamy-skeletal, mixed shallow Typic Cryochrepts
Depth class: very shallow and shallow (5 to 20 inches or 13 to 51 cm) over fractured bedrock
Drainage class: well drained
Permeability: moderate
Position on landscape: hillsides, mountainsides, and ridges
Slope range: 3 to 45 percent

Typical Pedon

Gilmore silt loam—on a 12 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—1 inch to 0 (3 cm to 0); slightly decomposed roots, leaves, and moss; abrupt smooth boundary
A—0 to 2 inches (0 to 5 cm); dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; strongly acid (pH 5.2); clear smooth boundary
Bw—2 to 9 inches (5 to 23 cm); dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; moderately acid (pH 5.6); clear wavy boundary
2C—9 to 17 inches (23 to 43 cm); light olive brown (2.5Y 5/6) very channery silt loam; massive; moderately acid (pH 6.0); 50 percent schist channers; gradual wavy boundary
2Cr—17 inches (43 cm); weathered fractured schist bedrock

Typical Pedon Location

Map unit in which located: 112—Gilmore silt loam, 12 to 45 percent slopes
Location in survey area: SE1/4, NW1/4, Sec. 1, T.1N, R.4W, Fairbanks Meridian

Range in Characteristics

Depth to skeletal material and solum thickness: 4 to 16 inches (10 to 41 cm)
Depth to unconsolidated bedrock: 5 to 20 inches (13 to 51 cm)
Thickness of the organic mat: 1 to 6 inches (3 to 15 cm)

Cambic horizon:
Thickness: 2 to 15 inches (5 to 38 cm)

A horizon:
Color: hue of 7.5YR or 10YR; value moist of 3, 4, or 5; chroma moist of 2, 3, or 4
Gravel content: 0 to 10 percent
Reaction: strongly acid to slightly acid

Bw horizon:
Color: hue of 7.5YR, 10YR, or 2.5Y; value moist of 3, 4, or 5; chroma moist of 3, 4, 5, or 6
Texture: silt or silt loam
Rock fragments: 0 to 50 percent
Gravel content: 0 to 40 percent
Cobble content: 0 to 10 percent
Reaction: strongly acid to slightly acid

2C horizon:
Color: hue of 10YR or 2.5Y; value moist of 4 or 5; chroma moist of 3, 4, 5, or 6
Rock fragments: 35 to 75 percent
Gravel content: 35 to 65 percent
Cobble content: 0 to 10 percent
Reaction: strongly acid to slightly acid

Goldstream Series

Taxonomic class: loamy, mixed, acid Histic Pergelic Cryaquepts
Depth class: very shallow and shallow (less than 20 inches or 51 cm) over permafrost
Drainage class: very poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral layers above the permafrost—moderate; below this—impermeable
Position on landscape: alluvial plains and toeslopes
Parent material: silty alluvium and colluvium
Slope range: 0 to 7 percent

Typical Pedon

Goldstream peat—on a 2 percent slope under shrub vegetation (all colors are for moist soils unless indicated)

Oi—13 to 8 inches (33 to 20 cm); peat; slightly decomposed mosses, sedges, and roots
Oe—8 inches to 0 (20 cm to 0); mucky peat; partially decomposed mosses, sedges, and roots
A—0 to 6 inches (0 to 15 cm); very dark grayish brown (2.5Y 3/2) mucky silt loam; massive; very friable, nonsticky and nonplastic; many very fine roots; very strongly acid (pH 5.0); gradual wavy boundary
Cg—6 to 13 inches (15 to 33 cm); mixed dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) silt loam; common medium distinct reddish brown (5YR 4/4) mottles; massive; very friable, nonsticky and nonplastic; strongly acid (pH 5.4); abrupt wavy boundary
Cgf—13 to 23 inches (33 to 58 cm); perennially frozen dark gray (10YR 4/1) silt loam; strongly acid (pH 5.4)

Typical Pedon Location

Map unit in which located: 117—Goldstream-Pergelic Cryohemists complex, 0 to 2 percent

slopes
Location in survey area: SW1/4, SE1/4, Sec. 15, T.3N, R.1W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 8 to 14 inches (20 to 36 cm)
Depth to permafrost from the surface of the mineral soil: 4 to 13 inches (10 to 33 cm) below the mineral surface
Reaction: extremely acid in the organic layers and very strongly acid to strongly acid in the mineral horizons

A horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 2, 3, or 4; chroma moist of 1, 2, or 3

Cg horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 3, 4, or 5; chroma moist of 1 or 2

Histic Pergelic Cryaquepts

Taxonomic class: Histic Pergelic Cryaquepts
Depth class: very shallow to shallow (less than 20 inches or 51 cm) over permafrost
Drainage class: very poorly and poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral layers above the permafrost—moderate; below this—impermeable
Position on landscape: north-facing mountain and hill slopes, alluvial fans, and flood plains
Parent material: loess overlying bedrock, colluvium, or alluvium
Slope range: 1 to 45 percent

Typical Pedon

Histic Pergelic Cryaquepts—on a 20 percent slope under shrub vegetation (all colors are for moist soils unless indicated)

Oi—13 to 10 inches (33 to 25 cm); peat, mat of slightly decomposed organic matter; very strongly acid (pH 5.0); clear wavy boundary
Oe—10 inches to 0 (25 cm to 0); mucky peat, moderately decomposed organic matter; strongly acid (pH 5.2); abrupt wavy boundary
C—0 to 5 inches (0 to 13 cm); dark brown (10YR 3/3) gravelly silt loam, gravel is angular schist fragments; massive; very friable, nonsticky and nonplastic; many very fine and common fine roots; strongly acid (pH 5.3); abrupt wavy boundary
Cf—5 to 15 inches (13 to 38 cm); perennially frozen dark brown (10YR 3/3) gravelly silt loam, gravel is angular schist fragments

Typical Pedon Location

Map unit in which located: 118—Histic Pergelic Cryaquepts, fans, 1 to 20 percent slopes
Location in survey area: NE1/4, SW1/4, Sec. 23, T.4N, R.7E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 8 to 16 inches (20 to 41 cm)
Depth to permafrost: 0 to 17 inches (0 to 43 cm) from the mineral soil surface
Depth to sand and gravel: 10 to greater than 60 inches (25 to greater than 152 cm)

Thickness of bedrock: 12 to greater than 60 inches (30 to greater than 152 cm)

O horizon:
Color: hue of 5YR, 7.5YR, or 10YR; value moist of 2, 3, 4, or 5; chroma moist of 1, 2, 3, 4, 5, or 6
Reaction: extremely acid to strongly acid

A horizon (when present):
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 2, 3, or 4; chroma moist of 1, 2, or 3
Reaction: very strongly acid to moderately acid

C horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 2, 3, 4, or 5; chroma moist of 1, 2, 3, or 4
Texture: silt loam, very fine sandy loam, sandy loam, medium sand, or sand
Rock fragments: 0 to 80 percent
Reaction: strongly acid to slightly acid

Perennially frozen substratum materials within 60 inches (152 cm) vary widely from bedrock to colluvial and alluvial deposits of silt loam, very fine sandy loam, fine sandy loam, and gravel.

Jarvis Series

Taxonomic class: coarse-loamy over sandy or sandy skeletal, mixed, nonacid Typic Cryofluvents
Depth class: shallow and moderately deep (10 to 40 inches or 25 to 102 cm) over sand and gravel
Drainage class: well drained
Permeability: above the sand and gravel—moderate; below this—rapid
Position on landscape: flood plains
Parent material: stratified alluvium over sand and gravel
Slope range: 0 to 3 percent

Typical Pedon

Jarvis very fine sandy loam—on a 3 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—2 inches to 0 (5 cm to 0); slightly decomposed leaves, twigs, and moss; clear smooth boundary
A—0 to 2 inches (0 to 5 cm); very dark grayish brown (10YR 3/2) very fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many fine and medium roots; slightly acid (pH 6.5); clear smooth boundary
C1—2 to 8 inches (5 to 20 cm); dark grayish brown (10YR 4/2) very fine sandy loam; few medium distinct brown (7.5YR 4/4) mottles; massive; very friable, nonsticky and nonplastic; common fine roots; neutral (pH 6.8); clear smooth boundary
C2—8 to 18 inches (20 to 46 cm); variegated strata of fine sandy loam and silt; massive; very friable, nonsticky and nonplastic; few fine roots; neutral (pH 6.8); clear smooth boundary
2C3—18 to 60 inches (46 to 152 cm); variegated very gravelly sand; single grain; very friable, nonsticky and nonplastic; 40 percent gravel; 10 percent cobble; neutral (pH 6.8)

Typical Pedon Location

Map unit in which located: 124—Jarvis-Salchaket complex, 0 to 3 percent slopes

Location in survey area: NE1/4, NE1/4, Sec. 27, T.1N, R.5E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 7 inches (3 to 18 cm)
Depth to sand and gravel: 10 to 39 inches (25 to 99 cm)

A horizon:
Color: hue of 7.5YR or 10YR; value moist of 2, 3, 4, or 5; chroma moist of 2, 3, or 4
Texture: very fine sandy loam, fine sandy loam, or silt loam
Reaction: strongly acid to slightly acid

C horizon:
Color: hue of 10YR or 2.5Y; value moist of 3, 4, 5, or 6; chroma moist of 2, 3, or 4
Texture: silt loam or very fine sandy loam in the upper horizons with stratified very fine sandy loam, fine sandy loam, loamy fine sand, sand, very fine sand, and silt loam below
Reaction: very strongly acid to neutral

2C horizon:
Color: variegated
Texture: sand or coarse sand
Rock fragments: 35 to 75 percent
Cobble content: 0 to 20 percent
Reaction: moderately acid to neutral

Pergelic Cryohemists

Taxonomic class: Pergelic Cryohemists
Depth class: shallow and moderately deep (10 to 40 inches or 25 to 102 cm) over permafrost
Drainage class: very poorly drained
Permeability: above the permafrost—assumed to be rapid; below this—impermeable
Position on landscape: alluvial plains
Parent material: mosses and sedges
Slope range: 0 to 2 percent

Reference Pedon

Pergelic Cryohemists—on a nearly level slope on a broad alluvial plain (all colors are for moist soils unless indicated)

Oi1—0 to 10 inches (0 to 25 cm); brown (7.5YR 5/4) fibrous peat; identifiable plant parts; upper part has living moss and roots; strongly acid (pH 5.2); gradual wavy boundary
Oi2—10 to 22 inches (25 to 56 cm); dark brown (7.5YR 3/2) and brown (7.5YR 4/4) fibrous peat; strongly acid (pH 5.2); gradual wavy boundary
Oe—22 to 28 inches (56 to 71 cm); dark brown (7.5YR 3/2) moderately decomposed mucky peat; strongly acid (pH 5.4); clear wavy boundary
Oef—28 to 38 inches (71 to 97 cm); perennially frozen dark brown (7.5YR 3/2) moderately decomposed mucky peat; strongly acid (pH 5.4)

Reference Pedon Location

Map unit in which located: 117—Goldstream-Pergelic Cryohemists complex, 0 to 2 percent slopes
Location in survey area: NW1/4, SW1/4, Sec. 31, T. 3N, R. 2W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 16 to 60 inches (41 to 152 cm)
Depth to permafrost: 10 to 40 inches (25 to 102 cm) from the surface of the organic material; reaction—extremely acid to moderately acid

Oi horizon:
Color: hue of 7.5YR or 10YR; value moist of 2, 3, 4, or 5; chroma moist of 4, 5, or 6

Oe horizon:
Color: hue from 7.5YR to 5Y; value moist of 2, 3, or 4; chroma moist of 2, 3, or 4

Salchaket Series

Taxonomic class: coarse-loamy, mixed, nonacid Typic Cryofluvents
Depth class: deep (40 to 60 inches or 102 to 152 cm) over sand and gravel
Drainage class: well drained
Permeability: above the sand and gravel—moderate; below this—rapid
Position on landscape: flood plains
Parent material: stratified silty and sandy alluvium
Slope range: 0 to 3 percent

Typical Pedon

Salchaket very fine sandy loam—on a 1 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—1 inch to 0 (3 cm to 0); slightly decomposed leaves, twigs, and moss
A—0 to 1 inch (0 to 3 cm); very dark grayish brown (2.5Y 3/2) very fine sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; moderately acid (pH 5.6); clear smooth boundary
C1—1 to 20 inches (3 to 51 cm); brown (10YR 4/3) stratified silt, very fine sandy loam, and very fine sand; weak thin platy structure; very friable, nonsticky and nonplastic; many very fine and fine roots in the upper part; moderately acid (pH 5.8); abrupt smooth boundary
Ab—20 to 22 inches (51 to 56 cm); dark brown (7.5YR 3/4) and black (10YR 2/1) silt loam; weak thin platy structure; very friable, nonsticky and nonplastic; visible decomposed plant fibers; moderately acid (pH 5.6); clear smooth boundary
C2—22 to 44 inches (56 to 112 cm); dark grayish brown (10YR 4/2) stratified silt loam and very fine sandy loam; weak thin platy structure; very friable, nonsticky and nonplastic; common fine partially decomposed roots in the upper part; moderately acid (pH 5.8) gradual wavy boundary
2C—44 to 60 inches (112 to 152 cm); dark grayish brown (10YR 4/2) very gravelly sand; single grained; loose, nonsticky and nonplastic; slightly acid (pH 6.4)

Typical Pedon Location

Map unit in which located: 124—Jarvis-Salchaket complex, 0 to 3 percent slopes
Location in survey area: NW1/4, NW1/4, Sec. 33, T.1N, R.5E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 2 to 6 inches (5 to 15 cm)
Depth to sand and gravel: greater than 40 inches (greater than 102 cm)

A horizon:

Color: value moist of 2, 3, or 4; chroma moist of 2, 3, or 4
Texture: silt loam or very fine sandy loam
Reaction: very strongly acid to neutral

C horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 3, 4, or 5; chroma moist of 2, 3, or 4
Texture: stratified very fine sandy loam, fine sandy loam, silt loam, loamy fine sand, and fine sand, with variegated sand and gravel below 40 inches (102 cm)
Reaction: moderately acid to neutral

Saulich Series

Taxonomic class: loamy, mixed, nonacid Histic Pergelic Cryaquepts
Depth class: very shallow and shallow (less than 20 inches or 51 cm) over permafrost
Depth class: very poorly drained and poorly drained
Permeability: in the organic mat—moderately rapid; in the mineral layers above the permafrost—moderate; below this—impermeable
Position on landscape: alluvial fans and hillslopes
Parent material: silty alluvium and colluvium
Slope range: 3 to 20 percent

Typical Pedon

Saulich peat—on a 3 percent slope under forest vegetation (all colors are for moist soil unless otherwise indicated)

Oi—8 to 2 inches (20 to 5 cm); slightly decomposed mosses, sedges, and roots
Oe—2 inches to 0 (5 cm to 0); mucky peat, moderately decomposed mosses, sedges, and roots; clear smooth boundary
A—0 to 2 inches (0 to 5 cm); very dark brown (10YR 2/2) silt loam; weak fine granular structure; friable, nonsticky and nonplastic; many fine and very fine roots; strongly acid (pH 5.2); clear smooth boundary
Bg—2 to 7 inches (5 to 18 cm); grayish brown (2.5Y 5/2) silt loam; many medium distinct light olive brown (2.5Y 5/4) mottles; moderate thin platy structure; friable, nonsticky and nonplastic; few fine roots; moderately acid (pH 5.6); gradual smooth boundary
Cgf—7 to 17 inches (18 to 43 cm); perennially frozen dark grayish brown (2.5Y 4/2) silt loam; common small faint very dark grayish brown (2.5Y 3/2) and black (5Y 2.5/1) mottles; moderate thin platy structure; moderately acid (pH 5.6)

Typical Pedon Location

Map unit in which located: 130—Saulich peat, 3 to 7 percent slopes
Location in survey area: SE1/4, NE1/4, Sec. 20, T.1N, R.4E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 8 to 16 inches (20 to 41 cm)
Depth to permafrost: 6 to 19 inches (15 to 48 cm) from the surface of the mineral soil
Reaction: strongly acid in the organic layer and strongly acid to slightly acid in the mineral horizons

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

Bg horizon:

Color: hue of 10YR, 2.5Y, 5Y, or 7.5YR; value moist of 3, 4, or 5; chroma moist of 1, 2, 3, or 4

Cgf horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 3, 4, or 5; chroma moist of 1, 2, 3, or 4
Texture: silt loam or very fine sandy loam

Steese Series

Taxonomic class: coarse-loamy, mixed Typic Cryochrepts
Depth class: moderately deep (20 to 40 inches or 51 to 102 cm) over bedrock
Drainage class: well drained
Permeability: moderate
Position on landscape: hillsides, mountainsides, and ridgetops
Parent material: loess over bedrock
Slope range: 3 to 45 percent

Typical Pedon

Steese silt loam—on a 15 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—2 inches to 0 (5 cm to 0); slightly decomposed roots, twigs, leaves, and moss; abrupt smooth boundary
A—0 to 2 inches (0 to 5 cm); dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; strongly acid (pH 5.2); clear smooth boundary
Bw—2 to 10 inches (5 to 25 cm); yellowish brown (10YR 5/4) silt loam; weak medium blocky structure parting to weak fine granular; very friable, nonsticky and nonplastic; common fine roots; strongly acid (pH 5.4); gradual smooth boundary
BC—10 to 26 inches (25 to 66 cm); dark yellowish brown (10YR 4/4) silt loam; weak thin platy structure; very friable, nonsticky and nonplastic; moderately acid (pH 5.6); clear smooth boundary
2C—26 to 32 inches (66 to 81 cm); light olive brown (2.5Y 5/6) very channery silt loam; massive; very friable, nonsticky and nonplastic; moderately acid (pH 5.8); gradual wavy boundary
2Cr—32 inches (81 cm); fractured schist over consolidated schist bedrock

Typical Pedon Location

Map unit in which located: 114—Gilmore-Steese complex, 3 to 15 percent slopes
Location in survey area: SW1/4, SE1/4, Sec. 30, T.2N, R.2W, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 6 inches (3 to 15 cm)
Depth to unconsolidated bedrock: 20 to 40 inches (51 to 102 cm)
Thickness of solum: 5 to 30 inches (13 to 76 cm)

Cambric horizon:
Thickness: 2 to 20 inches (5 to 51 cm)

A horizon:
Color: hue of 7.5YR or 10YR; value moist of 3 or 4; chroma moist of 2, 3, or 4
Texture: silt loam

Rock fragments: 0 to 20 percent
Reaction: very strongly acid to strongly acid

Bw horizon:
Color: hue of 7.5YR, 10YR, or 2.5Y; value moist of 3, 4, or 5; chroma moist of 2, 3, or 4
Texture: silt loam
Rock fragments: 0 to 30 percent
Gravel content: 0 to 15 percent
Cobble content: 0 to 5 percent
Reaction: strongly acid to slightly acid

C horizon:
Color: hue of 10YR or 2.5Y; value moist of 3, 4, or 5; chroma moist of 2, 3, 4, 5, or 6
Texture: silt loam or very fine sandy loam
Rock fragments: 40 to 65 percent
Gravel content: 30 to 50 percent
Cobble content: 10 to 15 percent
Reaction: strongly acid to slightly acid

Tanana Series

Taxonomic class: loamy, mixed, nonacid Pergelic Cryaquepts
Depth class: moderately deep (20 to 40 inches or 51 to 102 cm) over permafrost
Drainage class: poorly drained; if the organic mat is disturbed, the permafrost level will lower and drainage will improve
Permeability: above the permafrost—moderate; below this—impermeable
Position on landscape: alluvial plains and outwash plains
Parent material: silty loess and alluvium
Slope range: 0 to 3 percent

Typical Pedon

Tanana silt loam—on a level site under forest vegetation (all colors are for moist soils unless indicated)

Oi—3 inches to 0 (8 cm to 0); slightly decomposed mosses and roots; many very fine and fine roots; abrupt smooth boundary
A—0 to 4 inches (0 to 10 cm); very dark brown (10YR 2/2) silt loam; massive; very friable, nonsticky and nonplastic; many very fine and fine roots; strongly acid (pH 5.4); abrupt wavy boundary
Bg—4 to 18 inches (10 to 46 cm); dark gray (N 4/0) and light olive brown (2.5Y 5/4) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; massive structure; very friable, slightly sticky and slightly plastic; common fine and very fine roots; moderately acid (pH 5.6); abrupt wavy boundary
Cg—18 to 35 inches (46 to 89 cm); dark grayish brown (10YR 4/2) and grayish brown (2.5Y 5/2) silt loam; massive; very friable, slightly sticky and slightly plastic; moderately acid (pH 5.6); abrupt smooth boundary
Cgf—35 to 45 inches (89 to 114) cm); perennially frozen dark grayish brown (10YR 4/2) and grayish brown (2.5Y 5/2) silt loam

Typical Pedon Location

Map unit in which located: 137—Tanana silt loam, moderately wet, 0 to 3 percent slopes
Location in survey area: SE1/4, NW1/4, Sec. 16, T.1S, R.4E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 3 to 7 inches (8 to 18 cm)
Depth to permafrost: 20 to 40 inches (51 to 102 cm) typically, lower if the organic surface is disturbed
Thickness of solum: 10 to 24 inches (25 to 61 cm)
Texture: silt loam or very fine sandy loam

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

Bg horizon:
Color: hue of 10YR, 2.5Y, 5Y, or neutral; value moist of 3, 4, or 5; chroma moist of 0, 1, 2, 3, or 4

Cg horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 3, 4, or 5; chroma moist of 1, 2, 3, or 4

Cgf horizon:
Color: hue of 10YR, 2.5Y, or 5Y; value moist of 3, 4, or 5; chroma moist of 1, 2, 3, or 4

Typic Cryochrepts

Taxonomic class: Typic Cryochrepts
Depth class: very shallow to moderately deep (4 to 40 inches or 10 to 102 cm) over fractured bedrock
Drainage class: moderately well and well drained
Permeability: moderate
Position on landscape: ridgetops and south-facing hillsides and mountainsides
Parent material: loess and colluvium over fractured schist bedrock
Slope range: 6 to 45 percent

Reference Pedon

Typic Cryochrepts—on a 25 percent slope under forest vegetation (all colors are for moist soils unless indicated)

Oi—2 inches to 0 (5 cm to 0); slightly and moderately decomposed roots, leaves, mosses, and lichens; abrupt smooth boundary
A—0 to 1 inch (0 to 3 cm); dark brown (10YR 3/3) silt loam; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; very strongly acid (pH 4.8); clear wavy boundary
Bw—1 to 3 inches (3 to 8 cm); dark yellowish brown (10YR 4/6) channery loam; weak fine granular structure; very friable, nonsticky and nonplastic; strongly acid (pH 5.2); gradual wavy boundary
C1—3 to 14 inches (8 to 36 cm); dark yellowish brown (10YR 4/6) extremely channery loam; massive, friable, nonsticky and nonplastic; strongly acid (pH 5.2); diffuse irregular boundary
Cr—14 to 36 inches (36 to 91 cm); quartz schist fractured into channers and flags; interstices are void of soil; diffuse broken boundary

Reference Pedon Location

Map unit in which located: 138—Typic Cryochrepts-Rock outcrop complex, 6 to 35 percent slopes
Location in survey area: SE1/4, SW1/4, Sec. 3, T.3N, R.7E, Fairbanks Meridian

Range in Characteristics

Thickness of the organic mat: 1 to 6 inches (3 to 15 cm)
Depth to fractured schist bedrock: 4 to 40 inches (10 to 102 cm)
Thickness of solum: 5 to 30 inches (13 to 76 cm)

Cambic horizon:
Thickness: 2 to 20 inches (5 to 51 cm)

A horizon:
Color: hue of 7.5YR or 10YR; value moist of 2, 3, 4, or 5; chroma moist of 2, 3, or 4
Texture: silt loam or very fine sandy loam
Rock fragments: 0 to 60 percent
Stone content: 0 to 5 percent
Gravel content: 0 to 50 percent
Cobble content: 0 to 25 percent
Reaction: extremely acid to slightly acid

Bw horizon:
Color: hue of 7.5YR, 10YR, or 2.5Y; value moist of 3, 4, or 5; chroma moist of 2, 3, 4, 5, or 6
Texture: silt loam, loam, or very fine sandy loam
Rock fragments: 0 to 70 percent
Gravel content: 0 to 50 percent
Cobble content: 0 to 30 percent
Reaction: very strongly acid to neutral

C horizon:
Color: hue of 10YR or 2.5Y; value moist of 3, 4, or 5; chroma moist of 2, 3, 4, 5, or 6
Texture: silt loam, loam, or very fine sandy loam
Rock fragments: 0 to 80 percent
Gravel content: 0 to 75 percent
Cobble content: 0 to 50 percent
Reaction: very strongly acid to neutral

Formation of the Soils

Factors of Soil Formation

Soil is a natural, three-dimensional body on the earth's surface that supports plants. It forms through weathering and other processes that act on deposited or accumulated geologic material. The kind of soil that forms depends on the type of parent material; the climate under which soil material has existed since accumulation; the relief, or lay of the land; the plant and animal life in and on the soil; and the length of time that the forces of soil formation have acted on the soil material (*Jenny 1941*). The relative importance of each of these factors differs from place to place; in some areas, one factor is more important, and in other areas another may dominate. A modification or variation in any of the factors results in a different kind of soil.

Climate and living organisms are the active factors of soil formation. They act on parent material and change it to a natural body with definite characteristics. The effects of climate and living organisms are conditioned by relief, which influences surface drainage, the amount of water that percolates through the soil, the rate of erosion, and the kind of vegetation that grows on the soil. The nature of the parent material also affects the kind of soil profile that is formed. Time is needed for the parent material to change into a soil. The development of a distinct soil horizon normally requires a long period of time.

Parent Material and Permafrost

Many of the soils in the North Star Area formed in loess (wind-deposited silty sediment). In Fairbanks and Steese soils, the loess forms a rather thick blanket over weathered bedrock; in Gilmore and Ester soils the loess layer is thin and bedrock occurs near the surface. The thickness of the loess cannot be determined in some permafrost soils, as frozen soil limits the depth at which the soil scientist can observe the soil without the use of special equipment. Goldstream and Saulich soils formed in loess that was transported by water or hillslope processes and redeposited on valley bottoms.

Pergelic Cryohemists, in poorly drained areas, formed entirely in partially decomposed plant parts that accumulated in depressional areas. In these soils, organic matter amassed when wetness and cold temperatures caused it to decompose slowly.

Other soils formed in sandy or gravelly alluvial deposits, usually covered with a surface layer of loess or silty alluvium. In Bohica, Salchaket, and Tanana soils, a thick loess mantle covers the sand and gravel. Fubar soils have a thin loess mantle, and Jarvis soils have a loess mantle of intermediate thickness.

The North Star Area lies in the zone of discontinuous permafrost (*Péwé 1982*). Permafrost underlies most of the area except south-facing slopes and areas adjacent to bodies of water. A surface layer several inches to a few feet thick thaws each year. However, the underlying permafrost (frozen year round) is a barrier to root penetration and the infiltration of water. Soils with permafrost have perched water on the permafrost surface and are usually poorly or very poorly drained.

Permafrost may be devoid of visible ice, but usually contains ice as finely segregated crystals, lenses, wedges, or shapeless masses. In sandy and gravelly soils, ground ice usually occurs in small bodies in spaces between the mineral grains. In silty deposits, ground ice is often segregated into masses of nearly pure ice that may be many feet across. A change in the soil climate caused by disturbance (such as wild fires, clearing land for agriculture, or homesites) frequently leads to the thawing of buried ice masses, subsequent settling of the soil, and the appearance of hummocky topography or thermokarst pits.

Climate

The climate of the North Star Area is subarctic continental. Winters are long and cold, and the mean annual air temperature is only about 28°F (-2°C). *More detailed information on the climate of the North Star Area is addressed in the Climate section under General Nature of the survey area.* The cold climate of the Area results in low soil temperatures that minimize soil development. When the soil temperature remains below 0°C, permafrost occurs.

Relief

Relief influences the formation of soil through its effect on drainage, runoff, and erosion. In the North Star Area, the aspect of slope has a considerable effect on soil climate and vegetation. Soils on south-facing slopes (Fairbanks, Steese, and Gilmore soils) receive more solar radiation and thus are warmer than soils on north-facing slopes or level areas (Ester, Goldstream, and Histic Pergelic Cryaquept soils). Consequently, permafrost is not present in many soils on south-facing slopes but is common on north-facing slopes and level areas. Vegetation also influences the soil climate. The dense tree canopy and thick moss layer of spruce forests in the North Star Area efficiently insulate the soil; as a result, permafrost is common under spruce forests but rare under aspen or birch stands.

Topography also affects the parent material. As a result of erosion and deposition, ridgetops have a thin loess cover with bedrock near the surface; lower slopes have a thick layer of redeposited loess or colluvial material.

Plants and Animals

Living organisms greatly influence the processes of soil formation and the characteristics of the soils. Trees, grasses, earthworms, rodents, fungi, bacteria, and other forms of plant and animal life are affected by the other soil-forming factors. Animal activity is largely confined to the surface layer of the soil. The soil is continually mixed by their activity, which improves water infiltration. Plant roots create channels through which air and water move more rapidly, thereby improving soil structure and increasing the rate of chemical reactions in the soil.

Microorganisms help to decompose organic matter, which releases plant nutrients and chemicals into the soil. These nutrients are either used ty the plants or are leached from the soil. Numan activities that influence the plant and animal populations in the soil affect the future rate of soil formation.

In the North Star Area, circulation of nutrients through the soil tends to be rapid under stands of deciduous trees and shrubs such as aspen, birch, and highbush cranberry, as these plants grow nutrient-rich leaves each year that return to the soil in the fall. In contrast, nutrients cycle slowly in soils that support dominantly evergreen vegetation (such as spruce, Labrador tea, and mosses), because these plants retain their nutrient-rich leaves for several years. In addition, some evergreen plants, particularly mosses and spruce in dense stands, insulate the soil and maintain lower soil temperatures. This further inhibits decomposition of organic matter and the release of nutrients. The nutrients build up in a thick organic mat on the surface of the soil that acts both as an insulating blanket and a reservoir where nutrients are stored in a form unavailable to plants. As a result, the vegetation on these soils tends to be less productive than the vegetation on sites where nutrients cycle rapidly and are more available to plants (*Viereck et al. 1986*).

Summer fires occur frequently in Interior Alaska (*Viereck and Schandelmeier 1980*). Fire radically changes the vegetation, thereby altering the soil properties affected by vegetation. By destroying most of the forest canopy and part of the organic mat, fire releases many stored nutrients and increases the soil temperature. The latter causes the permafrost to recede deeper in the soil or disappear completely from the soil profile (*Dyrness 1982*). Fast-growing, nutrient-demanding plants such as fireweed, willows, and aspens tend to colonize recently burned areas. As time progresses following the fire, the organic mat builds up, spruce colonizes the site, and the permafrost table may again rise in the soil. Periodic fires lead to the cyclic appearance and disappearance of permafrost from the soil.

Departures from the idealized fire-induced permafrost cycle exist on steep south-facing or north-facing slopes and in wet areas. On steep south-facing slopes, frequent fires and droughty conditions may prevent a dense spruce forest, with moss understory and permafrost soil, from ever establishing. Conversely, in wet lowland areas and on steep north-facing slopes, fires do not disturb the organic mat enough to melt the permafrost; consequently, the spruce and moss community returns after the fire without an intervening period of deciduous vegetation.

Time

If all other factors of soil formation are equal, the degree of soil formatin is in direct proportion to time. If soil-forming factors have been active for a long time, horizon development is stronger than if these same factors have been active for a relatively short time.

In the North Star Area, geologic processes such as erosion of hillslopes and deposition of loess, alluvium, and colluvium ensure the constant addition of new, unweathered material to the soils. Consequently, the soils in the North Star Area are weakly developed, with most being classified in the Inceptisol order (a term based on the word "inception"). This order includes soils that are at the early stages of soil formation and are thus weakly developed.

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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.

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 hillslopes.

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

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

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

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hillslopes. 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.

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

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

Boulders. Rock fragments larger than 2 feet (61 cm) in diameter.

Broadleaf forest. Vegetation with at least 25 percent crown cover of trees and in which 75 percent or more of the tree cover is broadleaf trees, i.e. paper birch, quaking aspen, and/or balsam poplar. Open broadleaf forest has 25 to 59 percent total crown cover of trees. Closed broadleaf forest has 60 percent or more total crown cover of trees.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems use a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, a felled tree generally is reeled in while one end is lifted or the entire log is suspended.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

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-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.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Clay. As a soil separate, the mineral soil particles less than 0.002 mm 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 mm 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 cm) in diameter.

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

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

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

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

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

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

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

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

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

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

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

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

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

Cemented—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

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.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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.

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

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

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of soil over a limiting layer such as bedrock, permafrost, or sand and gravel. Very deep soils are more than 60 inches thick; deep soils, 40 to 60 inches thick; moderately deep, 20 to 40 inches thick; shallow, 10 to 20 inches thick; and very shallow, less than 10 inches thick.

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—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

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

Dwarf tree forest. Vegetation with at least 25 percent crown cover of trees, which are generally less than about 15 feet tall at maturity. Trees are typically black spruce; however, paper birch, tamarack, and white spruce occur frequently. Open dwarf tree forest has 25 to 59 percent total crown cover of dwarf trees. Closed dwarf tree forest has 60 percent or more total crown cover of dwarf trees.

Dwarf tree woodland. Vegetation with 10 to 24 percent crown cover of trees, which are generally less than about 15 feet tall at maturity. Trees are typically black spruce; however, paper birch, tamarack, and white spruce occur frequently.

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 soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

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

Erosion, geologic—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion, accelerated—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

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

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.

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.*

Fine textured soil. Sandy clay, silty clay, or clay.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 cm) long.

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 usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Footslope. The geomorphic component that forms the inner, gently inclined surface at the base of a hillslope. The surface profile is dominantly concave. In terms of gradational processes, a footslope is a transition zone between an upslope site of erosion (backslope) and a downslope site of deposition (toeslope).

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.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 mm to 7.6 cm) 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 cm) 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.

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 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. 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—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

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

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

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

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.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

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

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.

Low shrub. Vegetation with at least 25 percent crown cover of shrubs and less than 10 percent crown cover of trees or dwarf trees. The shrubs are generally less than about 5 feet tall at maturity. Open low shrub has 25 to 74 percent total crown cover of shrubs. Closed low shrub has 75 percent or more total crown cover of shrubs.

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

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

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

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.

Mixed forest. Vegetation with at least 25 percent crown cover of trees and in which broadleaf and needleleaf trees each compose between 26 and 74 percent of the total crown cover of trees. Open mixed forest has 25 to 59 percent total crown cover of trees. Closed mixed forest has 60 percent or more total crown cover of trees.

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

Needleleaf forest. Vegetation with at least 25 percent crown cover of trees and in which 75 percent or more of the tree cover is needleleaf trees, i.e. white spruce, black spruce, and/or tamarack. Open needleleaf forest has 25 to 59 percent total crown cover of trees. Closed needleleaf forest has 60 percent or more total crown cover of trees.

Needleleaf woodland. Vegetation with 10 to 24 percent crown cover of trees and in which 75 percent or more of the tree cover is needleleaf trees, i.e. white spruce, black spruce, and/or tamarack.

Neutral soil. A soil having a pH value between 6.6 and 7.3 (see Reaction, soil).

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

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.

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).

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

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

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting ground ice. They form on the soil after plant cover is removed.

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.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

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

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

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. 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.

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

Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
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

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.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

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

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

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff.

Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

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

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

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.

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 mm) to the lower limit of very fine sand (0.05 mm). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant or dominant and codominant trees in a fully stocked stand at the age of 100 years is 75 feet, the site index is 75.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

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. In this survey the following slope classes are recognized:

Nearly level	0 to 2 percent
Gently sloping	2 to 4 percent
Moderately sloping	4 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 45 percent
Very steep	More than 45 percent

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 cm) 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 mm in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the 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 cm) in diameter if rounded or 6 to 15 inches (15 to 38 cm) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single 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 cm). 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.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The outermost inclined surface at the base of a hill. Toeslopes 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.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

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.

Tables

TABLE 1--TEMPERATURE AND PRECIPITATION AT FAIRBANKS, ALASKA

(Recorded in the period 1949-94 at Fairbanks Airport)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature > than--	Minimum temperature < than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average total snow-fall
	°F	°F	°F	°F	°F	Units	In.	In.	In.		In.
January-----	-1.1	-18.7	-9.9	38	-53	0	0.61	0.20	0.94	2	11.2
February----	7.0	-15.2	-4.1	41	-48	0	0.42	0.13	0.66	1	8.4
March-------	23.9	-2.5	10.7	49	-37	0	0.39	0.12	0.64	0	6.5
April-------	41.6	19.9	30.8	65	-12	0	0.26	0.08	0.43	0	3.2
May---------	59.7	37.6	48.6	79	21	0	0.60	0.24	0.89	1	0.8
June--------	70.7	48.9	59.8	88	35	594	1.37	0.69	1.96	3	0.0
July--------	72.4	51.7	62.1	89	40	681	1.79	1.02	2.48	4	0.0
August------	66.5	46.6	56.6	84	31	511	1.78	0.91	2.54	5	0.0
September---	54.4	35.3	44.8	73	17	0	1.04	0.38	1.60	3	1.5
October-----	32.2	17.4	24.8	57	-13	0	0.82	0.40	1.19	2	10.8
November----	11.6	-4.9	3.3	41	-38	0	0.73	0.31	1.11	2	14.0
December----	1.3	-15.5	-7.1	38	-48	0	0.78	0.25	1.24	1	13.5
Yearly:											
Average---	36.7	16.7	26.7	---	---	---	----	----	----	---	---
Extreme---	96	-62	---	91	-55	---	----	----	----	---	---
Total-----	---	---	---	---	---	1786	10.58	7.41	13.15	24	69.7

Average number of days per year with at least 1 inch of snow on the ground: 190

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minumum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold: 40.0 deg. F). Growing degree days are calculated only during the 32 degree F. growing season.

TABLE 2--TEMPERATURE AND PRECIPITATION AT COLLEGE, ALASKA

(Recorded in the period 1949-94 at College Observatory)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature > than--	Minimum temperature < than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch ormore	Average total snow-fall
	°F	°F	°F	°F	°F	Units	In.	In.	In.		In.
January-----	1.5	-13.0	-5.7	38	-50	0	0.69	0.24	1.05	2	10.4
February----	7.9	-10.2	-1.1	42	-42	0	0.48	0.15	0.75	1	7.8
March-------	24.2	1.5	12.9	49	-30	0	0.45	0.11	0.73	1	6.3
April-------	41.1	19.6	30.3	63	-11	0	0.26	0.07	0.46	0	2.9
May---------	59.1	35.7	47.4	78	18	0	0.61	0.22	0.94	2	0.5
June--------	69.9	46.7	58.3	88	32	544	1.60	0.89	2.23	4	0.0
July--------	71.9	49.7	60.8	88	37	639	2.04	1.11	2.86	5	0.0
August------	66.4	45.2	55.8	85	29	483	2.08	1.14	2.90	6	0.0
September---	54.1	34.2	44.2	73	16	0	1.22	0.44	1.88	3	1.3
October-----	32.4	17.3	24.8	57	-11	0	0.89	0.45	1.28	2	10.5
November----	12.4	-1.8	5.3	42	-33	0	0.84	0.28	1.30	2	13.3
December----	2.9	-11.1	-4.1	38	-45	0	0.86	0.25	1.36	2	12.5
Yearly:	-----	-----	-----	-----	-----	-----	------	------	------	----	------
Average---	37.0	17.8	27.4	---	---	---	----	----	----	---	---
Extreme---	94	-66	---	90	-52	---	----	----	----	---	---
Total-----	---	---	---	---	---	1666	12.02	8.26	14.92	30	65.6

Average # of days per year with at least 1 inch of snow on the ground: 196

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minumum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold: 40.0 deg. F). Growing degree days are calculated only during the 32 degree F. growing season.

TABLE 3--FREEZE DATES IN SPRING AND FALL AT FAIRBANKS, ALASKA

(Recorded in the period 1949-94 at Fairbanks Airport)

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 4	May 14	May 25
2 years in 10 later than--	April 30	May 10	May 22
5 years in 10 later than--	April 23	May 3	May 16
First freezing temperature in fall:			
1 year in 10 earlier than--	September 14	September 5	August 23
2 years in 10 earlier than--	September 18	September 10	August 27
5 years in 10 earlier than--	September 27	September 18	September 5

TABLE 4--FREEZE DATES IN SPRING AND FALL AT COLLEGE, ALASKA

(Recorded in the period 1949-94 at College Observatory)

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 11	May 20	June 15
2 years in 10 later than--	May 7	May 17	June 9
5 years in 10 later than--	April 28	May 11	May 28
First freezing temperature in fall:			
1 year in 10 earlier than--	September 11	August 27	August 15
2 years in 10 earlier than--	September 16	September 1	August 20
5 years in 10 earlier than--	September 25	September 12	August 31

TABLE 5--GROWING SEASON AT FAIRBANKS, ALASKA

(Recorded in the period 1949-94 at Fairbanks Airport)

Probability	Daily Minimum Temperature during growing season		
	Higher than 24°F	Higher than 28°F	Higher than 32°F
	Days	Days	Days
9 years in 10	138	120	93
8 years in 10	144	126	99
5 years in 10	156	138	111
2 years in 10	168	149	122
1 year in 10	174	155	129

TABLE 6--GROWING SEASON AT COLLEGE, ALASKA

(Recorded in the period 1949-94 at College Observatory)

Probability	Daily Minimum Temperature during growing season		
	Higher than 24°F	Higher than 28°F	Higher than 32°F
	Days	Days	Days
9 years in 10	131	103	71
8 years in 10	137	110	79
5 years in 10	149	123	94
2 years in 10	161	136	110
1 year in 10	167	143	118

TABLE 7--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
101	Bohica silt loam, 0 to 3 percent slopes	320	*
102	Bohica silt loam, 3 to 7 percent slopes	660	*
103	Dumps, mine	2,100	0.1
104	Ester peat, 7 to 15 percent slopes	8,000	0.5
105	Ester peat, 15 to 45 percent slopes	15,000	1.0
106	Ester-Gilmore complex, 15 to 45 percent slopes	25,000	1.7
107	Fairbanks silt loam, 3 to 7 percent slopes	4,000	0.3
108	Fairbanks silt loam, 7 to 12 percent slopes	10,000	0.7
109	Fairbanks silt loam, 12 to 20 percent slopes	4,000	0.3
110	Gilmore silt loam, 3 to 7 percent slopes	6,000	0.4
111	Gilmore silt loam, 7 to 12 percent slopes	11,000	0.7
112	Gilmore silt loam, 12 to 45 percent slopes	218,000	14.5
113	Gilmore-Ester complex, 15 to 45 percent slopes	20,000	1.3
114	Gilmore-Steese complex, 3 to 15 percent slopes	18,000	1.2
115	Goldstream peat, 0 to 3 percent slopes	16,600	1.1
116	Goldstream peat, 3 to 7 percent slopes	10,000	0.7
117	Goldstream-Pergelic Cryohemists complex, 0 to 2 percent slopes	16,600	1.1
118	Histic Pergelic Cryaquepts, fans, 1 to 20 percent slopes	60,000	4.0
119	Histic Pergelic Cryaquepts, 15 to 45 percent slopes	263,000	17.5
120	Histic Pergelic Cryaquepts-Fubar complex, 3 to 7 percen t slopes	30,000	2.0
121	Histic Pergelic Cryaquepts-Typic Cryochrepts association, 15 to 45 percent slopes	310,000	20.6
122	Histic Pergelic Cryaquepts-Typic Cryochrepts complex, 15 to 45 percent slopes	190,000	12.6
123	Jarvis-Fubar complex, 0 to 3 percent slopes	40,000	2.7
124	Jarvis-Salchaket complex, 0 to 3 percent slopes	32,575	2.2
125	Pergelic Cryohemists	3,000	0.2
126	Pits, gravel	375	*
127	Riverwash	350	*
128	Rubble land	600	*
129	Salchaket very fine sandy loam, 0 to 2 percent slopes	620	*
130	Saulich peat, 3 to 7 percent slopes	26,000	1.7
131	Saulich peat, 7 to 12 percent slopes	26,000	1.7
132	Saulich peat, 12 to 20 percent slopes	15,800	1.0
133	Saulich-Fairbanks complex, 3 to 12 percent slopes	6,000	0.4
134	Steese silt loam, 7 to 12 percent slopes	6,000	0.4
135	Steese silt loam, 12 to 45 percent slopes	13,000	0.9
136	Steese-Gilmore complex, 10 to 45 percent slopes	20,000	1.3
137	Tanana silt loam, moderately wet, 0 to 3 percent slopes	900	*
138	Typic Cryochrepts-Rock outcrop complex, 6 to 35 percent slopes	72,000	4.8
W	Water	1,500	*
	Total	1,503,000	100.0

*Less than 0.1 percent.

TABLE 8--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed)

Map symbol and soil name	Ordi-nation symbol	Management Concerns: Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Plant competi-tion	Potential productivity: Common trees	Site index	Volume of wood fiber	Trees commonly managed
									m3/ha	
101:										
Bohica----------	2A	Slight	Moderate	Slight	Moderate	Moderate	Paper birch			White spruce
							Black spruce			
							Balsam poplar			
							Quaking aspen			
							White spruce	79	2	
102:										
Bohica----------	2A	Slight	Moderate	Slight	Moderate	Moderate	Paper birch			White spruce
							Black spruce			
							Balsam poplar			
							Quaking aspen			
							White spruce	79	2	
103:										
Dumps, mine.										
104:										
Ester-----------		Slight	Severe	Severe	Severe	Severe	Paper birch			
							Tamarack			
							White spruce			
							Black spruce			
							Quaking aspen			
105:										
Ester-----------		Moderate	Severe	Severe	Severe	Severe	Paper birch			
							Tamarack			
							White spruce			
							Black spruce			
							Quaking aspen			
106:										
Ester-----------		Moderate	Severe	Severe	Severe	Severe	Paper birch			
							Tamarack			
							White spruce			
							Black spruce			
							Quaking aspen			
Gilmore---------	2R	Moderate	Moderate	Slight	Moderate	Slight	Paper birch	38	1	White spruce
							Black spruce			
							Quaking aspen	44	2	
							White spruce	68	2	
107:										
Fairbanks-------	3A	Slight	Moderate	Slight	Moderate	Moderate	Black spruce			Paper birch, white spruce
							Quaking aspen	59	4	
							Paper birch	62	3	
							White spruce	88	3	
108:										
Fairbanks-------	3A	Slight	Moderate	Slight	Moderate	Moderate	Black spruce			Paper birch, white spruce
							Quaking aspen	59	4	
							Paper birch	62	3	
							White spruce	88	3	

TABLE 8--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume of wood fiber	Trees commonly managed
									m3/ha	
109:										
Fairbanks------	3R	Moderate	Moderate	Slight	Moderate	Moderate	Black spruce			Paper birch, white spruce
							Quaking aspen	59	4	
							Paper birch	62	3	
							White spruce	88	3	
110:										
Gilmore--------	2D	Slight	Moderate	Slight	Moderate	Slight	Paper birch	38	1	White spruce
							Black spruce			
							Quaking aspen	44	2	
							White spruce	68	2	
111:										
Gilmore--------	2D	Slight	Moderate	Slight	Moderate	Slight	Paper birch	38	1	White spruce
							Black spruce			
							Quaking aspen	44	2	
							White spruce	68	2	
112:										
Gilmore--------	2R	Moderate	Moderate	Slight	Moderate	Slight	Paper birch	38	1	White spruce
							Black spruce			
							Quaking aspen	44	2	
							White spruce	68	2	
113:										
Gilmore--------	2R	Moderate	Moderate	Slight	Moderate	Slight	Paper birch	38	1	White spruce
							Black spruce			
							Quaking aspen	44	2	
							White spruce	68	2	
Ester----------		Moderate	Severe	Severe	Severe	Severe	Paper birch			
							Tamarack			
							White spruce			
							Black spruce			
							Quaking aspen			
114:										
Gilmore--------	2D	Slight	Moderate	Slight	Moderate	Slight	Paper birch	38	1	White spruce
							Black spruce			
							Quaking aspen	44	2	
							White spruce	68	2	
Steese---------	2A	Slight	Moderate	Slight	Moderate	Moderate	Quaking aspen	43	2	Paper birch, white spruce
							Paper birch	51	2	
							White spruce	78	2	
115:										
Goldstream.										
116:										
Goldstream.										
117:										
Goldstream.										
Pergelic Cryohemists.										

TABLE 8--WOODLAND 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 commonly managed
									m3/ha	
118: Histic Pergelic Cryaquepts.										
119: Histic Pergelic Cryaquepts.										
120: Histic Pergelic Cryaquepts.										
Fubar----------	2F	Slight	Moderate	Moderate	Moderate	Slight	Black spruce Balsam poplar Quaking aspen Paper birch White spruce	 79	 2	Paper birch, white spruce
121: Histic Pergelic Cryaquepts.										
Typic Cryochrepts.										
122: Histic Pergelic Cryaquepts.										
Typic Cryochrepts.										
123: Jarvis---------	2A	Slight	Slight	Slight	Moderate	Moderate	Black spruce Balsam poplar Quaking aspen Paper birch White spruce	 60 50 80	 4 2 2	Paper birch, white spruce
Fubar----------	2F	Slight	Moderate	Moderate	Moderate	Slight	Black spruce Balsam poplar Quaking aspen Paper birch White spruce	 79	 2	Paper birch, white spruce
124: Jarvis---------	2A	Slight	Slight	Slight	Moderate	Moderate	Black spruce Balsam poplar Quaking aspen Paper birch White spruce	 60 50 80	 4 2 2	Paper birch, white spruce
Salchaket------	3A	Slight	Slight	Slight	Slight	Moderate	Balsam poplar White spruce	 94	 3	White spruce
125: Pergelic Cryohemists.										

TABLE 8--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume of wood fiber	Trees commonly managed
									m3/ha	
126: Pits, gravel.										
127: Riverwash.										
128: Rubble land.										
129: Salchaket------	2A	Slight	Slight	Slight	Moderate	Moderate	Quaking aspen Paper birch White spruce	 73	 2	Paper birch, white spruce
130: Saulich.										
131: Saulich.										
132: Saulich.										
133: Saulich.										
Fairbanks------	3A	Slight	Moderate	Slight	Moderate	Moderate	Black spruce Quaking aspen Paper birch White spruce	 59 62 88	 4 3 3	Paper birch, white spruce
134: Steese---------	2A	Slight	Moderate	Slight	Moderate	Moderate	Quaking aspen Paper birch White spruce	43 51 78	2 2 2	Paper birch, white spruce
135: Steese---------	2R	Moderate	Moderate	Slight	Moderate	Moderate	Quaking aspen Paper birch White spruce	43 51 78	2 2 2	Paper birch, white spruce
136: Steese---------	2R	Moderate	Moderate	Slight	Moderate	Moderate	Quaking aspen Paper birch White spruce	43 51 78	2 2 2	Paper birch, white spruce
Gilmore--------	2R	Moderate	Moderate	Slight	Moderate	Slight	Paper birch Black spruce Quaking aspen White spruce	38 44 68	1 2 2	White spruce
137: Tanana---------	2A	Slight	Moderate	Slight	Moderate	Moderate	Black spruce Balsam poplar Paper birch White spruce	 53 79	 2 2	Paper birch, white spruce

TABLE 8--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordi- nation symbol	Management Concerns					Potential productivity			Trees commonly managed
		Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	Volume of wood fiber	
									m3/ha	
138:										
Typic Cryochrepts.										
Typic Cryochrepts, stony.										
Rock outcrop.										

TABLE 9--RECREATIONAL DEVELOPMENT

(Some terms that define restrictive soil features are defined in the Glossary. See text for definitions of "slight", "moderate", and "severe". Absence of an entry indicates that the soil was not rated.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
101:					
Bohica----------	Slight	Slight	Slight	Slight	Slight
102:					
Bohica----------	Slight	Slight	Moderate: slope	Slight	Slight
103:					
Dumps, mine.					
104:					
Ester-----------	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, too acid, wetness
105:					
Ester-----------	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, too acid, wetness
106:					
Ester-----------	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, too acid, wetness
Gilmore---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
107:					
Fairbanks-------	Slight	Slight	Moderate: slope	Severe: erodes easily	Slight
108:					
Fairbanks-------	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
109:					
Fairbanks-------	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
110:					
Gilmore---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: erodes easily	Severe: depth to rock
111:					
Gilmore---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
112:					
Gilmore---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock

TABLE 9--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
113:					
Gilmore---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Ester-----------	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, too acid, wetness
114:					
Gilmore---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Steese----------	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
115:					
Goldstream------	Severe: permafrost	Severe: permafrost, wetness	Severe: permafrost, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, too acid, wetness
116:					
Goldstream------	Severe: permafrost	Severe: permafrost, wetness	Severe: permafrost, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, too acid, wetness
117:					
Goldstream------	Severe: permafrost	Severe: permafrost, wetness	Severe: permafrost, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, too acid, wetness
Pergelic Cryohemists----	Severe: permafrost	Severe: permafrost, ponding	Severe: permafrost, excess humus	Severe: permafrost, ponding, excess humus	Severe: permafrost, ponding
118:					
Histic Pergelic Cryaquepts-----	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness
119:					
Histic Pergelic Cryaquepts-----	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness
120:					
Histic Pergelic Cryaquepts-----	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, wetness

TABLE 9--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
120: (cont'd)					
Fubar-----------	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: droughty, flooding
121:					
Histic Pergelic Cryaquepts-----	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, wetness
Typic Cryochrepts.					
122:					
Histic Pergelic Cryaquepts-----	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, wetness
Typic Cryochrepts.					
123:					
Jarvis----------	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
Fubar-----------	Severe: flooding	Moderate: flooding	Severe: flooding	Moderate: flooding	Severe: droughty, flooding
124:					
Jarvis----------	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
Salchaket-------	Severe: flooding	Slight	Slight	Slight	Slight
125:					
Pergelic Cryohemists----	Severe: permafrost	Severe: permafrost, ponding	Severe: permafrost, excess humus	Severe: permafrost, ponding, excess humus	Severe: permafrost, ponding
126:					
Pits, gravel.					
127:					
Riverwash.					
128:					
Rubble land.					
129:					
Salchaket-------	Severe: flooding	Slight	Slight	Slight	Slight

TABLE 9--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
130:					
Saulich---------	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, wetness
131:					
Saulich---------	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, wetness
132:					
Saulich---------	Severe: permafrost, slope, wetness	Severe: permafrost, slope, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, wetness, slope
133:					
Saulich---------	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, excess humus	Severe: permafrost, wetness
Fairbanks-------	Slight	Slight	Severe: slope	Severe: erodes easily	Slight
134:					
Steese----------	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
135:					
Steese----------	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
136:					
Steese----------	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Gilmore---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
137:					
Tanana----------	Severe: permafrost	Severe: permafrost	Severe: permafrost	Severe: permafrost	Severe: permafrost
138:					
Typic Cryochrepts.					
Typic Cryochrepts, stony.					
Rock outcrop.					

TABLE 10--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight", "moderate", and "severe". Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for on-site investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
101:						
Bohica----------	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
102:						
Bohica----------	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
103:						
Dumps, mine.						
104:						
Ester-----------	Severe: permafrost, depth to rock, wetness	Severe: permafrost, wetness, low strength	Severe: permafrost, wetness, depth to rock	Severe: permafrost, wetness, slope	Severe: permafrost, wetness	Severe: permafrost, too acid, wetness
105:						
Ester-----------	Severe: permafrost, depth to rock, wetness	Severe: permafrost, wetness, low strength	Severe: permafrost, wetness, depth to rock	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Severe: permafrost, too acid, wetness
106:						
Ester-----------	Severe: permafrost, depth to rock, wetness	Severe: permafrost, wetness, low strength	Severe: permafrost, wetness, depth to rock	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Severe: permafrost, too acid, wetness
Gilmore---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
107:						
Fairbanks-------	Moderate: cutbanks cave	Slight	Slight	Moderate: slope	Severe: frost action	Slight
108:						
Fairbanks-------	Moderate: cutbanks cave, slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: frost action	Moderate: slope
109:						
Fairbanks-------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope, frost action	Severe: slope
110:						
Gilmore---------	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: slope, depth to rock	Moderate: depth to rock, frost action	Severe: depth to rock

TABLE 10--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
111:						
Gilmore	Severe: depth to rock	Moderate: slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, slope, frost action	Severe: depth to rock
112:						
Gilmore	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
113:						
Gilmore	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Ester	Severe: permafrost, depth to rock, wetness	Severe: permafrost, wetness, low strength	Severe: permafrost, wetness, depth to rock	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Severe: permafrost, too acid, wetness
114:						
Gilmore	Severe: depth to rock	Moderate: slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, slope, frost action	Severe: depth to rock
Steese	Moderate: depth to rock, cutbanks cave, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Moderate: slope, frost action	Moderate: slope, depth to rock
115:						
Goldstream	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, too acid, wetness
116:						
Goldstream	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost, too acid, wetness
117:						
Goldstream	Severe: permafrost, wetness	Severe: permafrost, wetness, pitting	Severe: permafrost, wetnes, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, too acid, wetness
Pergelic Cryohemists.						
118:						
Histic Pergelic Cryaquepts.						
119:						
Histic Pergelic Cryaquepts.						

TABLE 10--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
120: Histic Pergelic Cryaquepts.						
Fubar	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: droughty, flooding
121: Histic Pergelic Cryaquepts.						
Typic Cryochrepts.						
122: Histic Pergelic Cryaquepts.						
Typic Cryochrepts.						
123: Jarvis	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Fubar	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: droughty, flooding
124: Jarvis	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Salchaket	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
125: Pergelic Cryohemists.						
126: Pits, gravel.						
127: Riverwash.						
128: Rubble land.						
129: Salchaket	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight

TABLE 10--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
130:						
Saulich---------	Severe: permafrost, wetness	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness
131:						
Saulich---------	Severe: permafrost, wetness	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness
132:						
Saulich---------	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope
133:						
Saulich---------	Severe: permafrost, wetness	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness
Fairbanks-------	Moderate: cutbanks cave	Slight	Slight	Moderate: slope	Severe: frost action	Slight
134:						
Steese----------	Moderate: depth to rock, cutbanks cave, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Moderate: slope, frost action	Moderate: slope, depth to rock
135:						
Steese----------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
136:						
Steese----------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Gilmore---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
137:						
Tanana----------	Severe: permafrost	Severe: permafrost	Severe: permafrost	Severe: permafrost	Severe: permafrost	Severe: permafrost
138:						
Typic Cryochrepts.						
Typic Cryochrepts, stony.						
Rock outcrop.						

TABLE 11--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight", "good", and other terms. Absence of an entry indicates the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for on-site investigation.)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
101:					
Bohica----------	Moderate: percs slowly	Moderate: seepage	Moderate: too sandy	Slight	Fair: too sandy
102:					
Bohica----------	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too sandy	Slight	Fair: too sandy
103:					
Dumps, mine.					
104:					
Ester-----------	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, slope	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, wetness	Poor: permafrost, depth to rock
105:					
Ester-----------	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, slope	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, wetness	Poor: permafrost, depth to rock, slope
106:					
Ester-----------	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, slope	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, wetness	Poor: permafrost, depth to rock, slope
Gilmore---------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
107:					
Fairbanks-------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
108:					
Fairbanks-------	Moderate: percs slowly, slope	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
109:					
Fairbanks-------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
110:					
Gilmore---------	Severe: depth to rock	Severe: seepage, depth to rock	Severe: depth to rock, seepage	Severe: depth to rock	Poor: depth to rock, small stones

TABLE 11--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
111:					
Gilmore---------	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage	Severe: depth to rock	Poor: depth to rock, small stones
112:					
Gilmore---------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
113:					
Gilmore---------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Ester-----------	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, slope	Severe: permafrost, depth to rock, wetness	Severe: permafrost, depth to rock, wetness	Poor: permafrost, depth to rock, slope
114:					
Gilmore---------	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage	Severe: depth to rock	Poor: depth to rock, small stones
Steese----------	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage	Severe: depth to rock, seepage	Poor: depth to rock
115:					
Goldstream------	Severe: permafrost, wetness	Severe: permafrost, excess humus	Severe: permafrost, wetness	Severe: permafrost, wetness	Poor: permafrost, wetness
116:					
Goldstream------	Severe: permafrost, wetness, pitting	Severe: permafrost, excess humus	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness	Poor: permafrost, wetness
117:					
Goldstream------	Severe: permafrost, wetness	Severe: permafrost, excess humus	Severe: permafrost, wetness	Severe: permafrost, wetness	Poor: permafrost, wetness
Pergelic Cryohemists.					
118:					
Histic Pergelic Cryaquepts.					
119:					
Histic Pergelic Cryaquepts.					

TABLE 11--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
120: Histic Pergelic Cryaquepts.					
Fubar-----------	Severe: flooding, wetness, poor filter	Severe: seepage, flooding, wetness	Severe: flooding, seepage, wetness	Severe: flooding, seepage, wetness	Poor: seepage, too sandy, small stones
121: Histic Pergelic Cryaquepts.					
Typic Cryochrepts.					
122: Histic Pergelic Cryaquepts.					
Typic Cryochrepts.					
123: Jarvis----------	Severe: flooding, poor filter	Severe: seepage, flooding	Severe: flooding, seepage, too sandy	Severe: flooding, seepage	Poor: seepage, too sandy, small stones
Fubar-----------	Severe: flooding, wetness, poor filter	Severe: seepage, flooding, wetness	Severe: flooding, seepage, wetness	Severe: flooding, seepage, wetness	Poor: seepage, too sandy, small stones
124: Jarvis----------	Severe: flooding, poor filter	Severe: seepage, flooding	Severe: flooding, seepage, too sandy	Severe: flooding, seepage	Poor: seepage, too sandy, small stones
Salchaket-------	Moderate: flooding, percs slowly	Severe: seepage	Severe: seepage, too sandy	Moderate: flooding	Fair: too sandy, thin layer
125: Pergelic Cryohemists.					
126: Pits, gravel.					
127: Riverwash.					
128: Rubble land.					

TABLE 11--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
129:					
Salchaket-------	Moderate: flooding, percs slowly	Severe: seepage	Severe: seepage, too sandy	Moderate: flooding	Fair: too sandy, thin layer
130:					
Saulich---------	Severe: permafrost, wetness, pitting	Severe: permafrost, excess humus	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness	Poor: permafrost, wetness
131:					
Saulich---------	Severe: permafrost, wetness, pitting	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness	Poor: permafrost, wetness
132:					
Saulich---------	Severe: permafrost, wetness, slope	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, slope	Severe: permafrost, wetness, slope	Poor: permafrost, slope, wetness
133:					
Saulich---------	Severe: permafrost, wetness, pitting	Severe: permafrost, slope, excess humus	Severe: permafrost, wetness, pitting	Severe: permafrost, wetness	Poor: permafrost, wetness
Fairbanks-------	Moderate: percs slowly	Severe: slope	Slight	Slight	Good
134:					
Steese----------	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage	Severe: depth to rock, seepage	Poor: depth to rock
135:					
Steese----------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, seepage, slope	Poor: depth to rock, slope
136:					
Steese----------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, seepage, slope	Poor: depth to rock, slope
Gilmore---------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
137:					
Tanana----------	Severe: permafrost, wetness	Severe: permafrost, wetness	Severe: permafrost	Severe: permafrost	Poor: permafrost

TABLE 11--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
138:					
Typic Cryochrepts.					
Typic Cryochrepts, stony.					
Rock outcrop.					

TABLE 12--CONSTRUCTION MATERIALS

(Some terms that define restrictive soil features are defined in the Glossary. See text for definitions of "good", "fair", and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for on-site investigation.)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
101:				
Bohica----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too sandy
102:				
Bohica----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too sandy
103:				
Dumps, mine.				
104:				
Ester-----------	Poor: permafrost, depth to rock, wetness	Improbable: permafrost, excess humus	Improbable: permafrost, excess humus	Poor: permafrost, depth to rock, excess humus
105:				
Ester-----------	Poor: permafrost, depth to rock, wetness	Improbable: permafrost, excess humus	Improbable: permafrost, excess humus	Poor: permafrost, depth to rock, excess humus
106:				
Ester-----------	Poor: permafrost, depth to rock, wetness	Improbable: permafrost, excess humus	Improbable: permafrost, excess humus	Poor: permafrost, depth to rock, excess humus
Gilmore---------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
107:				
Fairbanks-------	Good	Improbable: excess fines	Improbable: excess fines	Good
108:				
Fairbanks-------	Good	Improbable: excess fines	Improbable: excess fines	Fair: slope
109:				
Fairbanks-------	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
110:				
Gilmore---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
111:				
Gilmore---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
112:				
Gilmore---------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope

TABLE 12--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
113:				
Gilmore---------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Ester-----------	Poor: permafrost, depth to rock, wetness	Improbable: permafrost, excess humus	Improbable: permafrost, excess humus	Poor: permafrost, depth to rock, excess humus
114:				
Gilmore---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Steese----------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, small stones, slope
115:				
Goldstream------	Poor: permafrost, wetness	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost, wetness
116:				
Goldstream------	Poor: permafrost, wetness	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost, wetness
117:				
Goldstream------	Poor: permafrost, wetness	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost, wetness
Pergelic Cryohemists.				
118:				
Histic Pergelic Cryaquepts.				
119:				
Histic Pergelic Cryaquepts.				
120:				
Histic Pergelic Cryaquepts.				
Fubar-----------	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
121:				
Histic Pergelic Cryaquepts.				
Typic Cryochrepts.				

TABLE 12--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
122:				
Histic Pergelic Cryaquepts.				
Typic Cryochrepts.				
123:				
Jarvis----------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Fubar-----------	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
124:				
Jarvis----------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Salchaket-------	Good	Probable	Probable	Poor: too sandy, area reclaim
125:				
Pergelic Cryohemists.				
126:				
Pits, gravel.				
127:				
Riverwash.				
128:				
Rubble land.				
129:				
Salchaket-------	Good	Probable	Probable	Poor: too sandy, area reclaim
130:				
Saulich---------	Poor: permafrost, wetness	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost, wetness
131:				
Saulich---------	Poor: permafrost, wetness	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost, wetness
132:				
Saulich---------	Poor: permafrost, wetness	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost, wetness, slope

TABLE 12--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
133:				
Saulich---------	Poor: permafrost, wetness	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost, wetness
Fairbanks-------	Good	Improbable: excess fines	Improbable: excess fines	Good
134:				
Steese----------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, small stones, slope
135:				
Steese----------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
136:				
Steese----------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Gilmore---------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
137:				
Tanana----------	Poor: permafrost	Improbable: permafrost, excess fines	Improbable: permafrost, excess fines	Poor: permafrost
138:				
Typic Cryochrepts.				
Typic Cryochrepts, stony.				
Rock outcrop.				

TABLE 13--WATER MANAGEMENT

(Some terms that define restrictive soil features are defined in the Glossary. See text for definitions of "slight", "moderate", and "severe". Absence of an entry indicates the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for on-site investigation.)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
101:							
Bohica-------	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water.	Soil blowing, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
102:							
Bohica-------	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
103:							
Dumps, mine.							
104:							
Ester--------	Severe: permafrost, depth to rock, slope.	Severe: permafrost, excess humus, wetness.	Severe: no water.	Permafrost, depth to rock, frost action.	Permafrost, slope, wetness.	Permafrost, slope, depth to rock.	Permafrost, wetness, slope.
105:							
Ester--------	Severe: permafrost, depth to rock, slope.	Severe: permafrost, excess humus, wetness.	Severe: no water.	Permafrost, depth to rock, frost action.	Permafrost, slope, wetness.	Permafrost, slope, depth to rock.	Permafrost, wetness, slope.
106:							
Ester--------	Severe: permafrost, depth to rock, slope.	Severe: permafrost, excess humus, wetness.	Severe: no water.	Permafrost, depth to rock, frost action.	Permafrost, slope, wetness.	Permafrost, slope, depth to rock.	Permafrost, wetness, slope.
Gilmore------	Severe: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
107:							
Fairbanks----	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
108:							
Fairbanks----	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, erodes easily.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
109:							
Fairbanks----	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, erodes easily.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
110:							
Gilmore------	Severe: depth to rock.	Severe: thin layer.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Depth to rock, erodes easily.	Erodes easily, depth to rock.

TABLE 13--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
111: Gilmore------	Severe: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
112: Gilmore------	Severe: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
113: Gilmore------	Severe: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Ester--------	Severe: permafrost, depth to rock, slope.	Severe: permafrost, excess humus, wetness.	Severe: no water.	Permafrost, depth to rock, frost action.	Permafrost, slope, wetness.	Permafrost, slope, depth to rock.	Permafrost, wetness, slope.
114: Gilmore------	Severe: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Steese-------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
115: Goldstream---	Severe: permafrost.	Severe: permafrost, piping, wetness.	Severe: no water.	Permafrost, subsides, frost action.	Permafrost, wetness.	Permafrost, erodes easily.	Permafrost, wetness.
116: Goldstream---	Severe: permafrost.	Severe: permafrost, piping, wetness.	Severe: no water.	Permafrost, subsides, frost action.	Permafrost, slope, wetness.	Permafrost, erodes easily,	Permafrost, wetness.
117: Goldstream---	Severe: permafrost.	Severe: permafrost, piping, wetness.	Severe: no water.	Permafrost, subsides, frost action.	Permafrost, wetness.	Permafrost, erodes easily.	Permafrost, wetness.
Pergelic Cryohemists.							
118: Histic Pergelic Cryaquepts.							
119: Histic Pergelic Cryaquepts.							

TABLE 13--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
120: Histic Pergelic Cryaquepts.							
Fubar--------	Severe: seepage.	Severe: seepage, large stones.	Severe: cutbanks cave.	Deep to water.	Slope, large stones, droughty.	Large stones, too sandy, soil blowing.	Large stones, droughty.
121: Histic Pergelic Cryaquepts.							
Typic Cryochrepts							
122: Histic Pergelic Cryaquepts.							
Typic Cryochrepts							
123: Jarvis-------	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water.	Soil blowing, erodes easily.	Large stones, erodes easily, too sandy.	Large stones, erodes easily.
Fubar--------	Severe: seepage.	Severe: seepage, large stones.	Severe: cutbanks cave.	Deep to water.	Large stones, droughty.	Large stones, too sandy, soil blowing.	Large stones, droughty.
124: Jarvis-------	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water.	Soil blowing, erodes easily.	Large stones, erodes easily, too sandy.	Large stones, erodes easily,
Salchaket----	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water.	Soil blowing, erodes easily.	Erodes easily, soil blowing.	erodes easily.
125: Pergelic Cryohemists							
126: Pits, gravel.							
127: Riverwash.							
128: Rubble land.							
129: Salchaket----	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water.	Soil blowing, erodes easily.	Erodes easily, soil blowing.	Erodes easily.

TABLE 13--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
130: Saulich------	Severe: permafrost.	Severe: permafrost, piping, wetness.	Severe: no water.	Permafrost, subsides, frost action.	Permafrost, slope, wetness.	Permafrost, erodes easily.	Permafrost, wetness.
131: Saulich------	Severe: permafrost, slope.	Severe: permafrost, piping, wetness.	Severe: no water.	Permafrost, subsides, frost action.	Permafrost, slope, wetness.	Permafrost, slope, erodes easily.	Permafrost, wetness, slope.
132: Saulich------	Severe: permafrost, slope.	Severe: permafrost, piping, wetness.	Severe: no water.	Permafrost, subsides, frost action.	Permafrost, slope, wetness.	Permafrost, slope, erodes easily.	Permafrost, wetnes,s slope.
133: Saulich------	Severe: permafrost.	Severe: permafrost, piping, wetness.	Severe: no water.	Permafrost, subsides, frost action.	Permafrost, slope, wetness.	Permafrost, erodes easily.	Permafrost, wetness.
Fairbanks----	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
134: Steese-------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
135: Steese-------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
136: Steese-------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erode easily, depth to rock.
Gilmore------	Severe: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water.	Slope, soil blowing, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
137: Tanana-------	Severe: permafrost.	Severe: permafrost, piping.	Severe: no water.	Permafrost, subsides.	Permafrost, wetness.	Permafrost, erodes easily, wetness.	Permafrost, erodes easily.
138: Typic Cryochrepts.							

TABLE 13--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for—			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
138: cont'd							
Typic Cryochrepts, stony.							
Rock outcrop.							

TABLE 14--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
101:												
Bohica----------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	65-75	25-30	NP-5
	2-16	Silt loam, very fine sandy loam	ML, SM	A-4	0	0	100	95-100	90-100	35-60	---	NP
	16-60	Stratified very fine sandy loam to loamy fine sand	ML, SM	A-4	0	0	100	95-100	90-100	35-60	---	NP
102:												
Bohica----------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	65-75	25-30	NP-5
	2-16	Silt loam, very fine sandy loam	ML, SM	A-4	0	0	100	95-100	90-100	35-60	---	NP
	16-60	Stratified very fine sandy loam to loamy fine sand	ML, SM	A-4	0	0	100	95-100	90-100	35-60	---	NP
103:												
Dumps, mine.												
104:												
Ester-----------	10-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-4	Silt loam, channery silt loam	ML, SM	A-4	0	0-5	90-100	65-95	60-95	45-85	25-30	NP-5
	4-12	Ice or frozen soil			0	0	0	0	0	0	---	NP
	12-16	Weathered bedrock			0	0	0	0	0	0	---	NP
105:												
Ester-----------	10-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-4	Silt loam, channery silt loam	ML, SM	A-4	0	0-5	90-100	65-95	60-95	45-85	25-30	NP-5
	4-12	Ice or frozen soil			0	0	0	0	0	0	---	NP
	12-16	Weathered bedrock			0	0	0	0	0	0	---	NP
106:												
Ester-----------	10-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-4	Silt loam, channery silt loam	ML, SM	A-4	0	0-5	90-100	65-95	60-95	45-85	25-30	NP-5
	4-12	Ice or frozen soil			0	0	0	0	0	0	---	NP
	12-16	Weathered bedrock			0	0	0	0	0	0	---	NP

TABLE 14--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	
106: cont'd												
Gilmore---------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	2-9	Silt loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-10
	9-17	Very channery silt loam, extremely channery silt loam	GM	A-4, A-2	0-5	25-40	55-65	50-60	35-50	25-40	---	NP
	17-21	Weathered bedrock			0	0	0	0	0	0	---	NP
107:												
Fairbanks-------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-5
	2-60	Silt loam, very fine sandy loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-5
108:												
Fairbanks-------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-5
	2-60	Silt loam, very fine sandy loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-5
109:												
Fairbanks-------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-5
	2-60	Silt loam, very fine sandy loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-5
110:												
Gilmore---------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	2-9	Silt loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-10
	9-17	Very channery silt loam, extremely channery silt loam	GM	A-4, A-2	0-5	25-40	55-65	50-60	35-50	25-40	---	NP
	17-21	Weathered bedrock			0	0	0	0	0	0	---	NP
111:												
Gilmore---------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	2-9	Silt loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-10
	9-17	Very channery silt loam, extremely channery silt loam	GM	A-4, A-2	0-5	25-40	55-65	50-60	35-50	25-40	---	NP
	17-21	Weathered bedrock			0	0	0	0	0	0	---	NP
112:												
Gilmore---------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	2-9	Silt loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-10

TABLE 14--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	
112: cont'd												
Gilmore	9-17	Very channery silt loam, extremely channery silt loam	GM	A-4, A-2	0-5	25-40	55-65	50-60	35-50	25-40	---	NP
	17-21	Weathered bedrock			0	0	0	0	0	0	---	NP
113:												
Gilmore	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	2-9	Silt loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-10
	9-17	Very channery silt loam, extremely channery silt loam	GM	A-4, A-2	0-5	25-40	55-65	50-60	35-50	25-40	---	NP
	17-21	Weathered bedrock			0	0	0	0	0	0	---	NP
Ester	10-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-4	Silt loam, channery silt loam	ML, SM	A-4	0	0-5	90-100	65-95	60-95	45-85	25-30	NP-5
	4-12	Ice or frozen soil			0	0	0	0	0	0	---	NP
	12-16	Weathered bedrock			0	0	0	0	0	0	---	NP
114:												
Gilmore	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	2-9	Silt loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-10
	9-17	Very channery silt loam, extremely channery silt loam	GM	A-4, A-2	0-5	25-40	55-65	50-60	35-50	25-40	---	NP
	17-21	Weathered bedrock			0	0	0	0	0	0	---	NP
Steese	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	2-26	Silt, silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	26-32	Very channery silt loam	GM, SM	A-1, A-2	0	15-20	50-70	30-50	25-45	20-35	---	NP
	32-36	Weathered bedrock			0	0	0	0	0	0	---	NP
115:												
Goldstream	13-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-6	Silt loam, mucky silt loam	ML, OL	A-4, A-5	0	0	100	100	95-100	75-90	30-50	NP-10
	6-13	Silt loam, silt	ML	A-4	0	0	95-100	95-100	85-100	75-95	25-35	NP-10
	13-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
116:												
Goldstream	13-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-6	Silt loam, mucky silt loam	ML, OL	A-4, A-5	0	0	100	100	95-100	75-90	30-50	NP-10

TABLE 14--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	
116: cont'd												
Goldstream------	6-13	Silt loam, silt	ML	A-4	0	0	95-100	95-100	85-100	75-95	25-35	NP-10
	13-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
117:												
Pergelic Cryohemists.												
Goldstream------	13-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-6	Silt loam, mucky silt loam	ML, OL	A-4, A-5	0	0	100	100	95-100	75-90	30-50	NP-10
	6-13	Silt loam, silt	ML	A-4	0	0	95-100	95-100	85-100	75-95	25-35	NP-10
	13-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
118:												
Histic Pergelic Cryaquepts.												
119:												
Histic Pergelic Cryaquepts.												
120:												
Histic Pergelic Cryaquepts.												
Fubar-----------	0-6	Fine sandy loam	SM, ML	A-4	0	0-10	95-100	90-100	70-80	40-60	15-20	NP-5
	6-60	Stratified extremely cobbly sand to silt loam	GP, GP-GM, SP, SP-SM	A-1	0	15-45	50-75	30-55	15-35	0-10	---	NP
121:												
Histic Pergelic Cryaquepts.												
Typic Cryochrepts.												
122:												
Histic Pergelic Cryaquepts.												
Typic Cryochrepts.												
123:												
Jarvis----------	0-2	Very fine sandy loam	ML	A-4	0	0	100	100	95-100	65-75	25-30	NP-5
	2-8	Very fine sandy loam, silt loam	ML	A-4	0	0	100	100	95-100	75-90	20-25	NP-5
	8-18	Stratified very fine sand to silt	ML, SM	A-4	0	0-5	95-100	90-95	70-90	45-65	20-25	NP-5

TABLE 14--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	
123: cont'd												
Jarvis----------	18-60	Very gravelly sand, extremely cobbly sand	GP-GM, SP-SM	A-1	0	15-55	50-70	30-55	20-30	5-10	---	NP
Fubar-----------	0-6	Very fine sandy loam	ML	A-4	0	0-10	95-100	90-100	80-90	65-80	25-30	NP-5
	6-60	Stratified extremely cobbly sand to silt loam	GP, GP-GM, SP, SP-SM	A-1	0	15-45	50-75	30-55	15-35	0-10	---	NP
124:												
Jarvis----------	0-2	Very fine sandy loam	ML	A-4	0	0	100	100	95-100	65-75	25-30	NP-5
	2-8	Very fine sandy loam, silt loam	ML	A-4	0	0	100	100	95-100	75-90	20-25	NP-5
	8-18	Stratified very fine sand to silt	ML, SM	A-4	0	0-5	95-100	90-95	70-90	45-65	20-25	NP-5
	18-60	Very gravelly sand, extremely cobbly sand	GP-GM, SP-SM	A-1	0	15-55	50-70	30-55	20-30	5-10	---	NP
Salchaket-------	0-1	Very fine sandy loam	ML	A-4	0	0	100	100	90-100	65-75	25-30	NP-5
	1-44	Stratified very fine sand to silt	ML, SM	A-4	0	0	100	95-100	85-95	40-65	25-30	NP-5
	44-60	Very gravelly sand, extremely cobbly sand	GP-GM, SP-SM	A-1	0	15-35	50-70	30-55	20-30	5-10	---	NP
125: Pergelic Cryohemists.												
126: Pits, gravel.												
127: Riverwash.												
128: Rubble land.												
129:												
Salchaket-------	0-1	Very fine sandy loam	ML	A-4	0	0	100	100	90-100	65-75	25-30	NP-5
	1-44	Stratified very fine sand to silt	ML, SM	A-4	0	0	100	95-100	85-95	40-65	25-30	NP-5
	44-60	Very gravelly sand, extremely cobbly sand	GP-GM, SP-SM	A-1	0	15-35	50-70	30-55	20-30	5-10	---	NP

TABLE 14--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	
130:												
Saulich---------	8-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-2	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	2-7	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	7-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
131:												
Saulich---------	8-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-2	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	2-7	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	7-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
132:												
Saulich---------	8-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-2	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	2-7	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	7-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
133:												
Saulich---------	8-0	Peat	PT	A-8	0	0	0	0	0	0	---	NP
	0-2	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	2-7	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	65-75	30-40	NP-10
	7-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
Fairbanks-------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-5
	2-60	Silt loam, very fine sandy loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-5
134:												
Steese----------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	2-26	Silt, silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	26-32	Very channery silt loam	GM, SM	A-1, A-2	0	15-20	50-70	30-50	25-45	20-35	---	NP
	32-36	Weathered bedrock			0	0	0	0	0	0	---	NP
135:												
Steese----------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	2-26	Silt, silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	26-32	Very channery silt loam	GM, SM	A-1, A-2	0	15-20	50-70	30-50	25-45	20-35	---	NP
	32-36	Weathered bedrock			0	0	0	0	0	0	---	NP
136:												
Steese----------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	2-26	Silt, silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-10
	26-32	Very channery silt loam	GM, SM	A-1, A-2	0	15-20	50-70	30-50	25-45	20-35	---	NP
	32-36	Weathered bedrock			0	0	0	0	0	0	---	NP
Gilmore---------	0-2	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	30-40	NP-10
	2-9	Silt loam, silt	ML	A-4	0	0	100	100	85-95	75-85	25-35	NP-10

TABLE 14--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	
136: cont'd												
Gilmore---------	9-17	Very channery silt loam, extremely channery silt loam	GM	A-4, A-2	0-5	25-40	55-65	50-60	35-50	25-40	---	NP
	17-21	Weathered bedrock			0	0	0	0	0	0	---	NP
137:												
Tanana----------	0-4	Silt loam	ML	A-4	0	0	100	100	95-100	75-90	30-40	NP-10
	4-35	Silt loam	ML	A-4	0	0	100	100	95-100	75-90	30-40	NP-10
	35-60	Ice or frozen soil			0	0	0	0	0	0	---	NP
138:												
Typic Cryochrepts.												
Typic Cryochrepts, stony.												
Rock outcrop.												

TABLE 15--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi-bility group	Organic matter
								K	T		
	In	Pct	G/cc	In/hr	In/in	pH					Pct
101, 102:											
Bohica-----------	0-2	5-10	1.10-1.20	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	5	2	3-5
	2-16	5-10	1.20-1.30	0.6-2.0	0.15-0.18	5.6-7.3	Low----------	0.32			
	16-60	5-10	1.20-1.30	0.6-2.0	0.15-0.18	5.6-7.3	Low----------	0.32			
103.											
Dumps, mine											
104, 105:											
Ester------------	10-0	0-2	0.05-0.10	2.0-6.0	0.25-0.30	<4.5	Low----------	0.05	1	8	80-95
	0-4	5-10	1.10-1.20	0.6-2.0	0.20-0.22	4.5-6.5	Low----------	0.37			
	4-12	---	---	---	---	---	-------------	----			
	12-16	---	---	---	---	---	-------------	----			
106:											
Ester------------	10-0	0-2	0.05-0.10	2.0-6.0	0.25-0.30	<4.5	Low----------	0.05	1	8	80-95
	0-4	5-10	1.10-1.20	0.6-2.0	0.20-0.22	4.5-6.5	Low----------	0.37			
	4-12	---	---	---	---	---	-------------	----			
	12-16	---	---	---	---	---	-------------	----			
Gilmore----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.37	1	2	2-8
	2-9	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.43			
	9-17	0-5	1.40-1.50	2.0-6.0	0.05-0.10	5.1-6.5	Low----------	0.15			
	17-21	---	---	---	---	---	-------------	----			
107, 108, 109:											
Fairbanks--------	0-2	5-10	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.37	5	2	2-6
	2-60	0-10	1.10-1.20	0.6-2.0	0.20-0.22	5.1-8.4	Low----------	0.43			
110, 111, 112:											
Gilmore----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.37	1	2	2-8
	2-9	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.43			
	9-17	0-5	1.40-1.50	2.0-6.0	0.05-0.10	5.1-6.5	Low----------	0.15			
	17-21	---	---	---	---	---	-------------	----			
113:											
Gilmore----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.37	1	2	2-8
	2-9	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.43			
	9-17	0-5	1.40-1.50	2.0-6.0	0.05-0.10	5.1-6.5	Low----------	0.15			
	17-21	---	---	---	---	---	-------------	----			
Ester------------	10-0	0-2	0.05-0.10	2.0-6.0	0.25-0.30	<4.5	Low----------	0.05	1	8	80-95
	0-4	5-10	1.10-1.20	0.6-2.0	0.20-0.22	4.5-6.5	Low----------	0.37			
	4-12	---	---	---	---	---	-------------	----			
	12-16	---	---	---	---	---	-------------	----			
114:											
Gilmore----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.37	1	2	2-8
	2-9	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.43			
	9-17	0-5	1.40-1.50	2.0-6.0	0.05-0.10	5.1-6.5	Low----------	0.15			
	17-21	---	---	---	---	---	-------------	----			

TABLE 15--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH					Pct
114: (cont'd)											
Steese-----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.37	2	2	2-6
	2-26	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.43			
	26-32	0-5	1.30-1.40	2.0-6.0	0.05-0.10	5.6-6.5	Low----------	0.15			
	32-36	---	---	---	---	---	-------------	----			
115, 116:											
Goldstream-------	13-0	0-2	0.08-0.12	2.0-6.0	0.25-0.30	<4.5	Low----------	0.05	1	8	85-95
	0-6	5-10	1.00-1.20	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.37			
	6-13	5-10	1.00-1.20	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.55			
	13-60	---	---	---	---	---	-------------	----			
117:											
Goldstream-------	13-0	0-2	0.08-0.12	2.0-6.0	0.25-0.30	<4.5	Low----------	0.05	1	8	85-95
	0-6	5-10	1.00-1.20	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.37			
	6-13	5-10	1.00-1.20	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.55			
	13-60	---	---	---	---	---	-------------	----			
Pergelic cryohemists.											
118, 119:											
Histic pergelic cryaquepts.											
120:											
Histic pergelic cryaquepts.											
Fubar------------	0-6	5-10	1.20-1.30	0.6-2.0	0.15-0.17	5.6-6.5	Low----------	0.28	1	3	2-4
	6-60	0-5	1.50-1.60	6.0-20	0.04-0.06	5.6-7.3	Low----------	0.05			
121, 122:											
Histic pergelic cryaquepts.											
Typic cryochrepts.											
123:											
Jarvis-----------	0-2	5-10	1.10-1.20	0.6-2.0	0.19-0.22	5.1-6.5	Low----------	0.37	1	2	3-6
	2-8	5-10	1.10-1.20	0.6-2.0	0.18-0.20	5.1-6.5	Low----------	0.43			
	8-18	0-10	1.10-1.20	0.6-2.0	0.15-0.18	5.6-7.3	Low----------	0.32			
	18-60	0-5	1.60-1.70	6.0-20	0.03-0.06	5.6-7.3	Low----------	0.05			
Fubar------------	0-6	5-10	1.20-1.30	0.6-2.0	0.20-0.22	5.6-6.5	Low----------	0.32	1	2	2-4
	6-60	0-5	1.50-1.60	6.0-20	0.04-0.06	5.6-7.3	Low----------	0.05			
124:											
Jarvis-----------	0-2	5-10	1.10-1.20	0.6-2.0	0.19-0.22	5.1-6.5	Low----------	0.37	1	2	3-6
	2-8	5-10	1.10-1.20	0.6-2.0	0.18-0.20	5.1-6.5	Low----------	0.43			
	8-18	0-10	1.10-1.20	0.6-2.0	0.15-0.18	5.6-7.3	Low----------	0.32			
	18-60	0-5	1.60-1.70	6.0-20	0.03-0.06	5.6-7.3	Low----------	0.05			
Salchaket--------	0-1	5-10	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.37	3	2	3-6
	1-44	5-10	1.10-1.20	0.6-2.0	0.20-0.22	5.6-6.5	Low----------	0.43			
	44-60	0-5	1.50-1.60	6.0-20	0.02-0.04	6.1-7.3	Low----------	0.05			

TABLE 15--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH					Pct
125: Pergelic cryohemists.											
126: Pits, gravel.											
127: Riverwash.											
128: Rubble land.											
129: Salchaket--------	0-1	5-10	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.37	3	2	3-6
	1-44	5-10	1.10-1.20	0.6-2.0	0.20-0.22	5.6-6.5	Low----------	0.43			
	44-60	0-5	1.50-1.60	6.0-20	0.02-0.04	6.1-7.3	Low----------	0.05			
130, 131, 132: Saulich----------	8-0	0-3	0.07-0.18	2.0-6.0	0.30-0.35	4.5-5.5	Low----------	0.05	1	8	80-90
	0-2	0-5	1.10-1.20	0.6-2.0	0.23-0.25	5.1-5.5	Low----------	0.37			
	2-7	0-5	1.10-1.20	0.6-2.0	0.21-0.23	5.6-6.5	Low----------	0.43			
	7-60	---	---	---	---	---	-------------	----			
133: Saulich----------	8-0	0-3	0.07-0.18	2.0-6.0	0.30-0.35	4.5-5.5	Low----------	0.05	1	8	80-90
	0-2	0-5	1.10-1.20	0.6-2.0	0.23-0.25	5.1-5.5	Low----------	0.37			
	2-7	0-5	1.10-1.20	0.6-2.0	0.21-0.23	5.6-6.5	Low----------	0.43			
	7-60	---	---	---	---	---	-------------	----			
Fairbanks--------	0-2	5-10	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.37	5	2	2-6
	2-60	0-10	1.10-1.20	0.6-2.0	0.20-0.22	5.1-8.4	Low----------	0.43			
134, 135: Steese-----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.37	2	2	2-6
	2-26	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.43			
	26-32	0-5	1.30-1.40	2.0-6.0	0.05-0.10	5.6-6.5	Low----------	0.15			
	32-36	---	---	---	---	---	-------------	----			
136: Steese-----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.37	2	2	2-6
	2-26	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.43			
	26-32	0-5	1.30-1.40	2.0-6.0	0.05-0.10	5.6-6.5	Low----------	0.15			
	32-36	---	---	---	---	---	-------------	----			
Gilmore----------	0-2	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.37	1	2	2-8
	2-9	0-5	1.10-1.20	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.43			
	9-17	0-5	1.40-1.50	2.0-6.0	0.05-0.10	5.1-6.5	Low----------	0.15			
	17-21	---	---	---	---	---	-------------	----			
137: Tanana-----------	0-4	5-10	1.10-1.20	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.37	3	2	2-6
	4-35	5-10	1.10-1.20	0.6-2.0	0.20-0.23	5.6-7.3	Low----------	0.43			
	35-60	---	---	---	---	---	-------------	----			
138: Typic cryochrepts.											

TABLE 15--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH					Pct
138: (cont'd)											
Typic cryochrepts, stony.											
Rock outcrop.											

TABLE 16--WATER FEATURES

("Flooding" and "Water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that the data were not estimated.)

Map symbol and soil name	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Water table depth	Kind of water table	Months
					Ft		
101:							
Bohica	B	None	---	---	>6.0	---	---
102:							
Bohica	B	None	---	---	>6.0	---	---
103:							
Dumps, mine.							
104:							
Ester	D	None	---	---	0.0-1.0	Perched	Jan-Dec
105:							
Ester	D	None	---	---	0.0-1.0	Perched	Jan-Dec
106:							
Ester	D	None	---	---	0.0-1.0	Perched	Jan-Dec
Gilmore	D	None	---	---	>6.0	---	---
107:							
Fairbanks	B	None	---	---	>6.0	---	---
108:							
Fairbanks	B	None	---	---	>6.0	---	---
109:							
Fairbanks	B	None	---	---	>6.0	---	---
110:							
Gilmore	D	None	---	---	>6.0	---	---
111:							
Gilmore	D	None	---	---	>6.0	---	---
112:							
Gilmore	D	None	---	---	>6.0	---	---
113:							
Gilmore	D	None	---	---	>6.0	---	---
Ester	D	None	---	---	0.0-1.0	Perched	Jan-Dec
114:							
Gilmore	D	None	---	---	>6.0	---	---
Steese	B	None	---	---	>6.0	---	---
115:							
Goldstream	D	None	---	---	0.0-0.5	Perched	Jan-Dec
116:							
Goldstream	D	None	---	---	0.0-0.5	Perched	Jan-Dec

TABLE 16--WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table		
		Frequency	Duration	Months	Water table depth	Kind of water table	Months
					Ft		
117:							
Goldstream---------	D	None	---	---	0.0-0.5	Perched	Jan-Dec
Pergelic Cryohemists.							
118:							
Histic Pergelic Cryaquepts--------		None	---	---	---	---	---
119:							
Histic Pergelic Cryaquepts--------		None	---	---	---	---	---
120:							
Histic Pergelic Cryaquepts.							
Fubar--------------	C	Frequent	Brief	May-Aug	3.0-6.0	Apparent	Jun-Aug
121:							
Histic Pergelic Cryaquepts--------		None	---	---	0.0-1.5	---	Jan-Dec
Typic Cryochrepts--		None	---	---	---	---	---
122:							
Histic Pergelic Cryaquepts--------		None	---	---	0.0-1.0	---	Jan-Dec
Typic Cryochrepts--		None	---	---	---	---	---
123:							
Jarvis-------------	B	Occasional	---	May-Aug	>6.0	---	---
Fubar--------------	C	Frequent	---	May-Aug	3.0-6.0	Apparent	Jun-Aug
124:							
Jarvis-------------	B	Occasional	---	May-Aug	>6.0	---	---
Salchaket----------	B	Rare	---	---	>6.0	---	---
125:							
Pergelic Cryohemists-------		None	---	---	---	---	---
126:							
Pits, gravel.							
127:							
Riverwash---------		Frequent	Long	Jan-Dec	---	---	---
128:							
Rubble land.							
129:							
Salchaket---------	B	Rare	---	---	>6.0	---	---

TABLE 16--WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table		
		Frequency	Duration	Months	Water table depth	Kind of water table	Months
					Ft		
130:							
Saulich-----------	D	None	---	---	0.5-1.5	Perched	Jan-Dec
131:							
Saulich-----------	D	None	---	---	0.5-1.5	Perched	Jan-Dec
132:							
Saulich-----------	D	None	---	---	0.5-1.5	Perched	Jan-Dec
133:							
Saulich-----------	D	None	---	---	0.5-1.5	Perched	Jan-Dec
Fairbanks---------	B	None	---	---	>6.0	---	---
134:							
Steese------------	B	None	---	---	>6.0	---	---
135:							
Steese------------	B	None	---	---	>6.0	---	---
136:							
Steese------------	B	None	---	---	>6.0	---	---
Gilmore-----------	D	None	---	---	>6.0	---	---
137:							
Tanana------------	C	None	---	---	2.5-5.0	Perched	Jan-Dec
138:							
Typic Cryochrepts-		None	---	---	---	---	---
Typic Cryochrepts, stony------------		None	---	---	---	---	---
Rock outcrop.							

TABLE 17--HYDRIC SOILS LIST

Map units are listed in alpha-numeric order by map unit symbol. The "Hydric soils criteria" columns indicate the conditions that caused the map unit component to be classified as "Hydric" or "Non-Hydric". These criteria are defined in "Hydric Soils of the United States" (USDA Miscellaneous Publication No. 1491, June 1991). See the "Criteria for Hydric Soils" endnote to determine the meaning of these columns. Spot symbols are footnoted at the end of the table.

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
101: Bohica silt loam, 0 to 3 percent slopes	Bohica	No	---	---	---	---	---
	Permafrost soils	Yes	Terrace	2b3	Yes	No	No
	Shallower soils	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
102: Bohica silt loam, 3 to 7 percent slopes	Bohica	No	---	---	---	---	---
	Permafrost soils	Yes	Terrace	2b3	Yes	No	No
	Shallower soils	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
103: Dumps, mine	Dumps, mine	No	---	---	---	---	---
	Ponded areas	Yes	Depression	3	No	No	Yes
104: Ester peat, 7 to 15 percent slopes	Ester	Yes	Hill	2b3	Yes	No	No
	Histosols	Yes	Depression	1	No	No	No
	Shallower soils	Yes	Hill	2b2	Yes	No	No
105: Ester peat, 15 to 45 percent slopes	Ester	Yes	Hill	2b3	Yes	No	No
	Histosols	Yes	Depression	1	No	No	No
	Shallower soils	Yes	Hill	2b2	Yes	No	No
106: Ester-Gilmore complex, 15 to 45 percent slopes	Ester	Yes	Hill	2b3	Yes	No	No
	Gilmore	No	---	---	---	---	---
	Fairbanks	No	---	---	---	---	---
	Rock outcrop	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
	Steese	No	---	---	---	---	---

TABLE 17--HYDRIC SOILS LIST--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
107: Fairbanks silt loam, 3 to 7 percent slopes	Fairbanks	No	---	---	---	---	---
	Gilmore	No	---	---	---	---	---
	Permafrost soils	Yes	Depression	2b3	Yes	No	No
	Steese	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
108: Fairbanks silt loam, 7 to 12 percent slopes	Fairbanks	No	---	---	---	---	---
	Gilmore	No	---	---	---	---	---
	Permafrost soils	Yes	Depression	2b3	Yes	No	No
	Steese	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
109: Fairbanks silt loam, 12 to 20 percent slopes	Fairbanks	No	---	---	---	---	---
	Gilmore	No	---	---	---	---	---
	Permafrost soils	Yes	Hill	2b3	Yes	No	No
	Steese	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
110: Gilmore silt loam, 3 to 7 percent slopes	Gilmore	No	---	---	---	---	---
	Permafrost soils	Yes	Depression	2b3	Yes	No	No
	Steeper slopes	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
111: Gilmore silt loam, 7 to 12 percent slopes	Gilmore	No	---	---	---	---	---
	Permafrost soils	Yes	Depression	2b3	Yes	No	No
	Steeper slopes	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
112: Gilmore silt loam, 12 to 45 percent slopes	Gilmore	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
	Permafrost soils	Yes	Hill	2b3	Yes	No	No

TABLE 17--HYDRIC SOILS LIST--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
113:							
Gilmore-Ester complex, 15 to 45 percent slopes	Gilmore	No	---	---	---	---	---
	Ester	Yes	Hill	2b3	Yes	No	No
	Fairbanks	No	---	---	---	---	---
	Histosols	Yes	Hill	1	No	No	No
	Rock outcrop	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
	Steese	No	---	---	---	---	---
114:							
Gilmore-Steese complex, 3 to 15 percent slopes	Gilmore	No	---	---	---	---	---
	Steese	No	---	---	---	---	---
	Aquic Cryochrepts	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
115:							
Goldstream peat, 0 to 3 percent slopes	Goldstream	Yes	Alluvial flat	2b3	Yes	No	No
	Ponded areas	Yes	Depression	2b2,3	Yes	No	Yes
	Histosols	Yes	Depression	1	No	No	No
	Steeper slopes	No	---	---	---	---	---
116:							
Goldstream peat, 3 to 7 percent slopes	Goldstream	Yes	Alluvial flat	2b3	Yes	No	No
	Ponded areas	Yes	Depression	2b2,3	Yes	No	Yes
	Histosols	Yes	Depression	1	No	No	No
	Steeper slopes	No	---	---	---	---	---
117:							
Goldstream-Pergelic Cryohemists complex, 0 to 2 percent slopes	Goldstream	Yes	Alluvial flat	2b3	Yes	No	No
	Pergelic Cryohemists	Yes	Alluvial flat	1	No	No	No
	Ponded areas	Yes	Depression	2b2,3	Yes	No	Yes
118:							
Histic Pergelic Cryaquepts, fans, 1 to 20 percent slopes	Histic Pergelic Cryaquepts	Yes	Alluvial fan	2b3	Yes	No	No
	Histosols	Yes	Depression	1	No	No	No
	Steeper slopes	No	---	---	---	---	---

TABLE 17--HYDRIC SOILS LIST--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
119: Histic Pergelic Cryaquepts, 15 to 45 percent slopes	Histic Pergelic Cryaquepts	Yes	Hill	2b3	Yes	No	No
	Histosols	Yes	Depression	1	No	No	No
	Shallower soils	No	---	---	---	---	---
120: Histic Pergelic Cryaquepts-Fubar complex, 3 to 7 percent slopes	Histic Pergelic Cryaquepts	Yes	Flood plain	2b3	Yes	No	No
	Fubar	No	---	---	---	---	---
	Histosols	Yes	Depression	1	No	No	No
	Ponded areas	Yes	Depression	2b2,3	Yes	No	Yes
	Steeper slopes	No	---	---	---	---	---
121: Histic Pergelic Cryaquepts-Typic Cryochrepts association, 15 to 45 percent slopes	Histic Pergelic Cryaquepts	Yes	Hill	2b1	Yes	No	No
	Typic Cryochrepts	No	---	---	---	---	---
	Rock outcroppings	No	---	---	---	---	---
	Somewhat poorly drained soils	No	---	---	---	---	---
122: Histic Pergelic Cryaquepts-Typic Cryochrepts complex, 15 to 45 percent slopes	Histic Pergelic Cryaquepts	Yes	Hill	2b1	Yes	No	No
	Typic Cryochrepts	No	---	---	---	---	---
	Rock outcroppings	No	---	---	---	---	---
	Somewhat poorly drained soils	No	---	---	---	---	---
123: Jarvis-Fubar complex, 0 to 3 percent slopes	Jarvis	No	---	---	---	---	---
	Fubar	No	---	---	---	---	---
	Permafrost soils	Yes	Flood plain	2b3	Yes	No	No
	Aquepts	Yes	Depression	2b2	Yes	No	No
124: Jarvis-Salchaket complex, 0 to 3 percent slopes	Jarvis	No	---	---	---	---	---
	Salchaket	No	---	---	---	---	---

TABLE 17--HYDRIC SOILS LIST--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
124: Jarvis-Salchaket complex, 0 to 3 percent slopes (cont'd)	Abandoned channels, sloughs	Yes	Depression	2b2,3	Yes	No	Yes
	Fubar	No	---	---	---	---	---
125: Pergelic Cryohemists	Pergelic Cryohemists	Yes	Alluvial flat	1	No	No	No
	Small ponds	No	---	---	---	---	---
126: Pits, gravel	Pits, gravel	No	---	---	---	---	---
	Small ponds	No	---	---	---	---	---
127: Riverwash	Riverwash	Yes	Flood plain	4	No	Yes	No
	Fluvents	Yes	Flood plain	4	No	Yes	No
128: Rubble land	Rubble land	No	---	---	---	---	---
	Rock outcrop	No	---	---	---	---	---
129: Salchaket very fine sandy loam, 0 to 2 percent slopes	Salchaket	No	---	---	---	---	---
	Jarvis	No	---	---	---	---	---
	Permafrost soils	Yes	Flood plain	2b3	Yes	No	No
130: Saulich peat, 3 to 7 percent slopes	Saulich	Yes	Alluvial fan	2b3	Yes	No	No
	Histosols	Yes	Depression	1	No	No	No
	Steeper slopes	No	---	---	---	---	---
131: Saulich peat, 7 to 12 percent slopes	Saulich	Yes	Alluvial fan	2b3	Yes	No	No
	Histosols	Yes	Depression	1	No	No	No
	Steeper slopes	No	---	---	---	---	---
132: Saulich peat, 12 to 20 percent slopes	Saulich	Yes	Hill	2b3	Yes	No	No
	Histosols	Yes	Depression	1	No	No	No
	Steeper slopes	No	---	---	---	---	---

TABLE 17--HYDRIC SOILS LIST--Continued

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
133:							
Saulich-Fairbanks complex, 3 to 12 percent slopes	Saulich	Yes	Hill	2b3	Yes	No	No
	Fairbanks	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
	Steese	No	---	---	---	---	---
134:							
Steese silt loam, 7 to 12 percent slopes	Steese	No	---	---	---	---	---
	Permafrost soils	Yes	Hill	2b3	Yes	No	No
	Shallower soils	No	---	---	---	---	---
	Steeper slopes	No	---	---	---	---	---
135:							
Steese silt loam, 12 to 45 percent slopes	Steese	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
	Permafrost soils	Yes	Hill	2b3	Yes	No	No
136:							
Steese-Gilmore complex, 10 to 45 percent slopes	Steese	No	---	---	---	---	---
	Gilmore	No	---	---	---	---	---
	Shallower soils	No	---	---	---	---	---
137:							
Tanana silt loam, moderately wet, 0 to 3 percent slopes	Tanana	No	---	---	---	---	---
	Permafrost soils	Yes	Alluvial flat	2b3	Yes	No	No
	Aquepts	Yes	Alluvial flat	2b2	Yes	No	No
138:							
Typic Cryochrepts-Rock outcrop complex, 6 to 35 percent slopes	Typic Cryochrepts	No	---	---	---	---	---
	Typic Cryochrepts, stony	No	---	---	---	---	---
	Rock outcrop	No	---	---	---	---	---
	Aquepts	Yes	Hill	2b3	Yes	No	No
	Permafrost soils	Yes	Hill	2b2	Yes	No	No
	Rubble land	No	---	---	---	---	---
139:							
Water	Water	No	---	---	---	---	---

FOOTNOTE: There may be small areas of included soils or miscellaneous areas that are significant to use and management of the soil yet are too small to delineate on the soil map at the map's original scale. These may be designated as spot symbols and are defined in the published Soil Survey Report or the USDA-NRCS Technical Guide, Part II.

ENDNOTE: HYDRIC SOILS CRITERIA CODES AND DEFINITIONS

1. All Histosols, except Folists, or
2. Soils in Aquic suborder, Aquic subgroup, Albolls suborder, Salorthids great group, Pell great group of Vertisols, Pachic subgroup, or Cumulic subgroups that are:
    a. somewhat poorly drained and have a frequently occurring water table less than 0.5 feet from the surface for a significant period (usually 14 consecutive days or more) during the growing season, or
    b. poorly drained or very poorly drained and have either:
        (1) a frequently occurring water table less than 0.5 feet from the surface for a significant period (usually 14 consecutive days or more) during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches, or for other soils,
        (2) a frequently occurring water table less than 1.0 feet from the surface for a significant period (usually 14 consecutive days or more) during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within 20 inches, or
        (3) a frequently occurring water table less than 1.5 feet from the surface for a significant period (usually 14 consecutive days or more) during the growing season if permeability is less than 6.0 in/hr in any layers within 20 inches, or
3. Soils that are frequently ponded for long or very long duration during the growing season, or
4. Soils that are frequently flooded for long or very long duration during the growing season.

TABLE 18--SOIL FEATURES

(The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
101:							
Bohica---------	>60	---	---	---	Moderate	Moderate	Moderate
102:							
Bohica---------	>60	---	---	---	Moderate	Moderate	Moderate
103:							
Dumps, mine.							
104:							
Ester----------	12-20	Soft	---	---	High	High	High
105:							
Ester----------	12-20	Soft	---	---	High	High	High
106:							
Ester----------	12-20	Soft	---	---	High	High	High
Gilmore--------	5-20	Soft	---	---	Moderate	Moderate	Moderate
107:							
Fairbanks------	>60	---	---	---	High	Moderate	Moderate
108:							
Fairbanks------	>60	---	---	---	High	Moderate	Moderate
109:							
Fairbanks------	>60	---	---	---	High	Moderate	Moderate
110:							
Gilmore--------	5-20	Soft	---	---	Moderate	Moderate	Moderate
111:							
Gilmore--------	5-20	Soft	---	---	Moderate	Moderate	Moderate
112:							
Gilmore--------	5-20	Soft	---	---	Moderate	Moderate	Moderate
113:							
Gilmore--------	5-20	Soft	---	---	Moderate	Moderate	Moderate
Ester----------	12-20	Soft	---	---	High	High	High
114:							
Gilmore--------	5-20	Soft	---	---	Moderate	Moderate	Moderate
Steese---------	20-40	Soft	---	---	Moderate	Moderate	Moderate
115:							
Goldstream-----	>60	---	1-6	6-12	High	High	High
116:							
Goldstream-----	>60	---	1-6	6-12	High	High	High
117:							
Goldstream-----	>60	---	1-6	6-12	High	High	High

TABLE 18--SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
117: (cont'd)							
Pergelic Cryohemists.							
118:							
Histic Pergelic Cryaquepts.							
119:							
Histic Pergelic Cryaquepts.							
120:							
Histic Pergelic Cryaquepts.							
Fubar----------	>60	---	---	---	Low	Moderate	Moderate
121:							
Histic Pergelic Cryaquepts.							
Typic Cryochrepts.							
122:							
Histic Pergelic Cryaquepts.							
Typic Cryochrepts.							
123:							
Jarvis---------	>60	---	---	---	Moderate	Moderate	Moderate
Fubar----------	>60	---	---	---	Low	Moderate	Moderate
124:							
Jarvis---------	>60	---	---	---	Moderate	Moderate	Moderate
Salchaket------	>60	---	---	---	Moderate	Moderate	Moderate
125:							
Pergelic Cryohemists.							
126:							
Pits, gravel.							
127:							
Riverwash.							
128:							
Rubble land.							
129:							
Salchaket------	>60	---	---	---	Moderate	Moderate	Moderate
130:							
Saulich--------	>60	---	4-8	6-12	High	High	High

TABLE 18--SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
131:							
Saulich--------	>60	---	4-8	6-12	High	High	High
132:							
Saulich--------	>60	---	4-8	6-12	High	High	High
133:							
Saulich--------	>60	---	4-8	6-12	High	High	High
Fairbanks------	>60	---	---	---	High	Moderate	Moderate
134:							
Steese---------	20-40	Soft	---	---	Moderate	Moderate	Moderate
135:							
Steese---------	20-40	Soft	---	---	Moderate	Moderate	Moderate
136:							
Steese---------	20-40	Soft	---	---	Moderate	Moderate	Moderate
Gilmore--------	5-20	Soft	---	---	Moderate	Moderate	Moderate
137:							
Tanana---------	>60	---	0-1	1-3	Moderate	Moderate	Moderate
138:							
Typic Cryochrepts.							
Typic Cryochrepts, stony.							
Rock outcrop.							

TABLE 19--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Bohica	Typic Cryochrepts, coarse-loamy, mixed
Ester	Histic Pergelic Cryaquepts, loamy, mixed, acid
Fairbanks	Typic Cryochrepts, coarse-silty, mixed
Fubar	Typic Cryofluvents, sandy-skeletal, mixed
Gilmore	Typic Cryochrepts, loamy-skeletal, mixed, shallow
Goldstream	Histic Pergelic Cryaquepts, loamy, mixed, acid
Histic Pergelic Cryaquepts	Histic Pergelic Cryaquepts
Jarvis	Typic Cryofluvents, coarse-loamy over sandy or sandy-skeletal, mixed, nonacid
Pergelic Cryohemists	Pergelic Cryohemists
Salchaket	Typic Cryofluvents, coarse-loamy, mixed, nonacid
Saulich	Histic Pergelic Cryaquepts, loamy, mixed, nonacid
Steese	Typic Cryochrepts, coarse-loamy, mixed
Tanana	Pergelic Cryaquepts, loamy, mixed, nonacid
Typic Cryochrepts	Typic Cryochrepts