United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the Alaska Army National Guard, State of Alaska Department of Military and Veteran's Affairs, University of Alaska Fairbanks Agriculture and Forestry Experiment Station and the Alaska Soil and Water Conservation District

Soil Survey of Stewart River Training Area, Alaska

How To Use This Soil Survey

General Soil Map

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

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

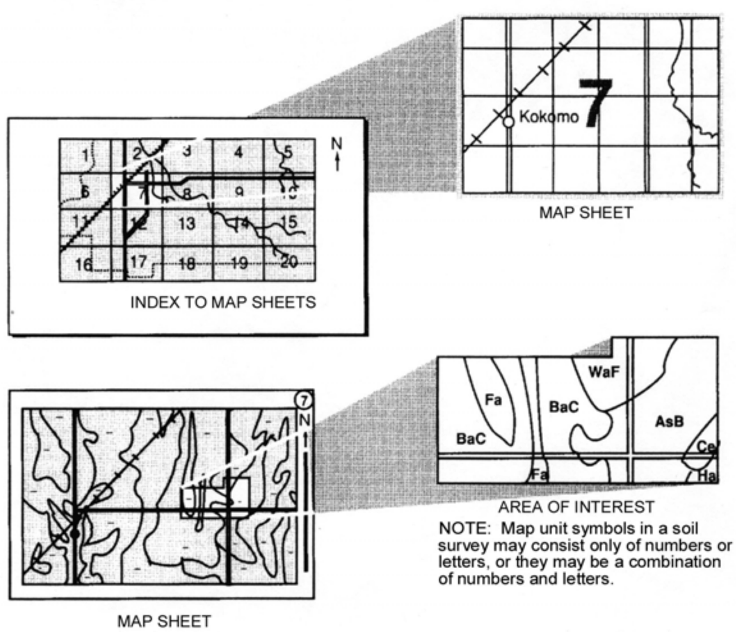
Detailed Soil Maps

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

To find information about your area of interest, locate that area on the **Index to Map Sheets** located in the lower left corner of each detailed map sheet. Note the number of the map sheet and turn to that sheet.

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

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



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

Major fieldwork for this soil survey was completed in 2004. Soil names and descriptions were approved in 2005. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2004. This survey was made cooperatively by the Natural Resources Conservation Service and the Alaska Army National Guard, State of Alaska Department of Military and Veteran's Affairs, University of Alaska Fairbanks Agriculture and Forestry Experiment Station and the Alaska Soil and Water Conservation District. This survey is part of the technical assistance furnished through the Alaska Soil and Water Conservation District.

Cover: A northerly view along Silver Creek Valley, a small tributary of Stewart River. Boldrin, poorly drained shallow soils over permafrost occupy the gentle slopes in the foreground.

Additional information about the nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov.

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Foreword

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

This soil survey is designed for many different users. Government agencies, community officials, Alaska Native tribes, 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 on 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 or to permafrost. Some are too unstable to be used as a foundation for buildings or roads. Wet soils are poorly suited to use for waste treatment systems. A high water table makes a soil poorly suited to basements or underground installations.

Many soil properties that affect land use are described in this soil survey. 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 Palmer office of the Natural Resources Conservation Service or Alaska Cooperative Extension.

Robert N. Jones
State Conservationist
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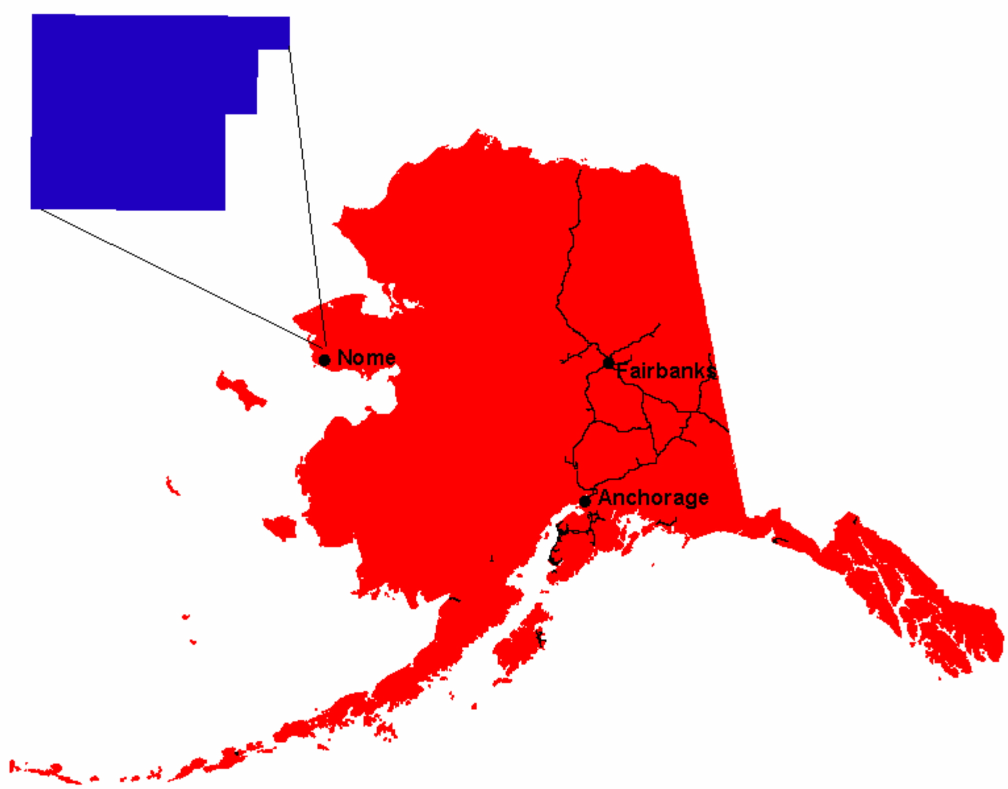

Figure 1. Location of Stewart River Training Area in Alaska.

Soil Survey of **Stewart River Training Area, Alaska**

By Mark Clark, Natural Resources Conservation Service

Fieldwork by Mark Clark, Casey Schroeder, Heather Oleson, and Brian Bourdon, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service in cooperation with the Alaska Army National Guard, State of Alaska Department of Military and Veteran's Affairs, University of Alaska Fairbanks Agriculture and Forestry Experiment Station and the Alaska Soil and Water Conservation District

General Nature of the Survey Area

Stewart River Training Area includes an area of about 25,000 acres on the Seward Peninsula in northwestern Alaska (Figure 1) at approximate latitude 64° 47' North and longitude 165° 35' West and is within Major Land Resource Area 241-Seward Peninsula Highlands (Soil Survey Staff 2004). The area is approximately 23 miles north of Nome and is accessed from Nome via Glacier Creek Road, a spur of the Teller Road. The site is owned by the Alaska Department of Natural Resources Division of Land, Mining, and Water and leased and managed by the Alaska Army National Guard. Stewart River Training Area supports a variety of users, including civilians and military units. Military users of the area include the 297th Infantry Battalion. Civilian use includes subsistence use by local residents and development of a number of state mining claims, which give the mining claim holder a right to use the surface for mining purposes (Stewart River Training Area-Integrated Natural Resources Management Plan and Environmental Assessment 2001).

The first comprehensive investigation of the soils of Alaska was made in 1946 and published in 1951by the US Department of Agriculture (Hinton and Gardner 1951). This investigation was followed by the Exploratory Soil Survey of Alaska, which was made from 1967–1973 and published in 1979 (Rieger and others 1979). The Stewart River Training Area was included in both of these surveys that covered the entire state at a very small scale. A survey of the entire Seward Peninsula was completed in 1990 by USDA Natural Resources Conservation Service (Van Patten 1990) at 1:125,000 scale. This project provided additional information and maps of greater detail than those presented in the previous surveys of Alaska.

Physiography

The Seward Peninsula contains: extensive uplands of broad convex hills and flat divides that are 500 to 2,000 feet in elevation and are indented by both sharp and broad valleys; isolated groups of rugged glaciated mountains having peaks 2,500 to 4,700 feet in elevation; and coastal lowland and interior basins (Wahrhaftig 1965). The

Stewart River Training Area lies in the south-central part of the Peninsula and includes two river valleys and surrounding low mountains. The Stewart River divides the area in an east-west direction with a total reach of seven miles within the project boundary. The Sinuk River crosses the northwest corner of the area, with only a half-mile stretch falling within the project area boundary. Both streams are low volume with flood plains less than a quarter mile wide (Plate 1). Small remnants of glacial landforms including plains and hills are found scattered along the lengths of both valleys and consist of middle and upper Pleistocene age drift (Bundtzen and others 1994) (Plate 2). Bedrock underlying mountains is primarily Precambrian to Paleozoic age metamorphic rocks including extensive areas of schist and with a single small area of marble along the western edge of the project area (Bundtzen and others 1994). Gentle foot-slopes and toe-slopes extend into the valley proper along the lower mountain flanks (Plate 1). Mid and upper mountain slopes are moderately steep with occasional schist bedrock outcrops in areas of steeper slopes (Plate 3). However, most mountains are gentle enough to traverse on foot. Elevation ranges from about 377 to 623 feet along the valley bottom to a maximum of 2,028 feet in the highest peaks of the surrounding low mountains.

Vegetation

Vegetation throughout the project area is typical of western Alaska tundra types. Medium willow/herbaceous scrub and herbaceous meadow types occupy moister or more mesic riparian areas subject to periodic flooding (Plate 1). Dwarf ericaceous and dwarf ericaceous-lichen types are found on drier well drained upland soils exposed to wind and these types are common to hills and mountains in the survey area (Plate 3). Medium willow/herbaceous scrub and dwarf willow-herbaceous scrub types typify swales on fans, hills, and mountains where snow accumulates and soils remain wet into early summer from melting snow (Plate 4). Sedge wet meadow types are extensive on gently sloping mountains toeslopes as well as broad mountain ridge summits where soils remain saturated over shallow permafrost during much of the summer (Plate 5). Mountain summits and convex slopes at higher elevation have sparse plant cover interspersed with areas devoid of vegetation from wind scour (Plate 6).

Permafrost

Soils with shallow permafrost occupy approximately 23 percent of the Stewart River Training Area (Figure 2). The extent of permafrost in soil map units is provided in Figure 2. The percentage listed for each category indicates the percentage of each map unit underlain by permafrost. Permafrost is common in soils formed in thick loamy textured materials with low rock fragment contents and thick organic deposits (Plate 7). These conditions are common to mountain footslopes, toeslopes, and broad ridge summits (Plate 5 and 8). A more detailed description of permafrost conditions in soils is provided in Formation of Soils.

Climate

The area has a blend of maritime and continental climates. Summers are cool with temperatures influenced by the cold waters of the Bering Sea about 20 miles to the West and South. Early winter temperatures are relatively moderate until pack ice normally forms in January when colder temperatures more typical of a more continental climate prevail. Table 1 gives data on temperature and precipitation for the

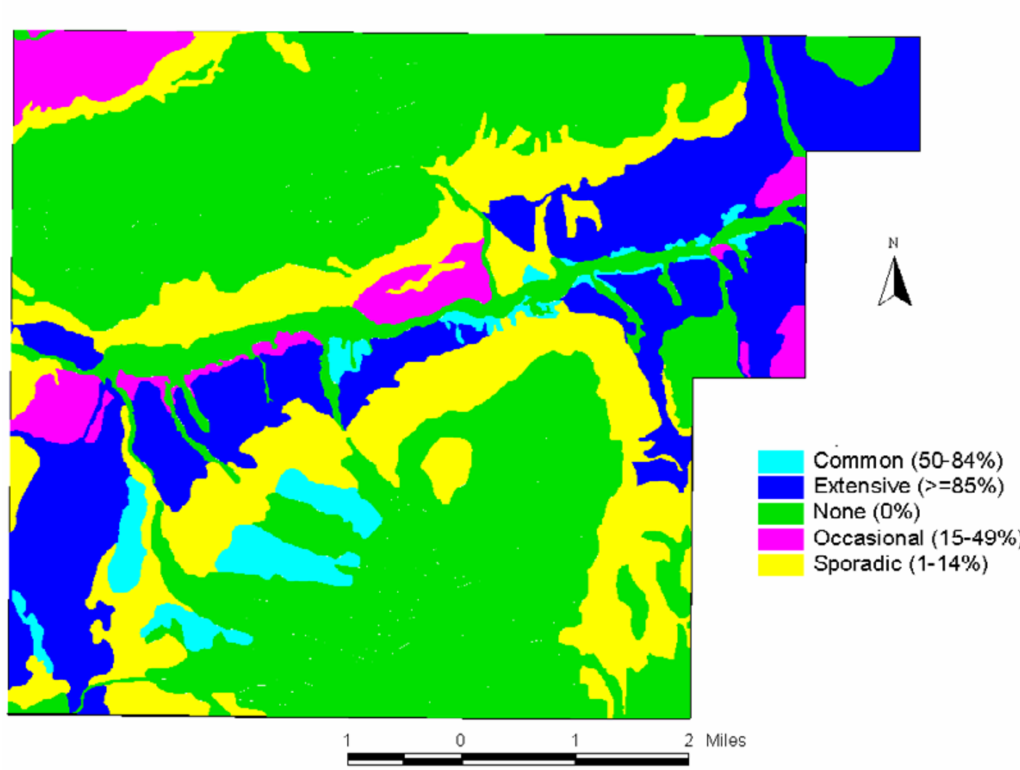

Figure 2. Extent of permafrost in the Stewart River Area

survey area as recorded at Nome for the period 9/1/1949 to 9/30/2004. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. In winter (November through March), the average temperature is 8.5 degrees F (-13.1 degrees C) and the average daily minimum temperature is 0.7 degrees F (-17.4 degrees C). The lowest temperature on record, which occurred on January 26, 1963, is minus 54 degrees F (12.2 degrees C). In summer, the average temperature is 48 degrees F (8.9 degrees C) and the average daily maximum temperature is 41.9 degrees F (5.5 degrees C). The highest recorded temperature, which occurred on July 8, 1968, is 86 degrees F (30.0 degrees C).

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature of 40 degrees F (4 degrees C).

The total annual precipitation at Nome is 15 inches (38 cm). Of this, 9.1 inches (23.1 cm), or 60 percent, usually falls in May through September. The growing season for most plants falls within this period. In 2 years out of 10, the rainfall in May through September is less than 4.3 inches (10.8 cm). During many years, a lack of sufficient precipitation in May and June results in a soil moisture deficit during the period of plant emergence.

The average seasonal snowfall is 54.4 inches (138.2 cm). The greatest snow depth at any one time during the period of record was 33 inches (83.8 cm). Snow covers the ground from September to May.

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. To characterize and map the soils, soil scientists dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The soil scientists also observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of native plants; and the kinds of geologic materials. GPS coordinates were recorded for each location where a detailed soil and landscape description was made.

Before beginning the fieldwork, relevant information on the climate, geology, geomorphology, hydrology, and vegetation of the survey area was assembled. Aerial photography of the survey area was acquired and prepared for field use and mapping. Satellite imagery and Light Detection and Ranging (LIDAR) imagery, Alaska High Altitude Photography (AHAP) color-infrared photography taken in August, 1985 at a nominal scale of 1:60,000 and enlarged to 1:24,000 was provided by the Alaska Army National Guard and used for mapping. Field work for the soil survey was conducted during July of 2004.

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 scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. See Figure 3 for a distribution of field stops. These observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. Data was recorded on field data forms and later entered into the Soil Survey Field Data Database (SSFDD) for analysis. After analysis of the field data, 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.

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

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

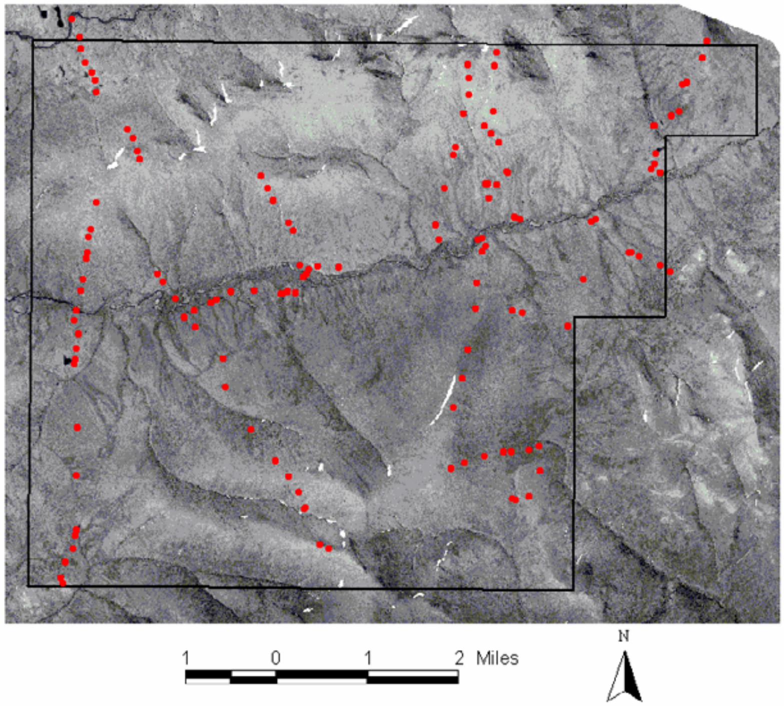

Figure 3. Distribution of field stops used to document map units and soil components.

Light Detection and Ranging (LIDAR) was used to establish natural slope categories for map units and these categories were used in conjunction with the field data to generate an initial soils map. Utilizing the draft map, aerial photography and field data, a final map was developed. Upon completion of field data analysis, results are entered into the National Soil Survey Information System (NASIS). This database is the national repository for soil survey data and is used to generate soil reports and various land use interpretations.

General Soil Map Units

The general soil map in this publication (Figure 4) 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. Two names have been given to each general soil map unit. The first uses the major landform or a combination of landform and position on the landscape on which the unit occurs. The second is named for the major soils occurring within the map unit. The components of one map 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 can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of an individual tract 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. Four general map units are recognized in the Stewart River Training Area.

1. Flood Plains and Fans (Nuluk-Belmezok-Agiapuk association)

Landforms: flood plains and alluvial fans
Description of Major Soils:
Nuluk are very deep, somewhat poorly drained soils formed in stratified loamy alluvium over sandy and gravelly alluvium on flood plains. Belmezok are very deep, somewhat poorly drained soils formed in gravelly alluvium on flood plains. Agiapuk are very deep, well drained soils formed in silty eolian material over sandy and gravelly alluvium on fan terraces.
Slope Range: 0 to 5 percent
Vegetation: willow/herbaceous scrub; dwarf ericaceous shrub/lichen scrub; and shrub birch/lichen scrub.
Principle land use limitations: flooding and shallow water table
Detailed map units included:
AF1-Agiapuk-Pinguk complex, 2 to 5 percent slopes
FP1-Nuluk-Belmezok

2. Glacial Plains, Hills, and Terraces (Tisuk-Imuruk-Distin association)

Landforms: outwash plains, till plains, hills, and stream terraces
Description of Major Soils:
Tisuk are very deep, well drained soils formed in silty eolian material over gravelly till on till plains and hills. Imuruk are very deep, somewhat excessively drained soils formed in silty eolian material over sandy and gravelly outwash on outwash plains

and hills. Distin are deep to very deep over permafrost, poorly drained soils formed in gravelly cryoturbate on terraces and plains.
Slope Range: 0 to 30 percent
Vegetation: dwarf ericaceous shrub/lichen scrub and shrub birch/lichen scrub
Principle land use limitations: short, steep slopes, depth to permafrost, and frost action
Detailed map units included:
TP1-Tisuk-Dirrant complex, 2 to 15 percent slopes
TP2-Imuruk-Tisuk-Dirrant complex, 0 to 30 percent slopes
TS2-Distin-Cassiterite complex

3. Lower Mountain Slopes (Boldrin-Peluk-Tuksuk association)

Landforms: mountain footslopes and toeslopes
Description of Major Soils:
Boldrin are shallow to moderately deep over permafrost, very poorly drained soils formed in loamy or gravelly colluvium on mountain footslopes and toeslopes. Peluk are shallow over permafrost, well drained soils formed in mossy or woody organic material. Tuksuk are moderately deep over bedrock, very poorly drained soils formed in silty eolian deposits over gravelly colluvium on mountain footslopes.
Slope Range: 0 to 12 percent
Vegetation: sedge wet meadow; shrub birch/sedge scrub; shrub birch/lichen scrub; and willow/herbaceous scrub
Principle land use limitations: depth to permafrost, depth to water table, and thermokarst subsidence
Detailed map units included:
FS1-Boldrin-Peluk complex, 5 to 12 percent slopes
FS2-Tuksuk-Kiglauik complex, 5 to 12 percent slopes
TS1-Boldrin-Peluk complex, 0 to 5 percent slopes

4. Upper Mountain Slopes (Sinuktuk-Kiglauik-Tigaraha association)

Landforms: mountain backslopes, shoulders, and summits
Description of Major Soils:
Sinuktuk are moderately deep over bedrock, well drained soils formed in silty eolian deposits over gravelly colluvium derived from schist. Kiglauik are moderately deep, somewhat poorly drained soils formed in loess over colluvium on solifluction lobes. Tigaraha are moderately deep, well drained soils formed in silty eolian deposits over gravelly residuum derived from schist on summits.
Slope Range: 0 to 65 percent
Vegetation: dwarf ericaceous shrub/lichen scrub and willow/herbaceous scrub
Principle land use limitations: shallow to bedrock and moderately steep to steep slope
Detailed map units included:
BS1-Sinuktuk-Kiglauik complex, 15 to 25 percent slopes
BSL1-Sinuktuk-Kiglauik complex, 5 to 15 percent slopes
BSS1-Sinuktuk-Kiglauik-Rock outcrop complex, 25 to 65 percent slopes
SU1-Tigaraha-Rock outcrop complex, 0 to 15 percent slopes
SU2-Boldrin-Sinuktuk complex, 0 to 15 percent slopes
SU3-Kanauguk-Rock outcrop complex, 5 to 25 percent slopes
GM1-Tisuk-Kuzitrin complex, 5 to 20 percent slopes

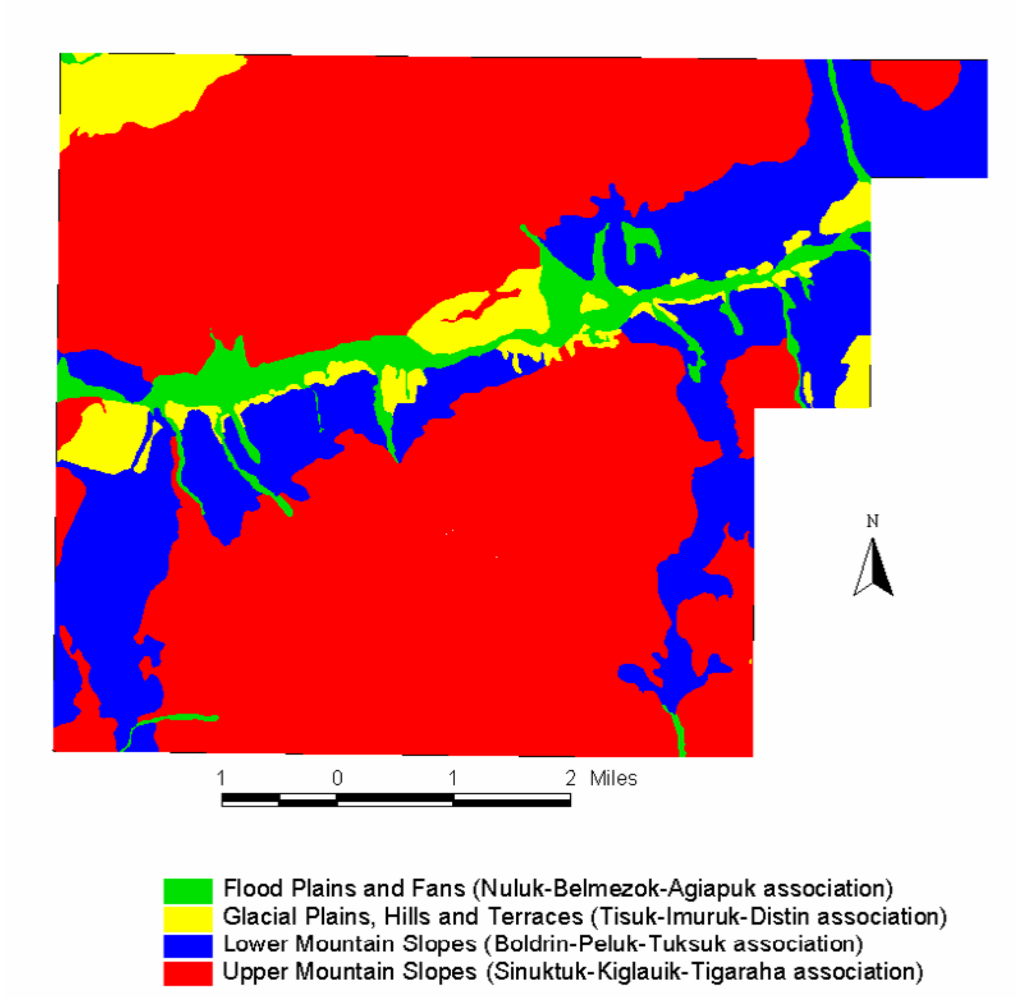

Figure 4. General soil map.

Detailed Soil Map Units

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

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

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

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

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

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. All general map units for the Stewart River Training Area are associations. *Upper Mountain Slopes (Sinuktuk-Kiglauik-Tigaraha association)* is an example.

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. All detailed map units in the Stewart River Training Area are complexes. *AF1–Agiapuk-Pinguk complex, 2 to 5 percent slopes* is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop, a part of map unit *BSS1–Sinuktuk-Kiglauik-Rock outcrop complex, 25 to 65 percent slopes* is an example.

Table 3 gives the acreage and proportionate extent of each map unit. Other 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.

AF1—Agiapuk-Pinguk complex, 2 to 5 percent slopes

Elevation: 381 to 564 feet
Mean annual precipitation: 22 to 27 inches
Frost-free period: 60 to 90 days

Agiapuk and similar soils

Extent: 60 to 85 percent of the map unit
Landform: fan terraces on alluvial fans
Slope shape: linear
Slope range: 2 to 5 percent
Parent material: silty eolian deposits over gravelly alluvium
Depth to strongly contrasting textural stratification: 1 to 4 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—severe
Runoff: low
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.5 inches
Vegetation: ericaceous shrub/lichen dwarf scrub
Representative Profile:
Oe—0 to 1 inch; moderately decomposed plant material, high permeability
A—1 to 2 inches; silt loam, moderately high permeability
2Bw—2 to 16 inches; stratified very gravelly sand to silt, moderately high permeability
2C—16 to 60 inches; very gravelly sand, high permeability

Pinguk and similar soils

Extent: 15 to 20 percent of the map unit
Landform: solifluction lobes on alluvial fans
Slope shape: concave
Slope range: 2 to 5 percent
Parent material: silty eolian deposits over gravelly alluvium derived from mixed
Depth to strongly contrasting textural stratification: 4 to 7 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—severe
Runoff: very high
Drainage class: somewhat poorly drained
Flooding: none

Depth to high water table (approximate): April-Sept.—0 to more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: willow/ericaceous shrub scrub
Representative Profile:
Oe—0 to 2 inches; dark brown slightly decomposed plant material, high permeability
A—2 to 5 inches; dark brown silt loam, moderately high permeability
2Bw—5 to 15 inches; dark brown gravelly loam, moderately high permeability
2C—15 to 60 inches; dark brown very cobbly sandy loam, moderately high permeability

Minor Components

Boldrin and similar soils: 0 to 10 percent of the map unit
Nuluk and similar soils: 0 to 10 percent of the map unit

BS1—Sinuktuk-Kiglauik complex, 15 to 25 percent slopes (Plate 9)

Elevation: 459 to 2119 feet
Mean annual precipitation: 22 to 27 inches
Frost-free period: 60 to 90 days

Sinuktuk and similar soils

Extent: 30 to 80 percent of the map unit
Landform: mountains
Position on slope: backslopes
Slope shape: linear
Slope range: 15 to 25 percent
Parent material: silty eolian deposits over gravelly colluvium derived from schist
Depth to strongly contrasting textural stratification: 2 to 6 inches
Depth to bedrock (paralithic): 27 to 38 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.7 inches
Vegetation: ericaceous shrub/lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; dark brown slightly decomposed plant material, high permeability
A—1 to 3 inches; olive brown silt loam, moderately high permeability
2Bw—3 to 16 inches; dark brown very channery loam, high permeability
2C—16 to 38 inches; dark brown very channery loam, high permeability
3Cr—38 to 60 inches; dark brown weathered bedrock, impermeable

Kiglauik and similar soils

Extent: 15 to 60 percent of the map unit
Landform: solifluction lobes on mountains
Position on slope: backslopes, footslopes
Slope shape: linear
Slope range: 15 to 25 percent

Parent material: silty eolian deposits over gravelly cryoturbate derived from schist
Depth to strongly contrasting textural stratification: 4 to 7 inches
Depth to bedrock (paralithic): 25 to 41 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: very high
Drainage class: somewhat poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oi—0 to 2 inches; olive brown slightly decomposed plant material, high permeability
A—2 to 5 inches; dark brown silt loam, moderately high permeability
2ABw—5 to 17 inches; olive brown very channery loam, high permeability
2C—17 to 33 inches; olive brown extremely channery loam, high permeability
2Cr—33 to 60 inches; olive brown weathered bedrock, impermeable

Minor Components

Rock outcrop: 0 to 15 percent of the map unit
Tuksuk and similar soils: 0 to 15 percent of the map unit

BSL1—Sinuktuk-Kiglauik complex, 5 to 15 percent slopes (Plate 9)

Elevation: 377 to 1257 feet
Mean annual precipitation: 21 to 29 inches
Frost-free period: 60 to 90 days

Sinuktuk and similar soils

Extent: 45 to 60 percent of the map unit
Landform: mountains
Position on slope: backslopes
Slope shape: linear
Slope range: 5 to 15 percent
Parent material: silty eolian deposits over gravelly colluvium derived from schist
Depth to strongly contrasting textural stratification: 2 to 6 inches
Depth to bedrock (paralithic): 27 to 38 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.7 inches
Vegetation: ericaceous shrub/lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; dark brown slightly decomposed plant material, high permeability
A—1 to 3 inches; olive brown silt loam, moderately high permeability
2Bw—3 to 16 inches; dark brown very channery loam, high permeability
2C—16 to 38 inches; dark brown very channery loam, high permeability
3Cr—38 to 60 inches; dark brown weathered bedrock, impermeable

Kiglauik and similar soils

Extent: 35 to 45 percent of the map unit
Landform: solifluction lobes on mountains
Position on slope: backslopes, footslopes
Slope shape: linear
Slope range: 5 to 15 percent
Parent material: silty eolian deposits over gravelly cryoturbate derived from schist
Depth to strongly contrasting textural stratification: 4 to 7 inches
Depth to bedrock (paralithic): 25 to 41 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: very high
Drainage class: somewhat poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oi—0 to 2 inches; dark brown slightly decomposed plant material, high permeability
A—2 to 5 inches; olive brown silt loam, moderately high permeability
2ABw—5 to 17 inches; dark brown very channery loam, high permeability
2C—17 to 33 inches; dark brown extremely channery loam, high permeability
2Cr—33 to 60 inches; dark brown weathered bedrock, impermeable

Minor Components

Boldrin and similar soils: 0 to 5 percent of the map unit
Peluk and similar soils: 0 to 5 percent of the map unit
Belmezok and similar soils: 0 to 2 percent of the map unit
Nuluk and similar soils: 0 to 2 percent of the map unit

BSS1—Sinuktuk-Kiglauik-Rock outcrop complex, 25 to 65 percent slopes (Plates 9 and 10)

Elevation: 568 to 2228 feet
Mean annual precipitation: 22 to 27 inches
Frost-free period: 60 to 90 days

Sinuktuk and similar soils

Extent: 45 to 75 percent of the map unit
Landform: mountains
Position on slope: backslopes
Slope shape: linear
Slope range: 25 to 65 percent
Parent material: silty eolian deposits over gravelly colluvium derived from schist
Depth to strongly contrasting textural stratification: 2 to 6 inches
Depth to bedrock (paralithic): 27 to 38 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches

Ponding: none
Available water capacity (approximate): 0.7 inches
Vegetation: ericaceous shrub/lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; dark brown slightly decomposed plant material, high permeability
A—1 to 3 inches; olive brown silt loam, moderately high permeability
2Bw—3 to 16 inches; dark brown very channery loam, high permeability
2C—16 to 38 inches; dark brown very channery loam, high permeability
3Cr—38 to 60 inches; dark brown weathered bedrock, impermeable

Kiglauik and similar soils

Extent: 10 to 20 percent of the map unit
Landform: solifluction lobes on mountains
Position on slope: backslopes, footslopes
Slope shape: linear
Slope range: 25 to 45 percent
Parent material: silty eolian deposits over gravelly cryoturbate derived from schist
Depth to strongly contrasting textural stratification: 4 to 7 inches
Depth to bedrock (paralithic): 25 to 41 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: very high
Drainage class: somewhat poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oi—0 to 2 inches; dark brown slightly decomposed plant material, high permeability
A—2 to 5 inches; olive brown silt loam, moderately high permeability
2ABw—5 to 17 inches; dark brown very channery loam, high permeability
2C—17 to 33 inches; dark brown extremely channery loam, high permeability
2Cr—33 to 60 inches; dark brown weathered bedrock, impermeable

Rock outcrop

Extent: 10 to 25 percent of the map unit
Landform: mountains
Position on slope: backslopes
Slope range: 25 to 65 percent

FP1—Nuluk-Belmezok complex

Elevation: 377 to 617 feet
Mean annual precipitation: 21 to 29 inches
Frost-free period: 60 to 90 days

Nuluk and similar soils

Extent: 30 to 80 percent of the map unit
Landform: flood plains
Slope shape: linear
Slope range: 0 to 2 percent

Parent material: sandy and silty alluvium over sandy and gravelly alluvium
Depth to strongly contrasting textural stratification: 9 to 33 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—moderate
Runoff: low
Drainage class: somewhat poorly drained
Flooding: occasional
Depth to high water table (approximate): April-May—20 to 47 inches; June-Sept.—28 inches
Ponding: none
Available water capacity (approximate): 2.8 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oi—0 to 1 inch; slightly decomposed plant material, high permeability
A—1 to 3 inches; silt loam, moderately high permeability
C1—3 to 19 inches; stratified sand to silt, moderately high permeability
2C2—19 to 60 inches; extremely gravelly coarse sand, high permeability

Belmezok and similar soils

Extent: 10 to 60 percent of the map unit
Landform: flood plains
Slope shape: linear
Slope range: 0 to 1 percent
Parent material: loamy alluvium over sandy and gravelly alluvium
Depth to strongly contrasting textural stratification: 1 to 2 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—moderate
Runoff: low
Drainage class: somewhat poorly drained
Flooding: frequent
Depth to high water table (approximate): April-May—20 to 47 inches; June-Sept.—28 inches
Ponding: none
Available water capacity (approximate): 0.3 inches
Vegetation: willow/ericaceous shrub scrub
Representative Profile:
A—0 to 2 inches; sandy loam, moderately high permeability
2C—2 to 60 inches; extremely gravelly coarse sand, high permeability

Minor Components

Cassiterite and similar soils: 0 to 15 percent of the map unit
Typic Gelaquents and similar soils: 0 to 5 percent of the map unit

FS1—Boldrin-Peluk complex, 5 to 12 percent slopes

Elevation: 525 to 846 feet
Mean annual precipitation: 23 to 29 inches
Frost-free period: 60 to 90 days

Boldrin and similar soils

Extent: 50 to 70 percent of the map unit
Landform: mountains
Position on slope: footslopes

Slope shape: linear
Slope range: 5 to 12 percent
Parent material: loamy and/or gravelly colluvium
Depth to permafrost: 17 to 31 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to 8 inches
Ponding: none
Available water capacity (approximate): 7.3 inches
Vegetation: sedge/moss herbaceous
Representative Profile:
Oi, Oe, Oa—0 to 15 inches; peat, high permeability
Cg—15 to 30 inches; gravelly loam, moderately high permeability
Cgf—30 to 60 inches; permanently frozen gravelly loam, impermeable

Peluk and similar soils

Extent: 15 to 35 percent of the map unit
Landform: hummocks on mountains
Position on slope: footslopes
Slope shape: convex
Slope range: 5 to 12 percent
Parent material: mossy organic material and/or woody organic material
Depth to permafrost: 15 to 18 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-May—31 to more than 60 inches; June-Sept.—8 to more than 60 inches
Ponding: none
Available water capacity (approximate): 5.4 inches
Vegetation: shrub birch-sedge dwarf scrub
Representative Profile:
Oi, Oe—0 to 16 inches; mucky peat, high permeability
Cgf/Oejjf—16 to 60 inches; permanently frozen, mixed loam, impermeable

Minor Components

Cassiterite and similar soils: 0 to 10 percent of the map unit
Kiglauik and similar soils: 0 to 10 percent of the map unit

FS2—Tuksuk-Kiglauik complex, 5 to 12 percent slopes

Elevation: 531 to 971 feet
Mean annual precipitation: 23 to 27 inches
Frost-free period: 60 to 90 days

Tuksuk and similar soils

Extent: 55 to 70 percent of the map unit
Landform: mountains

Position on slope: footslopes
Slope shape: linear
Slope range: 5 to 12 percent
Parent material: silty eolian deposits over gravelly colluvium
Depth to strongly contrasting textural stratification: 5 to 17 inches
Depth to bedrock (paralithic): 32 to 60 inches
Hazard of erosion (organic mat removed): by water—moderate; by wind—severe
Runoff: very high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): April-May—0 to 30 inches; June-Sept.—0 to 10 inches
Ponding: none
Available water capacity (approximate): 3.9 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oe, Oa—0 to 7 inches; moderately decomposed plant material, high permeability
A, Cg1—7 to 15 inches; silt loam, moderately high permeability
2Cg2—15 to 39 inches; channery loam, moderately high permeability
2Cr—39 to 60 inches; weathered bedrock, impermeable

Kiglauik and similar soils

Extent: 15 to 35 percent of the map unit
Landform: solifluction lobes on mountains
Position on slope: backslopes, footslopes
Slope shape: linear
Slope range: 5 to 12 percent
Parent material: silty eolian deposits over gravelly cryoturbate derived from schist
Depth to strongly contrasting textural stratification: 4 to 7 inches
Depth to bedrock (paralithic): 25 to 41 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: very high
Drainage class: somewhat poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oi—0 to 2 inches; dark brown slightly decomposed plant material, high permeability
A—2 to 5 inches; olive brown silt loam, moderately high permeability
2ABw—5 to 17 inches; dark brown very channery loam, high permeability
2C—17 to 33 inches; dark brown extremely channery loam, high permeability
2Cr—33 to 60 inches; dark brown weathered bedrock, impermeable

Minor Components

Sinuktuk and similar soils: 5 to 15 percent of the map unit
Boldrin and similar soils: 0 to 10 percent of the map unit

GM1—Tisuk-Kuzitrin complex, 5 to 20 percent slopes (Plates 11 and 12)

Elevation: 531 to 722 feet
Mean annual precipitation: 24 to 25 inches

Frost-free period: 60 to 90 days

Tisuk and similar soils

Extent: 70 to 95 percent of the map unit
Landform: mountains
Position on slope: backslopes
Slope shape: linear
Slope range: 10 to 20 percent
Parent material: silty eolian deposits over gravelly till
Depth to strongly contrasting textural stratification: 2 to 5 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: ericaceous shrub-lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; slightly decomposed plant material, high permeability
A—1 to 4 inches; silt loam, moderately high permeability
2Bw—4 to 15 inches; gravelly loam, moderately high permeability
2C—15 to 60 inches; very cobbly sandy loam, moderately high permeability

Kuzitrin and similar soils

Extent: 5 to 25 percent of the map unit
Landform: swales on mountains
Position on slope: footslopes
Slope shape: concave
Slope range: 5 to 16 percent
Parent material: silty eolian deposits over gravelly till
Depth to strongly contrasting textural stratification: 3 to 6 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: very high
Drainage class: somewhat poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to more than 60 inches
Ponding: none
Available water capacity (approximate): 0.8 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oe—0 to 1 inch; moderately decomposed plant material, high permeability
A—1 to 3 inches; silt loam, moderately high permeability
2Bw—3 to 15 inches; gravelly loam, moderately high permeability
2C—15 to 60 inches; very cobbly loam, moderately high permeability

SU1—Tigaraha-Rock outcrop complex, 0 to 15 percent slopes

(Plate 13)

Elevation: 741 to 2028 feet
Mean annual precipitation: 22 to 27 inches
Frost-free period: 50 to 90 days

Tigaraha and similar soils

Extent: 75 to 95 percent of the map unit
Landform: mountains
Position on slope: summits
Slope shape: linear
Slope range: 0 to 12 percent
Parent material: silty eolian deposits over gravelly residuum weathered from schist
Depth to strongly contrasting textural stratification: 0 to 1 inches
Depth to bedrock (paralithic): 19 to 45 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—severe
Runoff: low
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.1 inches
Vegetation: ericaceous shrub-lichen dwarf scrub
Representative Profile:
Oe—0 to 0 inch; dark brown moderately decomposed plant material, high permeability
A—0 to 2 inches; olive brown silt loam, moderately high permeability
2Bw—2 to 15 inches; dark brown very channery loam, high permeability
2C—15 to 23 inches; dark brown very channery loam, high permeability
2Cr—23 to 60 inches; dark brown weathered bedrock, impermeable

Rock outcrop

Extent: 5 to 25 percent of the map unit
Landform: mountains
Position on slope: backslopes
Slope range: 0 to 15 percent

SU2—Boldrin-Sinuktuk complex, 0 to 15 percent slopes

Elevation: 531 to 1391 feet
Mean annual precipitation: 22 to 26 inches
Frost-free period: 60 to 90 days

Boldrin and similar soils

Extent: 40 to 70 percent of the map unit
Landform: mountains
Position on slope: summits
Slope shape: linear
Slope range: 0 to 15 percent
Parent material: loamy and/or gravelly colluvium
Depth to permafrost: 17 to 31 inches
Hazard of erosion (organic mat removed): by water—moderate; by wind—slight
Runoff: very high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to 8 inches
Ponding: none

Available water capacity (approximate): 7.3 inches
Vegetation: sedge/moss herbaceous
Representative Profile:
Oi, Oe, Oa—0 to 15 inches; peat, high permeability
Cg—15 to 30 inches; gravelly loam, moderately high permeability
Cgf—30 to 60 inches; permanently frozen gravelly loam, impermeable

Sinuktuk and similar soils

Extent: 25 to 55 percent of the map unit
Landform: mountains
Position on slope: summits
Slope shape: linear
Slope range: 5 to 15 percent
Parent material: silty eolian deposits over gravelly colluvium derived from schist
Depth to strongly contrasting textural stratification: 2 to 6 inches
Depth to bedrock (paralithic): 27 to 38 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.7 inches
Vegetation: ericaceous shrub/lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; dark brown slightly decomposed plant material, high permeability
A—1 to 3 inches; olive brown silt loam, moderately high permeability
2Bw—3 to 16 inches; dark brown very channery loam, high permeability
2C—16 to 38 inches; dark brown very channery loam, high permeability
3Cr—38 to 60 inches; dark brown weathered bedrock, impermeable

Minor Components

Kiglauik and similar soils: 0 to 10 percent of the map unit

SU3—Kanauguk-Rock outcrop complex, 5 to 25 percent slopes

(Plate 13)

Elevation: 545 to 712 feet
Mean annual precipitation: 22 to 22 inches
Frost-free period: 50 to 90 days

Kanauguk and similar soils

Extent: 65 to 85 percent of the map unit
Landform: mountains
Position on slope: summits, shoulders
Slope shape: linear
Slope range: 5 to 25 percent
Parent material: gravelly colluvium derived from marble
Depth to bedrock (lithic): 9 to 25 inches
Hazard of erosion (organic mat removed): by water—moderate; by wind—slight
Runoff: medium
Drainage class: well drained

Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 2.4 inches
Vegetation: dwarf herbaceous
Representative Profile:
Oi—0 to 1 inch; slightly decomposed plant material, high permeability
A—1 to 11 inches; very channery loam, moderately high permeability
C—11 to 17 inches; very channery loam, moderately high permeability
R—17 to 60 inches; unweathered bedrock, impermeable

Rock outcrop

Extent: 15 to 35 percent of the map unit
Landform: mountains
Position on slope: backslopes
Slope range: 5 to 25 percent

TP1—Tisuk-Dirrant complex, 2 to 15 percent slopes

Elevation: 387 to 640 feet
Mean annual precipitation: 21 to 29 inches
Frost-free period: 60 to 90 days

Tisuk and similar soils

Extent: 45 to 85 percent of the map unit
Landform: till plains, hills
Position on slope: backslopes
Slope shape: linear, convex
Slope range: 2 to 15 percent
Parent material: silty eolian deposits over gravelly till
Depth to strongly contrasting textural stratification: 2 to 5 inches
Hazard of erosion (organic mat removed): by water—moderate; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: ericaceous shrub-lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; slightly decomposed plant material, high permeability
A—1 to 4 inches; silt loam, moderately high permeability
2Bw—4 to 15 inches; gravelly loam, moderately high permeability
2C—15 to 60 inches; very cobbly sandy loam, moderately high permeability

Dirrant and similar soils

Extent: 10 to 35 percent of the map unit
Landform: till plains
Slope shape: convex
Slope range: 2 to 6 percent
Parent material: silty eolian deposits over gravelly alluvium

Depth to permafrost: 17 to 29 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to 8 inches
Ponding: none
Available water capacity (approximate): 4.9 inches
Vegetation: sedge-ericaceous shrub herbaceous
Representative Profile:
Oi, Oe—0 to 13 inches; peat, high permeability
Cg—13 to 17 inches; gravelly loam, moderately high permeability
Cgf—17 to 60 inches; permanently frozen gravelly loam, impermeable

Minor Components

Distin and similar soils: 5 to 20 percent of the map unit

TP2—Imuruk-Tisuk-Dirrant complex, 0 to 30 percent slopes

Elevation: 404 to 778 feet
Mean annual precipitation: 22 to 29 inches
Frost-free period: 60 to 90 days

Imuruk and similar soils

Extent: 20 to 45 percent of the map unit
Landform: hills, outwash plains
Position on slope: backslopes
Slope shape: linear
Slope range: 0 to 30 percent
Parent material: silty eolian deposits over gravelly outwash
Depth to strongly contrasting textural stratification: 2 to 11 inches
Hazard of erosion (organic mat removed): by water—severe; by wind—severe
Runoff: high
Drainage class: somewhat excessively drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.5 inches
Vegetation: ericaceous shrub-lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; slightly decomposed plant material, high permeability
E—1 to 2 inches; silt loam, moderately high permeability
2Bs, 2BC—2 to 18 inches; very cobbly coarse sand, high permeability
2C—18 to 60 inches; very cobbly coarse sand, high permeability

Tisuk and similar soils

Extent: 20 to 45 percent of the map unit
Landform: till plains
Slope shape: linear
Slope range: 0 to 10 percent
Parent material: silty eolian deposits over gravelly till

Depth to strongly contrasting textural stratification: 2 to 5 inches
Hazard of erosion (organic mat removed): by water—moderate; by wind—severe
Runoff: medium
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-Sept.—more than 60 inches
Ponding: none
Available water capacity (approximate): 0.9 inches
Vegetation: ericaceous shrub-lichen dwarf scrub
Representative Profile:
Oi—0 to 1 inch; slightly decomposed plant material, high permeability
A—1 to 4 inches; silt loam, moderately high permeability
2Bw—4 to 15 inches; gravelly loam, moderately high permeability
2C—15 to 60 inches; very cobbly sandy loam, moderately high permeability

Dirrant and similar soils

Extent: 10 to 30 percent of the map unit
Landform: till plains
Slope shape: linear
Slope range: 0 to 5 percent
Parent material: silty eolian deposits over gravelly alluvium
Depth to permafrost: 17 to 29 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to 8 inches
Ponding: none
Available water capacity (approximate): 4.9 inches
Vegetation: sedge-ericaceous shrub herbaceous
Representative Profile:
Oi, Oe—0 to 13 inches; peat, high permeability
Cg—13 to 17 inches; gravelly loam, moderately high permeability
Cgf—17 to 60 inches; permanently frozen gravelly loam, impermeable

Minor Components

Kuzitrin and similar soils: 0 to 10 percent of the map unit
Peluk and similar soils: 0 to 5 percent of the map unit
Boldrin and similar soils: 0 to 3 percent of the map unit

TS1—Boldrin-Peluk complex, 0 to 5 percent slopes (Plate 9)

Elevation: 381 to 732 feet
Mean annual precipitation: 22 to 29 inches
Frost-free period: 60 to 90 days

Boldrin and similar soils

Extent: 35 to 75 percent of the map unit
Landform: mountains
Position on slope: toeslopes
Slope shape: linear
Slope range: 0 to 5 percent

Parent material: loamy and/or gravelly colluvium
Depth to permafrost: 17 to 31 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: very poorly drained
Flooding: none
Depth to high water table (approximate): April-Sept.—0 to 8 inches
Ponding: none
Available water capacity (approximate): 7.3 inches
Vegetation: sedge/moss herbaceous
Representative Profile:
Oi, Oe, Oa—0 to 15 inches; peat, high permeability
Cg—15 to 30 inches; gravelly loam, moderately high permeability
Cgf—30 to 60 inches; permanently frozen gravelly loam, impermeable

Peluk and similar soils

Extent: 20 to 70 percent of the map unit
Landform: hummocks on mountains
Position on slope: footslopes
Slope shape: convex
Slope range: 0 to 5 percent
Parent material: mossy organic material and/or woody organic material
Depth to permafrost: 15 to 18 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—slight
Runoff: very high
Drainage class: well drained
Flooding: none
Depth to high water table (approximate): April-May—31 to more than 60 inches; June-Sept.—8 to more than 60 inches
Ponding: none
Available water capacity (approximate): 5.4 inches
Vegetation: shrub birch-sedge dwarf scrub
Representative Profile:
Oi, Oe—0 to 16 inches; mucky peat, high permeability
Cgf/Oejjf—16 to 60 inches; permanently frozen, mixed loam, impermeable

Minor Components

Cassiterite and similar soils: 0 to 5 percent of the map unit
Fluvaquentic Sapristels and similar soils: 0 to 5 percent of the map unit

TS2—Distin-Cassiterite complex (Plate 14)

Elevation: 427 to 512 feet
Mean annual precipitation: 23 to 24 inches
Frost-free period: 60 to 90 days

Distin and similar soils

Extent: 60 to 85 percent of the map unit
Landform: circles on stream terraces
Slope shape: convex
Slope range: 0 to 2 percent
Parent material: silty eolian deposits over gravelly cryoturbate

Depth to strongly contrasting textural stratification: 1 to 3 inches
Depth to permafrost: 47 to 60 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—severe
Runoff: negligible
Drainage class: poorly drained
Flooding: none
Depth to high water table (approximate): April-May—39 inches; June-Sept.—31 to 39 inches
Ponding: none
Available water capacity (approximate): 0.4 inches
Vegetation: ericaceous shrub-lichen dwarf scrub
Representative Profile:
Oe—0 to 1 inch; moderately decomposed plant material, high permeability
A—1 to 2 inches; silt loam, moderately high permeability
2Bw/Cjj—2 to 14 inches; gravelly loam, moderately high permeability
2C—14 to 60 inches; gravelly loam, moderately high permeability
2Cf—60 to 60 inches; permanently frozen gravelly loam, impermeable

Cassiterite and similar soils

Extent: 15 to 30 percent of the map unit
Landform: flood plains
Slope shape: linear
Slope range: 0 to 2 percent
Parent material: sandy and silty alluvium over sandy and gravelly alluvium
Depth to strongly contrasting textural stratification: 9 to 33 inches
Hazard of erosion (organic mat removed): by water—slight; by wind—moderate
Runoff: low
Drainage class: somewhat poorly drained
Flooding: rare
Depth to high water table (approximate): April-May—20 to more than 60 inches; June-Sept.—28 to more than 60 inches
Ponding: none
Available water capacity (approximate): 3.1 inches
Vegetation: willow/mixed grass-forb scrub
Representative Profile:
Oi—0 to 1 inch; slightly decomposed plant material, high permeability
A, Bw—1 to 9 inches; silt loam, moderately high permeability
C1, Cg—9 to 35 inches; stratified sand to silt, moderately high permeability
2C2—35 to 60 inches; extremely gravelly coarse sand, high permeability

Use and Management of the Soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, permafrost, or unstable soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, and trails.

Interpretive Ratings

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

Rating Class Terms

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

Numerical Ratings

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

Recreation

The soils of the survey area are rated in table 4 according to limitations that affect their suitability for recreation. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicates the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00). If the soil is *not limited* (value = 0.00), no entry appears for the numerical value.
The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality and vegetation.

Primitive camp areas are recreational areas that are used for tent camping by small groups of people. These areas are typically in undeveloped or minimally developed, remote locations off the road system. Primitive camp areas are subject to intermittent light to heavy foot traffic. The soils are rated as *not limited*, *somewhat limited*, and *very limited* to indicate the extent to which soil and site properties limit the use and performance for the intended use. The critical properties are slope, the texture of the soil surface, the amount of small and large stones on the soil surface, permeability, and flooding and ponding hazards. Ratings for primitive camp areas can help land management agencies direct use to soils favorable for remote camping and thereby increase user satisfaction and minimize site damage. *Not limited* indicates that the soil has few features that limits its use as a primitive camp site. Intermittent use should not cause significant site degradation. *Somewhat limited* indicates that the soil has moderate limitations. Some moderate limitations are seasonal, such as wet ground, flooding, and dustiness during dry conditions. *Very limited* indicates that the soil has one or more features that are unfavorable during all seasons, such as steep slopes or poor soil drainage and a shallow water table.

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

Engineering

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

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet (1.5 to 2.1 m). Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

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

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

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

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

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 5 shows the degree and kind of soil limitations that affect structures and site improvements, including dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

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

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

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

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

Construction Materials

Tables 6 and 7 give information about the soils as potential sources of gravel, sand, topsoil, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

In table 6, the soils are rated as a *probable* or *improbable* source of sand and gravel. A rating of *probable* means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that the soil is an improbable source. A number between 0.00 and 1.00 indicates the degree to which the soil is a probable source of sand or gravel.

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

In table 7 the soils are rated *good, fair,* or *poor* as potential sources of topsoil, and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil or roadfill. The lower the number, the greater the limitation. Only material in suitable quantity is evaluated.

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

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

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet (1.8 m) high and less exacting in design than higher embankments.

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

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

Hydric Soils

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

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

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

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in *Soil Taxonomy* (Soil Survey Staff 1999) and *Keys to Soil Taxonomy* (Soil Survey Staff 2003) and in the *Soil Survey Manual* (Soil Survey Division Staff 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in *Field Indicators of Hydric Soils in the United States* (Hurt and others 1998).

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

Those soils that meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators, are listed in table 8. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council 1995; Hurt and others 1998).

Some map units consist almost entirely of hydric soils, such as map unit TS1-Boldrin-Peluk complex, 0 to 5 percent slopes (in which Boldrin, which comprised a majority of the unit, is hydric). Other map units consist primarily of nonhydric soils, such as map unit BS1-Sinuktuk-Kiglauik complex, 15 to 25 percent slopes (in which all listed major components are nonhydric). Hydric soils may occur as minor inclusions even in map units listed without any hydric soils in the table.

Table 8 also lists the local landform on which each soil occurs, the hydric criteria code, and whether or not each soil meets the saturation, flooding, or ponding criteria for hydric soils. Codes for hydric soil criteria are explained in the following key:

Key To Hydric Soil Criteria

1. All Histosols except Folists, or

2. Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, Pell great groups of Vertisols, Pachic subgroups, or cumulic subgroups that are:

a. somewhat poorly drained and have a frequently occurring water table at less than 0.5 foot from the surface for a significant period (usually more than 2 weeks) during the growing season, or

b. poorly drained or very poorly drained and have either:

(1) a frequently occurring water table at less than 0.5 foot from the surface for a significant period (usually more than 2 weeks) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or for other soils

(2) a frequently occurring water table at less than 1.0 foot from the surface for a significant period (usually more than 2 weeks) during the growing season if permeability is equal to or greater than 6.0 inches/hour in all layers within a depth of 20 inches, or

(3) a frequently occurring water table at less than 1.5 feet from the surface for a significant period (usually more than 2 weeks) during the growing season if permeability is less than 6.0 inches/hour in any layer within a depth of 20 inches, or

3. Soils that are frequently ponded for a long duration or a very long duration during the growing season, or

4. Soils that are frequently flooded for a long duration or a very long duration during the growing season.

Soil Properties

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

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

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

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

Engineering Index Properties

Tables 9 and 10 give the engineering classifications and the range of index properties for the layers of each soil in the survey area.

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

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

Classification of the soils is determined according to the Unified soil classification system (ASTM 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 2000).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches (75 mm) in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches (75 mm) in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

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.

Rock fragments larger than 10 inches (250 mm) in diameter and 3 to 10 inches (75 to 250 mm) in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches (75 mm) in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. The estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. The estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

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

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

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

Physical Properties

Table 11 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition. The estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Erosion factors are shown as the K factor (Kw and Kf) and the T factor.
Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

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

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

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

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

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

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

Chemical Properties

Table 12 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

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

Water Features

Table 13 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

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

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

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

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

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

Local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods is 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.

Soil Features

Table 14 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

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

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

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

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

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

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff 2003; Soil Survey Staff 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 15 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is *gelepts* (*gel*, meaning very cold, plus *epts*, 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; type of saturation; 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 *Dystrogelepts* (*Dystro*, meaning low base saturation, plus *gelepts*, the suborder of the inceptisols that has a pergelic temperature regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup 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 taxonomic class. 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 Dystrogelepts*.

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, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is *loamy-skeletal, paramicaceous, superactive Typic Dystrogelepts*.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example from this survey area is the Tigaraha series.

The Official Series Descriptions (OSDs) provide the most current information about the series mapped in this survey area. Descriptions for named soil series are available on the Web at http://soils.usda.gov. Two soils of minor extent are named at the subgroup level of soil classification. These are described below.

Fluvaquentic Sapristels

Taxonomic Classification

- Euic, subgelic Fluvaquentic Sapristels

Depth class: moderately deep
Drainage class: very poorly drained
Landforms: drainageways on mountains
Parent material: silty alluvium and/or grassy organic material
Elevation: 381 to 732 feet
Slope: 0 to 2 percent
Annual precipitation: 21.7 to 29.1 inches
Annual temperature: 23.7 to 25.0 degrees F
Frost-free period: 60 to 90 days

Modal Pedon Location

Mapunit in which located: TS1—Boldrin-Peluk complex, 0 to 5 percent slopes in the Stewart River Area, Alaska
Location in survey area: UTM coordinates: Zone 3, Easting 469834, Northing 7180988

Modal Pedon

Oi—0 to 3 inches; very dark brown (10YR 2/2) peat; many very fine and fine roots; moderately acid; clear smooth boundary.
Oa—3 to 8 inches; dark brown (10YR 3/3) muck; many very fine and fine roots; moderately acid; gradual smooth boundary.
OaC—8 to 31 inches; dark brown (10YR 3/3) muck; many very fine and fine roots; moderately acid; abrupt smooth boundary.
OaCf—31 to 60 inches; dark brown (10YR 3/3) permanently frozen muck; few very fine and fine roots; moderately acid.

Range in Characteristics

Soil moisture class: aquic
Average annual soil temperature: -0.5 degrees F
Depth to strongly contrasting textural stratification: 38 to 52 inches

Oi, Oa horizon:
Color—hue of 7.5YR or 10YR; value of 2 to 3; chroma from 1 to 3
Texture: peat; muck
Organic matter content: 65 to 90 percent
Reaction: strongly acid to slightly acid

OaC horizon:
Color—hue from 10YR to 5Y; chroma from 1 to 3
Organic matter content: 30 to 65 percent
Reaction: strongly acid to neutral

OaCf horizon:
Color—hue from 10YR to 5Y; chroma from 1 to 3
Organic matter content: 30 to 65 percent
Reaction: strongly acid to neutral

Typic Gelaquents

Taxonomic Classification

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

Depth class: very deep
Drainage class: very poorly drained
Landforms: flood plains
Parent material: sandy and silty alluvium over sandy and gravelly alluvium
Elevation: 377 to 617 feet
Slope: 0 to 1 percent
Annual precipitation: 21.0 to 29.1 inches
Annual temperature: 23.7 to 25.0 degrees F
Frost-free period: 60 to 90 days

Modal Pedon Location

Mapunit in which located: FP1 — Nuluk-Belmezok complex in the Stewart River Area, Alaska
Location in survey area: UTM coordinates: Zone 3, Easting 473806, Northing 7185660

Modal Pedon

Oe—0 to 1 inch; very dark brown (7.5YR 2.5/3) moderately decomposed plant material; many very fine and fine and few medium roots; moderately acid; clear wavy boundary.
A—1 to 3 inches; very dark grayish brown (10YR 3/2) silt loam; very friable, nonsticky and nonplastic; many very fine and fine roots; moderately acid; abrupt wavy boundary.
Cg1—3 to 19 inches; dark gray (2.5Y 4/1) stratified sand to silt; very friable, nonsticky and nonplastic; few very fine and fine roots; slightly acid; clear wavy boundary.
2Cg2—19 to 25 inches; dark gray (5Y 4/1) extremely gravelly coarse sand; loose, nonsticky and nonplastic; 45 percent gravel, 20 percent cobbles; slightly acid; abrupt wavy boundary.
2Cg3—25 to 60 inches; gray (5Y 5/1) extremely gravelly coarse sand; loose, nonsticky and nonplastic; 45 percent gravel, 20 percent cobbles; neutral.

Range in Characteristics

Soil moisture class: aquic
Average annual soil temperature: -0.5 degree F
Depth to strongly contrasting textural stratification: 9 to 33 inches

Oe horizon:
Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma from 1 to 3
Organic matter content: 65 to 90 percent
Reaction: very strongly acid to moderately acid

A horizon:
Color—value of 2 or 3; chroma from 1 to 3
Clay content: 0 to 10 percent
Silt content: 55 to 75 percent

Sand content: 15 to 35 percent
Organic matter content: 2 to 4 percent
Reaction: very strongly acid to moderately acid

Cg1 horizon:
Color—hue of 2.5Y or 5Y; value of 4 or 5; chroma from: 1 through 3
Clay content: 0 to 10 percent
Silt content: 15 to 35 percent
Sand content: 60 to 85 percent
Organic matter content: 1 to 3 percent
Rock fragments: 0 to 5 percent rounded indurated cobbles
Reaction: very strongly acid to slightly acid

2Cg2 horizon:
Color—value of 4 or 5; chroma of 1 or 2
Texture: very cobbly loamy sand; very gravelly coarse sand; extremely gravelly coarse sand
Clay content: 0 to 5 percent
Silt content: 0 to 15 percent
Sand content: 80 to 95 percent
Rock fragments: 30 to 60 percent rounded indurated gravel; 0 to 40 percent rounded indurated cobbles
Reaction: strongly acid to neutral

Formation of the Soils

Soil is the unconsolidated mineral and organic material on the surface of the earth that serves as the natural medium for the growth of land plants (Soil Survey Division Staff 1993). Soil differs from the material from which it was derived in many physical, chemical, and morphological properties and characteristics. Environmental factors such as climate, parent material, topography, and living organisms, all acting over time, influence soil development. The influence of any one of these factors varies from place to place, but the interaction of all of them determines the kind of soil that forms. The exact combination of physiochemical and biological reactions that transforms materials into the soil horizons of a specific soil cannot be determined with certainty. Soil processes are best described as a package of soil forming factors with associated characteristics that may be observed in the field. The fluvial process, described in detail below in Soil Processes and Indicators, provides an example of a package of soil forming factors including topography, parent material and time. A discussion of individual soil forming factors including climate, parent material, topography, living organisms, and time with reference to important processes associated with each factor are provided. This is followed by an independent discussion of the major soil and geomorphic processes identified for the Stewart River Training Area and a section on permafrost and soil formation.

Soil Forming Factors

Climate

The Stewart River Training Area has a blend of maritime and continental climates. Summers are cool with temperatures influenced by the cold waters of the Bering Sea which lies about 20 miles to the West and South. Early winter temperatures are relatively moderate until pack ice normally forms in January and colder temperatures more typical of a continental climate prevail. The presence of permafrost and periglacial landforms including solifluction lobes and circles are landscape expressions of the cold sub-arctic climate that typifies the area. Péwé (1975) described the area as lying within the zone of discontinuous permafrost with permafrost underlying mountain footslopes, toeslopes and broad summits and generally absent below flood plains, lakes and gravelly mountain slopes. Periodic winter winds are also a distinctive climatic characteristic of the area. Exposed slopes are blown free of snow while large drifts are created on leeward slopes and areas on and behind natural barriers such as copses of willow scrub. Two distinctive soil micro-climates are created by this redistribution of snow. Areas swept clear of snow have deep seasonal frost or permafrost, where as, soils beneath snow-beds have shallow annual frost and are seasonally saturated from snow-melt in late spring.

The soil terminology used to describe and classify soils of the Stewart River Training Area is indicative of the cold climate of the region (see Classification of the Soils). The soil order “Gelisols”, or soils with permafrost within six feet of the surface and “Gelepts” the Suborder of Inceptisols with the coldest mean annual soil temperatures are the two major groups of soils mapped within the Stewart River

Training Area. Within the gravelly alpine mountain areas, the most extensive soil Order found is the Inceptisols. Gelisols are found on mountain footslopes, toeslopes and broad summits where site and soil conditions favor permafrost formation (see Boldrin soil description). These soils have permafrost within 40 inches of the surface with mean annual soil temperatures at 20 inches that are relatively stable near 32 degrees year round. Gelepts, cold soils without permafrost, are confined to the gravelly mountains of the area (see Sinuktuk soil description). Though these soils lack permafrost, they experience high temperature variations between seasons. Annual frost penetrates deeply during winter with minimum winter soil temperatures at 20 inches of 0 degrees F or lower in February and warm summer soil temperatures that reach 59 degrees F or warmer during August. The high rock fragment content in the Gelepts is an important contributor to heat conduction from the atmosphere into soils during summer and from the soils during winter.

Parent Material

Soil parent materials are divided into organic and mineral. Organic materials consist of a predominance of nonliving, partially to highly decomposed plant materials. The occurrence and thickness of organic materials varies widely on area soils with observed layers 8 to 16 inches or more thick observed in soils with shallow permafrost (Plate 7). Conditions including prolonged saturated and a general lack of oxygen favor the accumulation and preservation of organic matter. Soils with thin organic mats occupy soils of the steep mountains where windy conditions limit vegetation establishment and biomass production. Aerobic processes, which prevail under freely drained soil conditions, quickly decomposes what little organic litter that may be produced and deposited on the soil surface. On mountain slopes the organic mat is discontinuous and generally less than one inch thick.

Mineral soil parent materials include unconsolidated sediments consisting of relatively homogeneous rocks that are derived locally and heterogeneous materials that have a more regional origin. The most extensive homogeneous material is colluvium and residuum derived from Precambrian to Paleozoic age schist (Bundtzen and others 1994) which mantles a majority of the areas mountain slopes (Plate 15). Other parent materials consisting of more heterogeneous rock types include flood plain and glacial deposits. Flood plain materials include over-bank alluvial deposits of sand and silt and channel deposits of sand and gravel (Plate 16). Drift deposits found on glacial landforms adjacent to the Stewart and Sinuk Rivers consist of heterogeneous deposits of gravel and cobble mixed with sand and silt. These are assigned to middle Pleistocene Nome River Glaciation and the upper Pleistocene Stewart River Glaciation by Bundtzen and others (1994). Eolian or wind-blown deposits of variable mineralogy mantle upland soils with a thin surface layer generally less than three inches thick and represented by the “A” horizons of Sinuktuk and Kiglauik soils (Plate 15).

Topography

Topography influences the degree of down slope movement of materials, the collection or dispersion of water, as well as soil temperature. Slope steepness is one example of topographic influences on soil formation. Steeper slopes are inherently unstable and more subject to down-slope movement, conditions that continually mix soil materials, conditions unfavorable to soil weathering and the differentiation of soil horizons.

Topography also influences the accumulation of water on the landscape. On various landforms snow accumulates in swales and depressions and drifts persist into late spring and early summer (Plate 17). As drifts melt from swales a steady discharge of water saturates soils down-slope, promoting brief anaerobic conditions and the accumulation of organic matter within the mineral surface layer.

Flooding along valley bottoms is another expression of the topography factor. Flooding frequency and elevation above active river channels influences the texture of flood deposits and the type of vegetation that grows. Areas adjacent to active channels are regularly scoured by high velocity flood waters and soils are gravelly with water tables near the surface (Plate 16). Topographic exposure also influences the type of soils and that form and plant communities that occupy soils. In mountainous alpine areas, a stark contrast exists in vegetation in depressions on slopes where snow accumulates. Swales remain snow covered into late spring which shortens the growing season and favors faster growing herbaceous vegetation.

Patterned ground is micro-relief associated with mixing of the soil by frost action (cryoturbation) with or without permafrost present. Pattern ground features include circles, solifluction lobes, and ice-cored mounds. Circles (or mud boils) are clusters of more or less circular features several feet in diameter with slightly raised centers that are often free of vegetation. Beneath the center of the circles, permafrost is intermittent and, when present, is deep in the soil profile. The troughs surrounding the circles are several feet wide, have scrub vegetation, thick organic mats, shallow permafrost, and a shallow water table perched over the frost (Plate 18). Swanson and others (1999) attribute the formation of circles to a process described as “diapirism,” which is the upward movement of relatively low density saturated soil material above the permafrost table. Soil material with a low bulk density, as a result of high ice content, is described as being present just below the permafrost table. This material has a significantly lower bulk density than the overlying drier mineral soil material. As a result of this unstable bulk density profile, upward movement of the low-density soil material is likely to occur when the soil surface is disturbed or warm summer temperatures causes it to thaw. The flow upward to the surface forms the slightly elevated, often vegetation-free micro-feature.

Solifluction lobes are features three feet or more high and several feet across on steeper slopes with the long axis orientated in across slope direction with overall slopes from about 8 to 35 percent. Solifluction lobes are the result of ice segregation, differential freezing, and differential ground heaving with or without permafrost present (Embleton and King 1968; Sigafoos and Hopkins 1951). These processes results in a locally elevated ground surface as soil particles move toward the direction from which the frost enters and penetrates the ground. On thaw, the particles resettle in a direction controlled by gravity. Thus, if the cooling surface is inclined, the displaced particles will always resettle slightly down hill from their original position (Embleton and King 1968) resulting in a lobe shaped feature. Kiglauik provides an example of a soil on solifluction lobes (Plate 17).

Peat mound development, as described by Williams and Smith (1989), is attributable to a thin cover of snow, which allows for deep frost penetration and frost heaving. These features are underlain by permafrost at shallow depths in the Area. Peat mounds form discrete, irregularly spaced bumps three feet or more across and several inches to three feet or more in height. The drier peat near the surface of these elevated areas increases the overall insulating qualities of the peat, thus maintaining frozen soil conditions throughout the summer and promoting the formation of ice crystals and masses. Abundant water from the adjacent wet meadows and ponds feeds the developing ice core of the mound. Free water in contact with the frozen core then freezes, increasing the size and extent of the frozen core. Peat mounds are usually formed as the core of massive ice enlarges and pushes the surface up several centimeters or meters above the surrounding landscape. Peluk provides an example of soils formed in peat mounds (Plate 7).

Living Organisms

The living organism factor includes animals, lower plants, and higher plants. Many biochemical processes involving the cycling of different elements occur in soil where the organic compounds exuded by the roots and produced by microbial degradation of organic debris are involved and provide the energy needed in the biological weathering process. Also, the mixing and breakdown of organic materials by animals are important to soil formation.

Animals contribute, to various degrees, to the mixing and decomposition of organic materials in all soils in the Stewart River Training Area. Large mammals like moose, caribou and grizzly bears contribute locally to mixing of soils, but are rarely responsible for determining the type of soil that forms. Earth worms, though significant contributors in more temperate climates, are minor contributors because of their small size and very low density.

The lower plants include moss, fungi, bacteria, and algae. Observing lower plants, especially micro-organisms in a field setting, and correlating these with specific soil processes is very difficult and beyond the scope of this project. The higher plants are the vascular plants, which includes shrubs, grasses, and forbs. This category of living organisms provide the most profound affect on soils of the area, since the higher plants contribute significantly to the organic matter content of soils, as well as soil, stability. In addition to the stabilizing affects of vegetation, various plant communities contribute to the braunification process because of the acidity of their litter. Precipitation percolating downward through surface litter and moss acidifies mineral soils. In alpine areas especially throughout the area, the resinous litter from shrub birch is an important contributor to soil acidification, braunification and podzolization.

Time

The time that a soil is exposed to soil-forming processes also determines the degree of mineral weathering and horizon development. Soils of the Stewart River Area are grouped into two age categories: young, and intermediate. Young soils are those subject to episodic or continuous disturbance that restricts the development of soil horizons other than thin surface accumulation of organic material or organic enrichment of the mineral surface horizon. These soils lack significant surface stability and the age of these soils may range from months to decades. Included within this group are soils on flood plains (Plate 16).

Soils categorized as intermediate in age are those that are in dynamic equilibrium between a process that favors vertical percolation of water and horizon differentiation and a process or processes that favors the destabilization or halting of the soil forming processes. Generally, landform surfaces associated with intermediate age soil are typically Holocene in age (less than 10 thousand years old). Members of this group include well drained soils on moderately steep slopes with continuous root mats, well drained soils on terraces, and soils with permafrost on mountain footslopes, toeslopes and broad summits. An example of an intermediate age soil is provided by Sinuktuk (Plate 15). Braunification is the common process in well drained intermediate age soils. Also included within this age group are soils with thick surface organic horizons and permafrost (Plate 7). The presence of a thick organic mat and permafrost indicates a certain degree of surface stability. All intermediate age soils are destabilized somewhat by cryoturbation.

Soil Processes and Indicators

Soil processes are defined as a combination of physiochemical and biological reactions that have actually transformed materials into soil horizons. The factors of soil formation previously recognized are thought of as controls on processes that result in observable and measurable features. Simplified concepts of solution, oxidation, reduction, hydrolysis, hydration, chelation, ionic substitution, synthesis, and crystallization have been applied to transformations of individual compounds and components of soils. Combinations of these elementary processes are believed to occur in the development of soils. Where a combination has been dominated by a

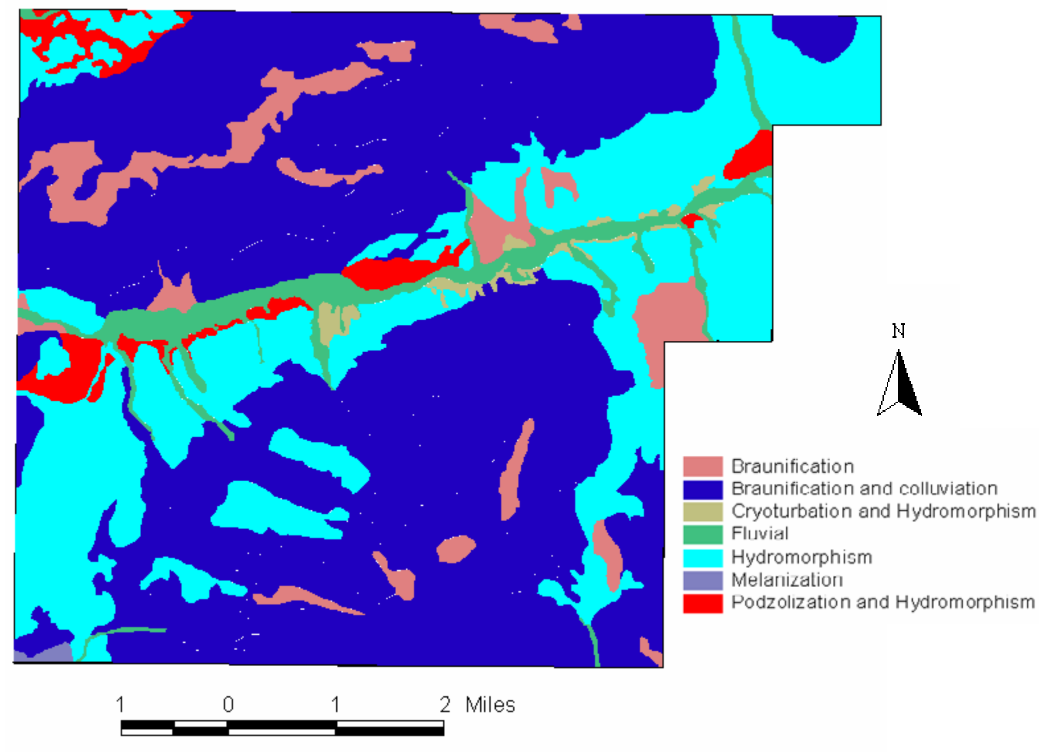

Figure 5. Distribution of soil and geomorphic processes in the survey area.

particular process, or by a rate of a particular process, the resulting combination has often been given a name (Wilding and others 1984). The primary processes of braunification, colluviation, fluvial processes, hydromorphism, and podzolization are described below and illustrated geospatially for the Stewart River Training Area in Figure 5. Each process discussed is related to observable sets of soil properties, or field indicators, used for field identification.

Colluviation is a depositional process by mass wasting or overland flow. Sediment deposited by mass wasting is generally nonsorted and nonstratified. Individual particles are not rounded. These characteristics distinguish colluvium from sediments deposited by fluvial processes (Longwell and others 1969). Products of colluvial processes include talus and solifluction deposits. In the Stewart River Training Area, this process is enhanced by extreme temperature variations throughout the year. Multiple freeze-thaw cycles not only fracture exposed bedrock but also destabilize the slopes where the rock fragments accumulate. This process is extensive throughout the mountains and along steep river escarpments. Field indicators of this process include long plain slopes or conical features extending down slope from steep exposures of bedrock. Most mountain slopes of the Stewart River Training Area are primarily “meta-stable” colluvial slopes in which adequate surface stability exists for a sequence of soil horizons to form. This sequence includes a continuous organic mat underlain by “A”, “2Bw”, “2C”, and “2Cr” horizons (see Sinuktuk soil description). This horizon sequence indicative of colluvial processes are illustrated in Plate 15.

Fluvial processes include the erosion, transportation, and deposition of alluvium by water. This process is a good example of the topographic and time factors of soil formation. Periodic flooding results in soils that exhibit minimal horizon development. In soils on high flood plain positions, such as those found in Nuluk soils, low velocity flood waters slowed by well established willow scrub vegetation deposit relatively thick deposits of stratified sandy and silty sediments (Plate 16). On lower, more frequently flooded positions, such as those found in Belmezok soils, high velocity floodwaters deposit gravelly and cobbly alluvium as channel deposits and remove finer sand and silt size particles (Plate 16). Photographs illustrating these properties for Nuluk and Belmezok soils are provided in Plate 16. Landscape indicators of fluvial processes includes the presence of barren or sparsely vegetated gravel bars, channels, and alluvial flats adjacent to active river channels (Plate 1), as well as debris and watermarks on vegetation. Soil indicators include stratification of sandy and silty textured sediments and the presence of buried organic layers and relatively high soil reaction (pH) relative to soils on adjacent upland positions.

Fluvial processes also include an enrichment of soils as indicated by relatively high soil reaction when compared to upland soils of the area. Enrichment includes the saturation or accumulation of basic soil metals such as calcium, magnesium, potassium, and sodium in surface soil layers. Enrichment includes both the deposition of base rich sediments by flooding and the concentration of bases in the upper soil profile by upward diffusion of base-rich water from a near-surface water table to the drier soil surface during periods of dry, warm weather.

Hydromorphism is associated with near-surface saturated conditions and is an extensively occurring process in the Stewart River Training Area. Hydromorphism provides a good example of the topographic factor of soil formation since water collects locally in depressions and swales (Plate 19) or as part of a regional water table beneath river valleys and basins (Plate 16). Hydromorphism is a process closely tied to the climatic factor of soil formations since shallow permafrost in soils perches water. A distribution of map units with hydromorphism identified as a primary or secondary process is provided in Figure 5. This process includes the chemical reduction, mobilization, and movement of soluble minerals and the formation of thick surface organic mats under saturated anaerobic conditions. Plant roots and soil microbes deplete the soil oxygen in these saturated soils, causing anaerobic conditions. Subsequently, iron and manganese, the primary pigments in mineral soils, are converted to reduced forms. These reduced compounds are mobile in the soil solution and are easily stripped from the soil by the water table. Soils stripped of mineral pigments in this way take on a neutral gray through bluish color, as illustrated in Plate 19, and referred to as redox depletions or a depleted matix. Soil morphological features indicative of this process are noted with the “Cg” horizon (see Boldrin in the taxonomic unit descriptions). The mobilized minerals are transported through the soil by ground water to an oxidized zone. Here, mineral oxidation and precipitation occur, imparting a yellowish through reddish color to the soil, features referred to as redox concentrations, which are visible in the upper part of Plate 19. Where the water table fluctuates near the surface, the soil environment commonly alternates between reduced and oxidized states, and soils frequently display a complex mottled pattern of both reddish-oxidized (concentrations) and grayish-reduced colors (depletions). Permanently saturated soils often have thick organic layers (Plate 7). The accumulation and stability of organic deposits in these soils is attributed to prolonged saturation and the associated anaerobic environment.

Braunification is the release of iron from primary minerals by oxidation or hydration. This gives the soil matrix brownish, reddish-brown, and red colors respectively (Wilding and others 1984). This process provides a good example of the joint influences of the time and topographic factors of soil formation. Braunification is common on well drained soil on mountain slopes, terraces, glacial plains, and hills throughout uplands of the area. The process is common to soils on relatively stable surfaces not influenced by flooding or excessive down-slope movement of soil materials or shallow water table. Here downward movement of water through the soil profile and free movement of oxygen promote weathering of primary iron minerals. Surface stability promotes the removal of excess basic metal cations from the soil through leaching and plant use. This is normally accompanied by a lowering in soil reaction (pH) in surface layers. The weathering and translocation of primary soil minerals, including iron and organic matter, accompany soil acidification. Surface indicators of braunification include the presence of a continuous surface organic mat or dwarf scrub cover and a thin dark surface mineral horizon, all indicative of a stable or meta-stable surface condition. Additional soil indicators include the presence of a light brown to yellowish brown subsurface layer that indicates weathering and translocation of primary soil minerals (Plate 15). Soil reaction also gradually increases with depth, as illustrated in the detailed soil description for Tigaraha.

Melanization includes the darkening of light colored mineral soil by the underground decomposition of organic residues in the presence of high levels of base saturation (see the soil description for Kanauguk). The residues that are decomposed are partly roots and partly organic litter from the surface that have been taken underground by animals. In Stewart River Training Area this process is limited to a single small area of marble parent material which provides abundant soil bases to support this process.

Podzolization includes the chelation and chemical migration of aluminum and iron and organic matter downward in the soil profile, leaving silica in the leached layer (Wilding and others 1984). This process provides a good example of the combined influences of climate and parent material factors of soil formation. A distribution of map units affected by the podzolization process is provided in Figure 5. This process of alteration and translocation is normally active under extremely acid soil conditions that are normally associated with high precipitation. Indicators of this process include a thin gray leached surface "E" horizon over a reddish or reddish brown "Bs" subsoil horizon. Soils displaying indicators of podzolization, or "podzols," are limited to coarse-textured soils on glacial plains and hills with shrub birch/ lichen scrub vegetation. The presence of shrub birch, a known soil acidifier, likely contributes to acidification and podzolization on these soils. Indicators of the podzolization process are exhibited in Imuruk soils (Plate 20).

Cryoturbation includes the churning of surface and subsoil layers by frost action and the micro-relief features associated with this process are often referred to as "periglacial features." This process is well expressed within the thin, annually thawed zone in soils underlain with permafrost but permafrost is not requisite. Indicators of cryoturbation include disrupted and broken soil horizons, mixing of materials from different horizons, and mechanical sorting of materials (Agriculture Canada Expert Committee on Soil Survey 1987). Cryoturbation is most evident in soils with abundant soil moisture, high rates of cooling (affected by vegetation and snow cover), and frequent freeze-thaw cycles (Embleton and King 1968). The presence of periglacial features such as circles, solifluction lobes, and peat mounds provide surface evidence of cryoturbation in underlying soils (Plates 17 and 5).

Permafrost and Soil Formation

Permafrost is soil or geologic material that is continuously at or below 32 degrees F. (National Research Council of Canada 1988). The presence of permafrost in soils influences properties and processes by restricting downward water movement causing poor surface drainage as well as presenting a physical barrier to plant roots. In terms of the distribution of permafrost on the landscape, permafrost is generally absent in soils on flood plains because of hydrologic factors and in soils formed in gravelly materials such as colluvium because of soil thermal properties. Flood plain soils are warmed by shallow water tables underlying the flood plain system and permafrost is generally absent. Nuluk and Belmezok are two examples of soils on flood plains that lack permafrost. Soils with a high rock fragment content conduct heat effectively into the soil preventing frost from persisting through the summer months. Soils with a high rock fragment content that lack permafrost include Tigarah and Sinuktuk. Soils formed in loamy, silty, or organic materials low in rock fragment content have low thermal conductivity (Jury and others 1991). These soils warm slowly during summer and permafrost is often present. Boldrin and Peluk provide two examples of soils with organic or loamy textures and shallow permafrost.

Permafrost in soils of the area commonly occurs as fine ice crystals between individual soil grains with occasional segregated seams and lenses (Plate 20) and an overall ice content ranged from about 60 to 70 percent by volume, conditions common to Boldrin soils. Less extensive is permafrost consisting of relatively pure ice masses that form mounded surface micro-relief two or more feet high, conditions typical of Peluk soils (Plate 7). Both permafrost conditions are represented in map unit TS1-Boldrin-Peluk complex, 0 to 5 percent slopes.

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Glossary

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

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

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Aspect. The direction in which a slope faces.

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
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

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

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

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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

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

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 cm) along the longest axis. A single piece is called a channer.

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.

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

COLE (coefficient of linear extensibility). See Linear extensibility.

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

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

Congeliturbate. Soil material disturbed by frost action.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

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 (25 cm) and 40 or 80 inches (102 or 203 cm).

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches (152 cm) deep over bedrock; deep soils, 40 to 60 inches (102 to 152 cm); moderately deep, 20 to 40 inches (51 to 102 cm); shallow, 10 to 20 inches (25 to 51 cm); and very shallow, less than 10 inches (25 cm).

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the *Soil Survey Manual*.

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

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, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

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

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

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has 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 flooding unless protected artificially.

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

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

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

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

Glacial drift. Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

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

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

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

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

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 has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 cm) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

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

Hill. A natural elevation of the land surface, rising as much as 1,000 feet (305 m) above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

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

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

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

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

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

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

Cr horizon.—Soft, consolidated bedrock beneath the soil.

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

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

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

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.

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

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

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Ksat. Saturated hydraulic conductivity. (See Permeability.)

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

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

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

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.

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

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

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. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 in); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 in); and *coarse,* more than 15 millimeters (about 0.6 in).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet (305 m) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

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.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

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

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

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.)

Percolation. The movement of water through the soil.

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

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the *Soil Survey Manual*. In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 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, such as slope, stoniness, and flooding.

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

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

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

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

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

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

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:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
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

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

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.

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

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

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

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

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

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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, classes for simple slopes are as follows:

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

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

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25

Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

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, considered collectively. It includes all subdivisions of these horizons.

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

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 Summaries at Nome, Alaska.

TAPS Station: NOME WSO AIRPORT, AK6496
Start yr. - 1961 End yr. - 1990
Temperature: 30 years available out of 30 requested in this analysis
Precipitation: 30 years available out of 30 requested in this analysis

Month	Temperature (Degrees F.)						Precipitation (Inches)				
				2 yrs in 10 will have				2 yrs in 10 will have			
	average daily max	average daily min	average	max temp. >than	min temp. <than	average # of grow degree days*	average	less than	more than	average # of days w/.1 or more	average total snow fall
January	14.6	-0.6	7.0	38	-36	0	0.79	0.40	1.18	2	8.1
February	12.4	-4.4	4.0	40	-36	0	0.62	0.17	1.06	2	6.2
March	17.4	-0.3	8.5	39	-35	0	0.54	0.23	0.84	1	5.8
April	25.5	9.7	17.6	44	-20	0	0.68	0.18	1.08	2	7.0
May	42.0	29.1	35.5	68	4	55	0.62	0.24	0.95	2	2.6
June	52.9	38.8	45.8	77	27	194	1.12	0.37	1.74	3	0.2
July	57.7	45.2	51.4	79	34	355	2.17	0.99	3.18	5	0.0
August	56.1	44.1	50.1	75	29	315	2.70	1.63	3.67	7	0.0
September	48.7	36.3	42.5	64	20	118	2.48	1.03	3.70	7	0.2
October	33.8	22.2	28.0	49	-1	5	1.35	0.52	2.05	4	4.4
November	22.5	9.2	15.9	39	-21	0	1.04	0.35	1.61	3	10.9
December	15.1	-0.5	7.3	38	-32	0	0.83	0.37	1.23	2	9.0
Yearly :	-----	-----	-----	-----	-----	-----	------	------	------	----	------
Average	33.2	19.1	26.1	---	---	----	----	----	----	----	------
Extreme	86	-54	---	81	-41	-----	----	----	----	----	-----
Total:	---	---	---	---	---	1042	14.96	11.20	18.28	40	54.4

Average number of days per year with at least 1 inch of snow on the ground: 188

*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)

Table 2. Frost-free dates for Nome, Alaska.

FROST Station: NOME WSO AIRPORT, AK6496
Start yr. - 1961 End yr. - 1990
Requested years of data: 30 Available years of data: 30
Spring:
Years of missing data: 24 deg = 0, 28 deg = 0, 32 deg = 0
Years with no occurrence: 24 deg = 0, 28 deg = 0, 32 deg = 0
Data years used: 24 deg = 30, 28 deg = 30, 32 deg = 30
Fall:
Years of missing data: 24 deg = 0, 28 deg = 0, 32 deg = 0
Years with no occurrence: 24 deg = 0, 28 deg = 0, 32 deg = 0
Data years used: 24 deg = 30, 28 deg = 30, 32 deg = 30

	Temperature		
Probability	24F or lower	28F or lower	32F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 27	June 8	July 4
2 year in 10 later than--	May 22	June 4	June 27
5 year in 10 later than--	May 13	May 26	June 13
First freezing temperature in fall:			
1 yr in 10 earlier than--	September 15	August 24	August 12
2 yr in 10 earlier than--	September 20	August 31	August 19
5 yr in 10 earlier than--	September 29	September 12	September 1

Table 3. Acreage and Proportionate Extent of the Soils

Map symbol	Map unit name	Acres	Percent
AF1	Agiapuk-Pinguk complex, 2 to 5 percent slopes	285	1.1
BS1	Sinuktuk-Kiglauik complex, 15 to 25 percent slopes	5,813	22.8
BSL1	Sinuktuk-Kiglauik complex, 5 to 15 percent slopes	4,571	17.9
BSS1	Sinuktuk-Kiglauik-Rock outcrop complex, 25 to 65 percent slopes	4,578	17.9
FP1	Nuluk-Belmezok complex	1,131	4.4
FS1	Boldrin-Peluk complex, 5 to 12 percent slopes	477	1.9
FS2	Tuksuk-Kiglauik complex, 5 to 12 percent slopes	526	2.1
GM1	Tisuk-Kuzitrin complex, 5 to 20 percent slopes	246	1.0
SU1	Tigaraha-Rock outcrop complex, 0 to 15 percent slopes	1,080	4.2
SU2	Boldrin-Sinuktuk complex, 0 to 15 percent slopes	679	2.7
SU3	Kanauguk-Rock outcrop complex, 5 to 25 percent slopes	38	0.2
TP1	Tisuk-Dirrant complex, 2 to 15 percent slopes	728	2.9
TP2	Imuruk-Tisuk-Dirrant complex, 0 to 30 percent slopes	599	2.3
TS1	Boldrin-Peluk complex, 0 to 5 percent slopes	4,556	17.8
TS2	Distin-Cassiterite complex	212	0.8
	Total	25,519	102.1

Table 4. Recreation: Camp Areas, Foot and ATV Trails

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Camp Areas (primitive) (Alaska criteria)		Foot and ATV Trails (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AF1:					
Agiapuk	70	Somewhat limited:		Somewhat limited:	
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Pinguk	20	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
BS1:					
Sinuktuk	60	Very limited:		Very limited:	
		Slope	1.00	Water erosion hazard	1.00
		Too Stony	1.00	Too Stony	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Kiglauik	30	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
		Too Stony	0.19	Too Stony	0.19
BSL1:					
Sinuktuk	55	Somewhat limited:		Very limited:	
		Silty surface layer dusty when dry and slippery when wet	0.50	Water erosion hazard	1.00
		Slope	0.16	Silty surface layer dusty when dry and slippery when wet	0.50
Kiglauik	40	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Water erosion hazard	1.00
		Slope	0.37	Silty surface layer dusty when dry and slippery when wet	0.50
		Too Stony	0.19	Too Stony	0.19
BSS1:					
Sinuktuk	70	Very limited:		Very limited:	
		Slope	1.00	Too Stony	1.00
		Too Stony	1.00	Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Kiglauik	15	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
		Too Stony	0.19	Too Stony	0.19
Rock outcrop	15	Not rated		Not rated	

Table 4. Recreation: Primitive Camp Areas, Foot and ATV Trails

Map symbol and soil name	Percent of map unit	Camp Areas (primitive) (Alaska criteria)		Foot and ATV Trails (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
FP1:					
Nuluk-------------------	60	Somewhat limited:		Somewhat limited:	
		Depth to saturated zone	0.90	Silty surface layer dusty when dry and slippery when wet	0.50
		Silty surface layer dusty when dry and slippery when wet	0.50	Depth to saturated zone	0.22
Belmezok--------------	30	Somewhat limited:		Somewhat limited:	
		Depth to saturated zone	0.90	Sandy surface layer easily displaced	0.50
				Flooding	0.40
				Depth to saturated zone	0.22
FS1:					
Boldrin-----------------	65	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Excess surface organic matter	1.00
				Sandy surface layer easily displaced	0.50
				Depth to permafrost	0.46
Peluk-------------------	25	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to permafrost	1.00
				Depth to saturated zone	1.00
				Excess surface organic matter	1.00
				Sandy surface layer easily displaced	0.50
FS2:					
Tuksuk-----------------	60	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Kiglauik----------------	25	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Water erosion hazard	1.00
		Too Stony	0.19	Silty surface layer dusty when dry and slippery when wet	0.50
		Slope	0.16	Too Stony	0.19
GM1:					
Tisuk-------------------	80	Somewhat limited:		Very limited:	
		Slope	0.63	Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Kuzitrin-----------------	20	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Water erosion hazard	1.00
		Slope	0.16	Silty surface layer dusty when dry and slippery when wet	0.50

Table 4. Recreation: Primitive Camp Areas, Foot and ATV Trails—Continued

Map symbol and soil name	Percent of map unit	Camp Areas (primitive) (Alaska criteria) Rating class and limiting features	Value	Foot and ATV Trails (Alaska criteria) Rating class and limiting features	Value
SU1:					
Tigaraha---------------	85	Very limited:		Very limited:	
		Too Stony	1.00	Too Stony	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Rock outcrop---------	15	Not rated		Not rated	
SU2:					
Boldrin-----------------	50	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.16	Excess surface organic matter	1.00
				Sandy surface layer easily displaced	0.50
				Depth to permafrost	0.46
Sinuktuk---------------	45	Somewhat limited:		Very limited:	
		Slope	0.84	Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
SU3:					
Kanauguk-------------	80	Somewhat limited:		Not limited	
		Slope	0.16		
Rock outcrop---------	20	Not rated		Not rated	
TP1:					
Tisuk-------------------	65	Somewhat limited:		Somewhat limited:	
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Dirrant-----------------	25	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to permafrost	1.00
				Depth to saturated zone	1.00
				Excess surface organic matter	1.00
				Sandy surface layer easily displaced	0.50
TP2:					
Imuruk------------------	35	Very limited:		Very limited:	
		Slope	1.00	Water erosion hazard	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Tisuk-------------------	30	Somewhat limited:		Somewhat limited:	
		Silty surface layer dusty when dry and slippery when wet	0.50	Silty surface layer dusty when dry and slippery when wet	0.50
Dirrant-----------------	25	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to permafrost	1.00
				Depth to saturated zone	1.00
				Excess surface organic matter	1.00
				Sandy surface layer easily displaced	0.50

Table 4. Recreation: Primitive Camp Areas, Foot and ATV Trails—Continued

Map symbol and soil name	Percent of map unit	Camp Areas (primitive) (Alaska criteria)		Foot and ATV Trails (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TS1:					
Boldrin	55	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Excess surface organic matter	1.00
				Sandy surface layer easily displaced	0.50
				Depth to permafrost	0.46
Peluk	35	Very limited:		Very limited:	
		Depth to saturated zone	1.00	Depth to permafrost	1.00
				Depth to saturated zone	1.00
				Excess surface organic matter	1.00
				Sandy surface layer easily displaced	0.50
TS2:					
Distin	75	Somewhat limited:		Very limited:	
		Silty surface layer dusty when dry and slippery when wet	0.50	Excess surface organic matter	1.00
				Silty surface layer dusty when dry and slippery when wet	0.50
Cassiterite	25	Somewhat limited:		Somewhat limited:	
		Depth to saturated zone	0.90	Silty surface layer dusty when dry and slippery when wet	0.50
		Silty surface layer dusty when dry and slippery when wet	0.50	Depth to saturated zone	0.22

Table 5. Building Site Development: Structures

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements (Standard criteria)		Dwellings with basements (Standard criteria)		Small commercial buildings (Standard criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AF1:							
Agiapuk	70	Not limited		Not limited		Not limited	
Pinguk	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
BS1:							
Sinuktuk	60	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.12	Content of large stones	0.12	Content of large stones	0.12
				Depth to soft bedrock	0.01		
Kiglauik	30	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Content of large stones	0.01	Depth to soft bedrock	0.18	Content of large stones	0.01
				Content of large stones	0.01		
BSL1:							
Sinuktuk	55	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.16	Slope	0.16	Slope	1.00
		Content of large stones	0.12	Content of large stones	0.12	Content of large stones	0.12
				Depth to soft bedrock	0.01		
Kiglauik	40	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.37	Slope	0.37	Slope	1.00
		Content of large stones	0.01	Depth to soft bedrock	0.18	Content of large stones	0.01
				Content of large stones	0.01		
BSS1:							
Sinuktuk	70	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.12	Content of large stones	0.12	Content of large stones	0.12
				Depth to soft bedrock	0.01		
Kiglauik	15	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Content of large stones	0.01	Depth to soft bedrock	0.18	Content of large stones	0.01
				Content of large stones	0.01		
Rock outcrop	15	Not rated		Not rated		Not rated	

Table 5. Building Site Development: Structures—Continued

Map symbol and soil name	Pct of map unit	Dwellings without basements (Standard criteria)		Dwellings with basements (Standard criteria)		Small commercial buildings (Standard criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
FP1:							
Nuluk---------------	60	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.90	Depth to saturated zone	1.00	Depth to saturated zone	0.90
Belmezok------------	30	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.90	Depth to saturated zone	1.00	Depth to saturated zone	0.90
		Content of large stones	0.04	Content of large stones	0.04	Content of large stones	0.04
FS1:							
Boldrin---------------	65	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to permafrost	0.46	Depth to permafrost	0.46	Depth to permafrost	0.46
						Slope	0.12
Peluk-----------------	25	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Content of organic matter	1.00	Content of organic matter	1.00	Content of organic matter	1.00
						Slope	0.12
FS2:							
Tuksuk---------------	60	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Depth to soft bedrock	0.01	Slope	1.00
Kiglauik--------------	25	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.16	Depth to soft bedrock	0.18	Slope	1.00
		Content of large stones	0.01	Slope	0.16	Content of large stones	0.01
				Content of large stones	0.01		
GM1:							
Tisuk------------------	80	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.63	Slope	0.63	Slope	1.00
Kuzitrin---------------	20	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.16	Slope	0.16	Slope	1.00
SU1:							
Tigaraha-------------	85	Not limited		Somewhat limited		Not limited	
				Depth to soft bedrock	0.93		
Rock outcrop-------	15	Not rated		Not rated		Not rated	
SU2:							
Boldrin---------------	50	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to permafrost	0.46	Depth to permafrost	0.46	Slope	1.00
		Slope	0.16	Slope	0.16	Depth to permafrost	0.46
Sinuktuk-------------	45	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.84	Slope	0.84	Slope	1.00
		Content of large stones	0.12	Content of large stones	0.12	Content of large stones	0.12
				Depth to soft bedrock	0.01		

Table 5. Building Site Development: Structures—Continued

Map symbol and soil name	Pct of map unit	Dwellings without basements (Standard criteria): Rating class and limiting features	Value	Dwellings with basements (Standard criteria): Rating class and limiting features	Value	Small commercial buildings (Standard criteria): Rating class and limiting features	Value
SU3:							
Kanauguk	80	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	0.16	Slope	0.16	Slope	1.00
		Content of large stones	0.04	Content of large stones	0.04	Content of large stones	0.04
Rock outcrop	20	Not rated		Not rated		Not rated	
TP1:							
Tisuk	65	Not limited		Not limited		Very limited	
						Slope	1.00
Dirrant	25	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Content of organic matter	1.00			Content of organic matter	1.00
TP2:							
Imuruk	35	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.22	Content of large stones	0.22	Content of large stones	0.22
Tisuk	30	Not limited		Not limited		Somewhat limited	
						Slope	0.12
Dirrant	25	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Content of organic matter	1.00			Content of organic matter	1.00
TS1:							
Boldrin	55	Very limited		Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to permafrost	0.46	Depth to permafrost	0.46	Depth to permafrost	0.46
Peluk	35	Very limited		Very limited		Very limited	
		Depth to permafrost	1.00	Depth to permafrost	1.00	Depth to permafrost	1.00
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Content of organic matter	1.00	Content of organic matter	1.00	Content of organic matter	1.00
TS2:							
Distin	75	Very limited		Very limited		Very limited	
		Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
				Depth to saturated zone	1.00		
Cassiterite	25	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.90	Depth to saturated zone	1.00	Depth to saturated zone	0.90

Table 6. Construction Materials: Gravel and Sand

(This table gives soil suitability ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. Information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AF1:					
Agiapuk	70	Improbable:		Probable:	
		Bottom layer not a source	0.00	Bottom layer	0.80
Pinguk	20	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
BS1:					
Sinuktuk	60	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Kiglauik	30	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
BSL1:					
Sinuktuk	55	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Kiglauik	40	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
BSS1:					
Sinuktuk	70	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Kiglauik	15	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Rock outcrop	15	Not rated		Not rated	
FP1:					
Nuluk	60	Gravel source		Improbable:	
				Bottom layer not a source	0.00
Belmezok	30	Improbable:		Probable:	
		Bottom layer not a source	0.00	Bottom layer	0.14
FS1:					
Boldrin	65	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		No permafrost depth limitation	0.54	No permafrost depth limitation	0.54
Peluk	25	Improbable:		Improbable:	
		Depth to permafrost	0.00	Organic soil	0.00
		Organic soil	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00

Table 6. Construction Material: Gravel and Sand--Continued

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria): Rating class and limiting features	Value	Potential source of sand (Alaska criteria): Rating class and limiting features	Value
FS2:					
Tuksuk-------------------	60	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Kiglauik------------------	25	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
GM1:					
Tisuk---------------------	80	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Kuzitrin-------------------	20	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
SU1:					
Tigaraha------------------	85	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Rock outcrop-----------	15	Not rated		Not rated	
SU2:					
Boldrin-------------------	50	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		No permafrost depth limitation	0.54	No permafrost depth limitation	0.54
Sinuktuk------------------	45	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
SU3:					
Kanauguk---------------	80	Improbable:		Improbable:	
		Hard bedrock within4 feet	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Hard bedrock within4 feet	0.00
Rock outcrop-----------	20	Not rated		Not rated	
TP1:					
Tisuk----------------------	65	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Dirrant--------------------	25	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
TP2:					
Imuruk-------------------	35	Gravel source		Improbable:	
				Bottom layer not a source	0.00
Tisuk---------------------	30	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Dirrant--------------------	25	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00

Table 6. Construction Material: Gravel and Sand--Continued

Map symbol and soil name	Percent of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TS1:					
Boldrin-------------------	55	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		No permafrost depth limitation	0.54	No permafrost depth limitation	0.54
Peluk---------------------	35	Improbable:		Improbable:	
		Depth to permafrost	0.00	Organic soil	0.00
		Organic soil	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Depth to permafrost	0.00
TS2:					
Distin---------------------	75	Improbable:		Improbable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Cassiterite---------------	25	Improbable:		Probable:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.14

Table 7. Construction Materials: Topsoil and Roadfill

(This table gives soil suitability ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. Information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AF1:					
Agiapuk	70	Poor:		Good source	
		Rock fragment content	0.00		
		Too sandy	0.00		
		Too acid	0.95		
		Hard to reclaim	0.98		
Pinguk	20	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Rock fragment content	0.00	High frost action (check lower layers)	0.00
		Hard to reclaim	0.00	Cobble content	0.66
BS1:					
Sinuktuk	60	Poor:		Poor:	
		Slope	0.00	Depth to bedrock	0.00
		Rock fragment content	0.00	Cobble content	0.07
		Depth to bedrock	0.99	Moderate frost action (check lower layers)	0.50
				Slope	0.50
Kiglauik	30	Poor:		Poor:	
		Slope	0.00	Depth to bedrock	0.00
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Rock fragment content	0.00	High frost action(check lower layers)	0.00
		Depth to bedrock	0.81	Cobble content	0.45
				Slope	0.50
BSL1:					
Sinuktuk	55	Poor:		Poor:	
		Rock fragment content	0.00	Depth to bedrock	0.00
		Slope	0.84	Cobble content	0.07
		Depth to bedrock	0.99	Moderate frost action (check lower layers)	0.50
Kiglauik	40	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to bedrock	0.00
		Rock fragment content	0.00	Depth to saturated zone	0.00
		Slope	0.63	High frost action (check lower layers)	0.00
		Depth to bedrock	0.81	Cobble content	0.45
BSS1:					
Sinuktuk	70	Poor:		Poor:	
		Slope	0.00	Depth to bedrock	0.00
		Rock fragment content	0.00	Slope	0.00
		Depth to bedrock	0.99	Cobble content	0.07
				Moderate frost action (check lower layers)	0.50
Kiglauik	15	Poor:		Poor:	
		Slope	0.00	Depth to bedrock	0.00
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Rock fragment content	0.00	Slope	0.00
		Depth to bedrock	0.81	High frost action (check lower layers)	0.00
				Cobble content	0.45
Rock outcrop	15	Not rated		Not rated	

Table 7. Construction Materials: Topsoil and Roadfill—Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
FP1:					
Nuluk-----------------	60	Poor:		Poor:	
		Rock fragment content	0.00	High frost action (check lower layers)	0.00
		Hard to reclaim	0.00	Depth to saturated zone	0.22
		Depth to saturated zone	0.22		
Belmezok------------	30	Poor:		Fair:	
		Rock fragment content	0.00	Cobble content	0.21
		Hard to reclaim	0.00	Depth to saturated zone	0.22
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
		Depth to saturated zone	0.22		
FS1:					
Boldrin---------------	65	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
		No permafrost depth limitation	0.54	No permafrost depth limitation	0.54
Peluk-----------------	25	Poor:		Poor:	
		Depth to permafrost	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
		Too acid	0.76		
FS2:					
Tuksuk---------------	60	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to bedrock	0.00
		Rock fragment content	0.00	Depth to saturated zone	0.00
		No bedrock depth limitation	0.99	High frost action (check lower layers)	0.00
Kiglauik--------------	25	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to bedrock	0.00
		Rock fragment content	0.00	Depth to saturated zone	0.00
		Depth to bedrock	0.81	High frost action(check lower layers)	0.00
		Slope	0.84	Cobble content	0.45
GM1:					
Tisuk-----------------	80	Poor:		Fair:	
		Rock fragment content	0.00	Moderate frost action (check lower layers)	0.50
		Hard to reclaim	0.00	Cobble content	0.61
		Slope	0.37		
Kuzitrin--------------	20	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Rock fragment content	0.00	Moderate frost action (check lower layers)	0.50
		Hard to reclaim	0.00	Cobble content	0.87
		Slope	0.84		
SU1:					
Tigaraha-------------	85	Fair:		Poor:	
		Depth to bedrock	0.05	Depth to bedrock	0.00
				Moderate frost action (check lower layers)	0.50
				Cobble content	0.90
Rock outcrop-------	15	Not rated		Not rated	

Table 7. Construction Materials: Topsoil and Roadfill—Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria): Rating class and limiting features	Value	Potential source of roadfill (Alaska criteria): Rating class and limiting features	Value
SU2:					
Boldrin---------------	50	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
		No permafrost depth limitation	0.54	No permafrost depth limitation	0.54
		Slope	0.84		
Sinuktuk-------------	45	Poor:		Poor:	
		Rock fragment content	0.00	Depth to bedrock	0.00
		Slope	0.16	Cobble content	0.07
		Depth to bedrock	0.99	Moderate frost action (check lower layers)	0.50
SU3:					
Kanauguk-----------	80	Poor:		Poor:	
		Rock fragment content	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Moderate frost action (check lower layers)	0.50
		Slope	0.84		
Rock outcrop-------	20	Not rated		Not rated	
TP1:					
Tisuk------------------	65	Poor:		Fair:	
		Rock fragment content	0.00	Moderate frost action (check lower layers)	0.50
		Hard to reclaim	0.00	Cobble content	0.61
Dirrant----------------	25	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Content of organic matter	0.00	High frost action(check lower layers)	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Too acid	0.95		
TP2:					
Imuruk----------------	35	Poor:		Poor:	
		Rock fragment content	0.00	Slope	0.00
		Hard to reclaim	0.00	Cobble content	0.01
		Slope	0.00		
Tisuk------------------	30	Poor:		Fair:	
		Rock fragment content	0.00	Moderate frost action (check lower layers)	0.50
		Hard to reclaim	0.00	Cobble content	0.61
Dirrant----------------	25	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Content of organic matter	0.00	High frost action(check lower layers)	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Too acid	0.95		
TS1:					
Boldrin---------------	55	Poor:		Poor:	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Content of organic matter	0.00	High frost action(check lower layers)	0.00
		No permafrost depth limitation	0.54	No permafrost depth limitation	0.54
Peluk-----------------	35	Poor:		Poor:	
		Depth to permafrost	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Depth to permafrost	0.00
		Content of organic matter	0.00	High frost action(check lower layers)	0.00
		Too acid	0.76		

Table 7. Construction Materials: Topsoil and Roadfill—Continued

Map symbol and soil name	Percent of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
TS2:					
Distin	75	Poor:		Poor:	
		Rock fragment content	0.00	High frost action (check lower layers)	0.00
		Depth to saturated zone	0.94	Depth to saturated zone	0.94
Cassiterite	25	Poor:		Poor:	
		Hard to reclaim	0.00	High frost action (check lower layers)	0.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22

Table 8. Hydric Soils List

Map symbol and soil name (percent composition)	Hydric soil	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
AF1:						
Agiapuk (70%)	No	fan terraces on alluvial fans	---	---	---	---
Pinguk (20%)	No	solifluction lobes on alluvial fans	---	---	---	---
Boldrin (5%)	Yes	mountains	2B3	Yes	No	No
Nuluk (5%)	No	flood plains on alluvial fans	---	---	---	---
BS1:						
Sinuktuk (60%)	No	mountains	---	---	---	---
Kiglauik (30%)	No	solifluction lobes on mountains	---	---	---	---
Rock outcrop (5%)	Unranked	mountains	---	---	---	---
Tuksuk (5%)	Yes	mountains	2B3	Yes	No	No
BSL1:						
Sinuktuk (55%)	No	mountains	---	---	---	---
Kiglauik (40%)	No	solifluction lobes on mountains	---	---	---	---
Boldrin (3%)	Yes	mountains	2B3	Yes	No	No
Peluk (2%)	No	hummocks on mountains	---	---	---	---
Belmezok (0%)	No	flood plains	---	---	---	---
Nuluk (0%)	No	flood plains	---	---	---	---
BSS1:						
Sinuktuk (70%)	No	mountains	---	---	---	---
Kiglauik (15%)	No	solifluction lobes on mountains	---	---	---	---
Rock outcrop (15%)	Unranked	mountains	---	---	---	---
FP1:						
Nuluk (60%)	No	flood plains	---	---	---	---
Belmezok (30%)	No	flood plains	---	---	---	---
Cassiterite (7%)	No	flood plains	---	---	---	---
Typic Gelaquents (3%)	Yes	flood plains	2B3	Yes	No	No
FS1:						
Boldrin (65%)	Yes	mountains	2B3	Yes	No	No
Peluk (25%)	No	hummocks on mountains	---	---	---	---
Cassiterite (5%)	No	flood plains	---	---	---	---
Kiglauik (5%)	No	solifluction lobes on mountains	---	---	---	---

Table 8. Hydric Soils List—Continued

Map symbol and soil name (percent composition)	Hydric soil	Local landform	Hydric soils criteria			
			Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
FS2:						
Tuksuk (60%)	Yes	mountains	2B3	Yes	No	No
Kiglauik (25%)	No	solifluction lobes on mountains	---	---	---	---
Sinuktuk (10%)	No	mountains	---	---	---	---
Boldrin (5%)	Yes	mountains	2B3	Yes	No	No
GM1:						
Tisuk (80%)	No	mountains	---	---	---	---
Kuzitrin (20%)	No	swales on mountains	---	---	---	---
SU1:						
Tigaraha (85%)	No	mountains	---	---	---	---
Rock outcrop (15%)	Unranked	mountains	---	---	---	---
SU2:						
Boldrin (50%)	Yes	mountains	2B3	Yes	No	No
Sinuktuk (45%)	No	mountains	---	---	---	---
Kiglauik (5%)	No	solifluction lobes on mountains	---	---	---	---
SU3:						
Kanauguk (80%)	No	mountains	---	---	---	---
Rock outcrop (20%)	Unranked	mountains	---	---	---	---
TP1:						
Tisuk (65%)	No	till plains, hills	---	---	---	---
Dirrant (25%)	Yes	till plains	2B3	Yes	No	No
Distin (10%)	Yes	circles on till plains	2B3	Yes	No	No
TP2:						
Imuruk (35%)	No	hills, outwash plains	---	---	---	---
Tisuk (30%)	No	till plains	---	---	---	---
Dirrant (25%)	Yes	till plains	2B3	Yes	No	No
Kuzitrin (5%)	No	swales on till plains	---	---	---	---
Peluk (3%)	No	hummocks on mountains	---	---	---	---
Boldrin (2%)	Yes	mountains	2B3	Yes	No	No
TS1:						
Boldrin (55%)	Yes	mountains	2B3	Yes	No	No
Peluk (35%)	No	hummocks on mountains	---	---	---	---
Cassiterite (5%)	No	flood plains	---	---	---	---
Fluvaquentic Sapristels (5%)	Yes	drainageways on mountains	1,4	Yes	Yes	No

Table 8. Hydric Soils List—Continued

Map symbol and soil name (percent composition)	Hydric soil	Local landform	Hydric soils criteria: Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
TS2:						
Distin (75%)	Yes	circles on stream terraces	2B3	Yes	No	No
Cassiterite (25%)	No	flood plains	---	---	---	---

Table 9. Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Liquid limit	Plas- ticity index
			Unified	AASHTO		
	In.				Pct.	
AF1:						
Agiapuk--------------	0-1	Moderately decomposed plant material	PT	A-8	---	---
	1-2	Silt loam	ML	A-4	25-30	NP-5
	2-16	Gravelly sandy loam, stratified very gravelly sand to silt, extremely cobbly sandy loam	GW-GM, GC-GM	A-1, A-2	5-15	NP-5
	16-60	Very gravelly sand, extremely gravelly coarse sand, very channery sandy loam	SP-SM, GW, SM	A-1	0-0	NP
Pinguk----------------	0-2	Slightly decomposed plant material	PT	A-8	---	---
	2-5	Silt loam	ML	A-4	30-40	NP-10
	5-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	SC-SM, CL-ML, SM	A-1, A-4	5-15	NP-5
	15-60	Very gravelly sandy loam, very cobbly sandy loam	SM, SC-SM	A-1, A-2, A-4	5-15	NP-5
BS1:						
Sinuktuk-------------	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-3	Loam, silt loam	ML	A-4	30-40	NP-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	GP-GM, GM	A-2, A-4	0-0	NP
	38-60	Weathered bedrock			---	---
Kiglauik--------------	0-2	Slightly decomposed plant material	PT	A-8	---	---
	2-5	Silt loam	ML	A-4	30-40	NP-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	33-60	Weathered bedrock			---	---
BSL1:						
Sinuktuk-------------	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-3	Loam, silt loam	ML	A-4	30-40	NP-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	GP-GM, GM	A-2, A-4	0-0	NP
	38-60	Weathered bedrock			---	---
Kiglauik--------------	0-2	Slightly decomposed plant material	PT	A-8	---	---
	2-5	Silt loam	ML	A-4	30-40	NP-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	33-60	Weathered bedrock			---	---

Table 9. Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Liquid limit	Plasticity index
	In.				Pct.	
BSS1:						
Sinuktuk	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-3	Loam, silt loam	ML	A-4	30-40	NP-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	GP-GM, GM	A-2, A-4	0-0	NP
	38-60	Weathered bedrock			---	---
Kiglauik	0-2	Slightly decomposed plant material	PT	A-8	---	---
	2-5	Silt loam	ML	A-4	30-40	NP-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	33-60	Weathered bedrock			---	---
Rock outcrop	---	---	---	---	---	---
FP1:						
Nuluk	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-3	Silt loam	ML	A-4	25-30	NP-5
	3-19	Stratified sand to silt	SC-SM, SM	A-2, A-4	10-15	NP-5
	19-60	Very gravelly coarse sand, extremely gravelly coarse sand, very cobbly loamy sand	GP, GP-GM, SW-SM	A-1	0-0	NP
Belmezok	0-2	Sandy loam	SC-SM, SM	A-2, A-4	5-15	NP-5
	2-60	Extremely gravelly coarse sand, very gravelly loamy sand, extremely cobbly coarse sand	SP-SM, GP	A-1	0-0	NP
FS1:						
Boldrin	0-15	Peat, mucky peat	PT	A-8	---	---
	15-30	Loam, gravelly loam, gravelly sandy loam	CL-ML, SC-SM, SM	A-4, A-1	5-15	NP-5
	30-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam			---	---
Peluk	0-16	Mucky peat, peat	PT	A-8	---	---
	16-60	Permanently frozen, mixed loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam		A-4, A-1	---	---
FS2:						
Tuksuk	0-7	Highly decomposed plant material, moderately decomposed plant material	PT	A-8	---	---
	7-15	Mucky silt loam, silt loam	OL, ML	A-4	25-30	NP-5
	15-39	Very channery loam, channery loam	CL-ML, SC-SM, SM	A-1, A-4	5-15	NP-5
	39-60	Weathered bedrock			---	---
Kiglauik	0-2	Slightly decomposed plant material	PT	A-8	---	---
	2-5	Silt loam	ML	A-4	30-40	NP-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	33-60	Weathered bedrock			---	---

Table 9. Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Liquid limit	Plasticity index
	In.				Pct.	
GM1:						
Tisuk	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-4	Silt loam	ML	A-4	25-30	NP-5
	4-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	SC-SM, SM	A-1, A-4	5-15	NP-5
	15-60	Very gravelly sandy loam, very cobbly sandy loam	SC-SM, SM	A-1, A-2, A-4	5-15	NP-5
Kuzitrin	0-1	Moderately decomposed plant material	PT	A-8	---	---
	1-3	Mucky silt loam, silt loam	ML, OL	A-4	25-30	NP-5
	3-15	Loam, gravelly loam, gravelly sandy loam	CL-ML, SC-SM, SM	A-4, A-2	5-15	NP-5
	15-60	Very gravelly sandy loam, very gravelly loam, very cobbly loam	GC-GM, GM, SC-SM	A-1, A-2	5-15	NP-5
SU1:						
Tigaraha	0-0	Moderately decomposed plant material	PT	A-8	---	---
	0-2	Silt loam	ML	A-4	30-40	NP-10
	2-15	Very channery silt loam, extremely channery silt loam, very channery loam	GP-GM, GM	A-1, A-2, A-4	0-0	NP
	15-23	Very channery silt loam, extremely channery silt loam, very channery loam	GM, GP-GM	A-1, A-2, A-4	0-0	NP
	23-60	Weathered bedrock			---	---
Rock outcrop	---	---	---	---	---	---
SU2:						
Boldrin	0-15	Peat, mucky peat	PT	A-8	---	---
	15-30	Loam, gravelly loam, gravelly sandy loam	CL-ML, SC-SM, SM	A-4, A-1	5-15	NP-5
	30-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam			---	---
Sinuktuk	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-3	Loam, silt loam	ML	A-4	30-40	NP-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	GP-GM, GM	A-2, A-4	0-0	NP
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	GP-GM, GM	A-2, A-4	0-0	NP
	38-60	Weathered bedrock			---	---
SU3:						
Kanauguk	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-11	Very gravelly loam, very channery loam	SC-SM, SM	A-1, A-2, A-4	5-15	NP-5
	11-17	Extremely channery loam, very channery loam	SC-SM, SM	A-1, A-2, A-4	5-15	NP-5
	17-60	Unweathered bedrock			---	---
Rock outcrop	---	---	---	---	---	---

Table 9. Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Liquid limit	Plasticity index
	In.				Pct.	
TP1:						
Tisuk------------------	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-4	Silt loam	ML	A-4	25-30	NP-5
	4-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	SC-SM, SM	A-1, A-4	5-15	NP-5
	15-60	Very gravelly sandy loam, very cobbly sandy loam	SC-SM, SM	A-1, A-2, A-4	5-15	NP-5
Dirrant----------------	0-13	Mucky peat, peat	PT	A-8	---	---
	13-17	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	SC-SM, CL-ML, SM	A-1, A-4	5-15	NP-5
	17-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen cobbly sandy loam	CL-ML, ML, SM	A-2, A-4	---	---
TP2:						
Imuruk---------------	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-2	Silt loam	ML	A-4	25-30	NP-5
	2-18	Gravelly loamy sand, very gravelly loamy coarse sand, extremely gravelly coarse sand, very cobbly coarse sand	GP, GP-GM	A-1	0-0	NP
	18-60	Very gravelly coarse sand, extremely gravelly coarse sand, very cobbly coarse sand	GP, GP-GM	A-1	0-0	NP
Tisuk------------------	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-4	Silt loam	ML	A-4	25-30	NP-5
	4-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	SC-SM, SM	A-1, A-4	5-15	NP-5
	15-60	Very gravelly sandy loam, very cobbly sandy loam	SC-SM, SM	A-1, A-2, A-4	5-15	NP-5
Dirrant----------------	0-13	Mucky peat, peat	PT	A-8	---	---
	13-17	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	SC-SM, CL-ML, SM	A-1, A-4	5-15	NP-5
	17-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen cobbly sandy loam	CL-ML, ML, SM	A-2, A-4	---	---
TS1:						
Boldrin----------------	0-15	Peat, mucky peat	PT	A-8	---	---
	15-30	Loam, gravelly loam, gravelly sandy loam	CL-ML, SC-SM, SM	A-4, A-1	5-15	NP-5
	30-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam			---	---
Peluk-----------------	0-16	Mucky peat, peat	PT	A-8	---	---
	16-60	Permanently frozen, mixed loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam		A-4, A-1	---	---

Table 9. Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Liquid limit	Plas-ticity index
			Unified	AASHTO		
	In.				Pct.	
TS2:						
Distin	0-1	Moderately decomposed plant material	PT	A-8	---	---
	1-2	Mucky silt loam, silt loam	ML	A-4	25-30	NP-5
	2-14	Gravelly sandy loam, gravelly loam, very cobbly sandy loam	CL-ML, SC-SM, SM	A-1, A-4	5-15	NP-5
	14-60	Gravelly sandy loam, gravelly loam, very cobbly sandy loam	CL-ML, SC-SM, SM	A-1, A-4	5-15	NP-5
	>60	Permanently frozen gravelly sandy loam, permanently frozen gravelly loam, permanently frozen very cobbly sandy loam			---	---
Cassiterite	0-1	Slightly decomposed plant material	PT	A-8	---	---
	1-9	Silt loam	ML	A-4	25-30	NP-5
	9-35	Stratified sand to silt	SM, SC-SM	A-2, A-4	10-15	NP-5
	35-60	Very gravelly coarse sand, extremely gravelly coarse sand, very cobbly loamy sand	GP, SP, SP-SM	A-1	0-0	NP

Table 10. Engineering Sieve Data

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Sand	Silt	Clay
	In.		Pct.	Pct.					Pct.	Pct.	Pct.
AF1:											
Agiapuk------------	0-1	Moderately decomposed plant material	0	0	---	---	---	---	---	---	---
	1-2	Silt loam	0	0-5	95-100	90-100	80-95	55-75	15-35	55-75	0-10
	2-16	Gravelly sandy loam, stratified very gravelly sand to silt, extremely cobbly sandy loam	0	0-41	40-70	25-65	15-45	6-35	55-80	10-40	0-10
	16-60	Very gravelly sand, extremely gravelly coarse sand, very channery sandy loam	0	0-40	40-75	25-70	15-40	3-20	80-95	0-15	0-5
Pinguk--------------	0-2	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	2-5	Silt loam	0	0	95-100	95-100	90-100	80-90	15-50	50-80	0-10
	5-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-25
	15-60	Very gravelly sandy loam, very cobbly sandy loam	0	10-60	65-95	20-50	20-45	15-45	45-80	10-40	0-15
BS1:											
Sinuktuk------------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-3	Loam, silt loam	0	0	95-100	90-100	85-100	80-90	15-50	45-80	0-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Kiglauik------------	0-2	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	2-5	Silt loam	0	0	95-100	90-100	85-100	80-90	15-50	50-80	0-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
BSL1:											
Sinuktuk-----------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-3	Loam, silt loam	0	0	95-100	90-100	85-100	80-90	15-50	45-80	0-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

Table 10. Engineering Sieve Data—Continued

Map symbol and soil name	Depth	USDA texture	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Sand	Silt	Clay
	In.		Pct.	Pct.					Pct.	Pct.	Pct.
BSL1:											
Kiglauik	0-2	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	2-5	Silt loam	0	0	95-100	90-100	85-100	80-90	15-50	50-80	0-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
BSS1:											
Sinuktuk	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-3	Loam, silt loam	0	0	95-100	90-100	85-100	80-90	15-50	45-80	0-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Kiglauik	0-2	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	2-5	Silt loam	0	0	95-100	90-100	85-100	80-90	15-50	50-80	0-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop	---	---	---	---	---	---	---	---	---	---	
FP1:											
Nuluk	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-3	Silt loam	0	0	100	100	80-95	55-75	15-35	55-75	0-10
	3-19	Stratified sand to silt	0	0-10	100	100	80-90	30-50	60-85	15-35	0-10
	19-60	Very gravelly coarse sand, extremely gravelly coarse sand, very cobbly loamy sand	0	0-45	35-65	20-55	5-25	0-10	80-95	0-15	0-5
Belmezok	0-2	Sandy loam	0	0	95-100	90-100	75-85	35-50	60-85	15-35	0-10
	2-60	Extremely gravelly coarse sand, very gravelly loamy sand, extremely cobbly coarse sand	0	10-45	50-65	25-50	10-25	0-5	80-95	0-15	0-5
FS1:											
Boldrin	0-15	Peat, mucky peat	0	0	---	---	---	---	---	---	---
	15-30	Loam, gravelly loam, gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10
	30-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10
Peluk	0-16	Mucky peat, peat	0	0	---	---	---	---	---	---	---
	16-60	Permanently frozen, mixed loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10

Table 10. Engineering Sieve Data—Continued

Map symbol and soil name	Depth	USDA texture	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Sand	Silt	Clay
	In.		Pct.	Pct.					Pct.	Pct.	Pct.
FS2:											
Tuksuk-------------	0-7	Highly decomposed plant material, moderately decomposed plant material	0	0	---	---	---	---	---	---	---
	7-15	Mucky silt loam, silt loam	0	0	95-100	95-100	90-100	70-90	15-35	55-75	0-10
	15-39	Very channery loam, channery loam	0	0-15	70-100	55-90	35-80	25-55	30-75	15-50	0-10
	39-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Kiglauik------------	0-2	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	2-5	Silt loam	0	0	95-100	90-100	85-100	80-90	15-50	50-80	0-10
	5-17	Very channery silt loam, channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	17-33	Very channery silt loam, extremely channery silt loam, extremely channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
GM1:											
Tisuk----------------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-4	Silt loam	0	0-10	95-100	95-100	90-100	70-90	15-35	55-75	0-10
	4-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-15
	15-60	Very gravelly sandy loam, very cobbly sandy loam	0	10-60	65-95	20-50	20-45	15-45	45-80	10-40	0-15
Kuzitrin-------------	0-1	Moderately decomposed plant material	0	0	---	---	---	---	---	---	---
	1-3	Mucky silt loam, silt loam	0	0	90-100	90-100	90-100	70-90	15-35	55-75	0-10
	3-15	Loam, gravelly loam, gravelly sandy loam	0	0-10	70-100	55-90	35-80	25-55	30-75	15-50	0-10
	15-60	Very gravelly sandy loam, very gravelly loam, very cobbly loam	0	10-30	50-70	35-60	20-45	15-35	45-75	15-50	0-10
SU1:											
Tigaraha-----------	0-0	Moderately decomposed plant material	0	0	---	---	---	---	---	---	---
	0-2	Silt loam	0-5	0-15	90-100	95-100	90-100	80-90	15-50	50-80	0-10
	2-15	Very channery silt loam, extremely channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	15-23	Very channery silt loam, extremely channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	23-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop-----	---	---	---	---	---	---	---	---	---	---	
SU2:											
Boldrin--------------	0-15	Peat, mucky peat	0	0	---	---	---	---	---	---	---
	15-30	Loam, gravelly loam, gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10
	30-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10

Table 10. Engineering Sieve Data—Continued

Map symbol and soil name	Depth	USDA texture	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Sand	Silt	Clay
	In.		Pct.	Pct.					Pct.	Pct.	Pct.
SU2:											
Sinuktuk------------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-3	Loam, silt loam	0	0	95-100	90-100	85-100	80-90	15-50	45-80	0-10
	3-16	Very channery silt loam, extremely channery silt loam, very channery loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	16-38	Very channery loam, very channery silt loam, extremely channery silt loam	0	30-50	35-65	15-55	15-55	10-50	25-50	40-65	0-10
	38-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
SU3:											
Kanauguk----------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-11	Very gravelly loam, very channery loam	0-30	5-45	65-95	20-50	20-45	15-45	45-75	10-45	5-15
	11-17	Extremely channery loam, very channery loam	0-30	5-45	65-95	20-50	20-45	15-45	45-75	10-45	5-15
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop-----	---	---	---	---	---	---	---	---	---	---	
TP1:											
Tisuk----------------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-4	Silt loam	0	0-10	95-100	95-100	90-100	70-90	15-35	55-75	0-10
	4-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-15
	15-60	Very gravelly sandy loam, very cobbly sandy loam	0	10-60	65-95	20-50	20-45	15-45	45-80	10-40	0-15
Dirrant--------------	0-13	Mucky peat, peat	0	0	---	---	---	---	---	---	---
	13-17	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-25
	17-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-25
TP2:											
Imuruk--------------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-2	Silt loam	0	0-5	95-100	90-100	80-95	55-75	15-35	55-75	0-10
	2-18	Gravelly loamy sand, very gravelly loamy coarse sand, extremely gravelly coarse sand, very cobbly coarse sand	0	15-50	40-50	20-45	10-25	0-5	80-95	0-15	0-5
	18-60	Very gravelly coarse sand, extremely gravelly coarse sand, very cobbly coarse sand	0	15-50	40-50	20-45	10-25	0-5	80-95	0-15	0-5
Tisuk----------------	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-4	Silt loam	0	0-10	95-100	95-100	90-100	70-90	15-35	55-75	0-10
	4-15	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-15
	15-60	Very gravelly sandy loam, very cobbly sandy loam	0	10-60	65-95	20-50	20-45	15-45	45-80	10-40	0-15

Table 10. Engineering Sieve Data—Continued

Map symbol and soil name	Depth	USDA texture	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Sand	Silt	Clay
	In.		Pct.	Pct.					Pct.	Pct.	Pct.
TP2:											
Dirrant	0-13	Mucky peat, peat	0	0	---	---	---	---	---	---	---
	13-17	Very cobbly sandy loam, gravelly loam, cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-25
	17-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-25
TS1:											
Boldrin	0-15	Peat, mucky peat	0	0	---	---	---	---	---	---	---
	15-30	Loam, gravelly loam, gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10
	30-60	Permanently frozen loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10
Peluk	0-16	Mucky peat, peat	0	0	---	---	---	---	---	---	---
	16-60	Permanently frozen, mixed loam, permanently frozen gravelly loam, permanently frozen gravelly sandy loam	0	0	70-100	55-90	35-80	25-55	40-75	15-50	0-10
TS2:											
Distin	0-1	Moderately decomposed plant material	0	0	---	---	---	---	---	---	---
	1-2	Mucky silt loam, silt loam	0	0-10	95-100	90-100	85-100	70-90	15-35	55-75	0-10
	2-14	Gravelly sandy loam, gravelly loam, very cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-15
	14-60	Gravelly sandy loam, gravelly loam, very cobbly sandy loam	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-15
	>60	Permanently frozen gravelly sandy loam, permanently frozen gravelly loam, permanently frozen very cobbly sandy loaml	0	0-10	70-100	55-90	35-80	25-55	40-75	10-45	5-15
Cassiterite	0-1	Slightly decomposed plant material	0	0	---	---	---	---	---	---	---
	1-9	Silt loam	0	0	100	100	80-95	55-75	15-35	55-75	0-10
	9-35	Stratified sand to silt	0	0-10	95-100	90-100	65-80	30-50	60-85	15-35	0-10
	35-60	Very gravelly coarse sand, extremely gravelly coarse sand, very cobbly loamy sand	0	0-55	50-65	25-50	10-25	0-5	80-95	0-15	0-5

Table 11. Physical Properties of the Soils

(See text for definitions of terms used in this table. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In.	g/cc	In/Hr	In/In	Pct.	Pct.					
AF1:											
Agiapuk	0-1	---	6-20	0.32-0.35	---	65-90	---	---	5	1	160
	1-2	0.95-1.15	0.6-2	0.17-0.20	2.0-6.0	2.0-4.0	.37	.37			
	2-16	1.30-1.40	0.6-2	0.12-0.15	0.0-0.5	0.5-2.0	.28	.49			
	16-60	1.50-1.60	6-20	0.02-0.04	0.0-0.2	0.0-0.0	.02	.10			
Pinguk	0-2	0.05-0.10	6-20	0.05-0.35	---	85-95	---	---	1	1	160
	2-5	1.10-1.20	0.6-2	0.20-0.22	1.0-3.0	2.0-8.0	.37	.37			
	5-15	1.30-1.40	0.6-2	0.09-0.12	0.2-1.0	0.5-2.0	.28	.49			
	15-60	1.50-1.60	0.6-2	0.12-0.14	0.0-0.5	0.0-0.4	.17	.32			
BS1:											
Sinuktuk	0-1	0.05-0.10	6-20	0.32-0.35	---	85-95	---	---	1	2	134
	1-3	1.10-1.20	0.6-2	0.20-0.22	0.0-6.0	2.0-8.0	.37	.37			
	3-16	1.40-1.50	2-6	0.05-0.10	0.0-0.5	1.0-5.0	.10	.43			
	16-38	1.40-1.50	2-6	0.05-0.10	0.0-0.5	0.0-0.1	.10	.43			
	38-60	---	0.000-0.001	---	---	---	---	---			
Kiglauik	0-2	0.05-0.10	6-20	0.05-0.35	---	85-95	---	---	1	2	134
	2-5	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-8.0	.37	.37			
	5-17	1.40-1.50	2-6	0.05-0.10	0.0-3.0	1.0-5.0	.10	.43			
	17-33	1.40-1.50	2-6	0.05-0.10	0.0-3.0	0.0-0.1	.10	.43			
	33-60	---	0.000-0.001	---	---	---	---	---			
BSL1:											
Sinuktuk	0-1	0.05-0.10	6-20	0.32-0.35	---	85-95	---	---	1	2	134
	1-3	1.10-1.20	0.6-2	0.20-0.22	0.0-6.0	2.0-8.0	.37	.37			
	3-16	1.40-1.50	2-6	0.05-0.10	0.0-0.5	1.0-5.0	.10	.43			
	16-38	1.40-1.50	2-6	0.05-0.10	0.0-0.5	0.0-0.1	.10	.43			
	38-60	---	0.000-0.001	---	---	---	---	---			
Kiglauik	0-2	0.05-0.10	6-20	0.05-0.35	---	85-95	---	---	1	2	134
	2-5	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-8.0	.37	.37			
	5-17	1.40-1.50	2-6	0.05-0.10	0.0-3.0	1.0-5.0	.10	.43			
	17-33	1.40-1.50	2-6	0.05-0.10	0.0-3.0	0.0-0.1	.10	.43			
	33-60	---	0.000-0.001	---	---	---	---	---			
BSS1:											
Sinuktuk	0-1	0.05-0.10	6-20	0.32-0.35	---	85-95	---	---	1	2	134
	1-3	1.10-1.20	0.6-2	0.20-0.22	0.0-6.0	2.0-8.0	.37	.37			
	3-16	1.40-1.50	2-6	0.05-0.10	0.0-0.5	1.0-5.0	.10	.43			
	16-38	1.40-1.50	2-6	0.05-0.10	0.0-0.5	0.0-0.1	.10	.43			
	38-60	---	0.000-0.001	---	---	---	---	---			
Kiglauik	0-2	0.05-0.10	6-20	0.05-0.35	---	85-95	---	---	1	2	134
	2-5	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-8.0	.37	.37			
	5-17	1.40-1.50	2-6	0.05-0.10	0.0-3.0	1.0-5.0	.10	.43			
	17-33	1.40-1.50	2-6	0.05-0.10	0.0-3.0	0.0-0.1	.10	.43			
	33-60	---	0.000-0.001	---	---	---	---	---			
Rock outcrop	---	---	---	---	---	---	---	---	-	---	---

Table 11. Physical Properties of the Soils—Continued

Map symbol and soil name	Depth	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In.	g/cc	In/Hr	In/In	Pct.	Pct.					
FP1:											
Nuluk	0-1	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	2	3	86
	1-3	0.95-1.15	0.6-2	0.17-0.20	0.0-2.9	2.0-4.0	.37	.37			
	3-19	1.10-1.30	0.6-2	0.12-0.15	0.2-1.5	1.0-3.0	.24	.24			
	19-60	1.50-1.60	6-20	0.02-0.04	0.0-2.9	0.0-0.2	.10	.64			
Belmezok	0-2	0.90-1.00	0.6-2	0.16-0.18	0.2-1.0	0.0-2.0	.28	.28	5	3	86
	2-60	1.50-1.60	6-20	0.02-0.04	0.0-0.2	0.0-0.5	.02	.64			
FS1:											
Boldrin	0-15	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	1	8	0
	15-30	1.30-1.40	0.6-2	0.12-0.15	0.0-1.0	0.2-0.6	.28	.49			
	30-60	---	0.000-0.001	---	---	0.0-0.2	.28	.49			
Peluk	0-16	0.05-0.20	6-20	0.32-0.35	---	65-90	---	---	2	8	0
	16-60	---	0.000-0.001	---	---	8.0-20	.28	.49			
FS2:											
Tuksuk	0-7	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	1	1	160
	7-15	0.90-1.15	0.6-2	0.17-0.20	2.0-6.0	8.0-12	.37	.37			
	15-39	1.30-1.40	0.6-2	0.12-0.15	0.0-0.5	0.0-0.2	.28	.49			
	39-60	---	0.000-0.001	---	---	---	---	---			
Kiglauik	0-2	0.05-0.10	6-20	0.05-0.35	---	85-95	---	---	1	2	134
	2-5	1.10-1.20	0.6-2	0.20-0.22	0.0-2.9	2.0-8.0	.37	.37			
	5-17	1.40-1.50	2-6	0.05-0.10	0.0-3.0	1.0-5.0	.10	.43			
	17-33	1.40-1.50	2-6	0.05-0.10	0.0-3.0	0.0-0.1	.10	.43			
	33-60	---	0.000-0.001	---	---	---	---	---			
GM1:											
Tisuk	0-1	---	6-20	0.32-0.35	---	65-90	---	---	5	1	160
	1-4	0.95-1.15	0.6-2	0.17-0.20	2.0-6.0	3.0-6.0	.37	.37			
	4-15	1.30-1.40	0.6-2	0.09-0.12	0.2-1.0	0.5-2.0	.28	.49			
	15-60	1.50-1.60	0.6-2	0.12-0.14	0.0-0.5	0.0-0.4	.17	.32			
Kuzitrin	0-1	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	5	1	160
	1-3	0.95-1.15	0.6-2	0.17-0.20	0.0-2.9	6.0-12	.37	.37			
	3-15	1.30-1.40	0.6-2	0.12-0.15	0.0-2.9	4.0-10	.28	.49			
	15-60	1.50-1.70	0.6-2	0.09-0.12	0.0-2.9	0.0-0.2	.17	.49			
SU1:											
Tigaraha	0-0	0.05-0.10	6-20	0.32-0.35	---	85-95	---	---	1	2	134
	0-2	1.10-1.20	0.6-2	0.20-0.22	2.0-6.0	2.0-8.0	.28	.37			
	2-15	1.40-1.50	2-6	0.05-0.10	0.0-0.5	1.0-5.0	.10	.43			
	15-23	1.40-1.50	2-6	0.05-0.10	0.0-0.5	0.0-0.1	.10	.43			
	23-60	---	0.000-0.001	---	---	---	---	---			
Rock outcrop	---	---	---	---	---	---	---	---	-	---	---
SU2:											
Boldrin	0-15	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	1	8	0
	15-30	1.30-1.40	0.6-2	0.12-0.15	0.0-1.0	0.2-0.6	.28	.49			
	30-60	---	0.000-0.001	---	---	0.0-0.2	.28	.49			
Sinuktuk	0-1	0.05-0.10	6-20	0.32-0.35	---	85-95	---	---	1	2	134
	1-3	1.10-1.20	0.6-2	0.20-0.22	0.0-6.0	2.0-8.0	.37	.37			
	3-16	1.40-1.50	2-6	0.05-0.10	0.0-0.5	1.0-5.0	.10	.43			
	16-38	1.40-1.50	2-6	0.05-0.10	0.0-0.5	0.0-0.1	.10	.43			
	38-60	---	0.000-0.001	---	---	---	---	---			

Table 11. Physical Properties of the Soils—Continued

Map symbol and soil name	Depth	Moist bulk density	Permea- bility	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In.	g/cc	In/Hr	In/In	Pct.	Pct.					
SU3:											
Kanauguk	0-1	---	6-20	0.32-0.35	---	65-90	---	---	1	8	0
	1-11	1.50-1.60	0.6-2	0.12-0.14	0.0-0.5	3.0-8.0	.17	.32			
	11-17	1.50-1.60	0.6-2	0.12-0.14	0.0-0.5	0.2-1.0	.17	.32			
	17-60	---	0.000-0.001	---	---	---	---	---			
Rock outcrop	---	---	---	---	---	---	---	---	-	---	---
TP1:											
Tisuk	0-1	---	6-20	0.32-0.35	---	65-90	---	---	5	1	160
	1-4	0.95-1.15	0.6-2	0.17-0.20	2.0-6.0	3.0-6.0	.37	.37			
	4-15	1.30-1.40	0.6-2	0.09-0.12	0.2-1.0	0.5-2.0	.28	.49			
	15-60	1.50-1.60	0.6-2	0.12-0.14	0.0-0.5	0.0-0.4	.17	.32			
Dirrant	0-13	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	1	8	0
	13-17	1.30-1.40	0.6-2	0.09-0.12	0.0-0.5	0.2-0.6	.28	.49			
	17-60	---	0.000-0.001	---	---	0.0-0.2	.28	.49			
TP2:											
Imuruk	0-1	---	6-20	0.32-0.35	---	65-90	---	---	5	1	160
	1-2	0.95-1.15	0.6-2	0.17-0.20	2.0-6.0	2.0-4.0	.37	.37			
	2-18	1.50-1.60	6-20	0.02-0.04	0.0-0.2	0.5-2.0	.02	.10			
	18-60	1.50-1.60	6-20	0.02-0.04	0.0-0.2	0.0-0.0	.02	.10			
Tisuk	0-1	---	6-20	0.32-0.35	---	65-90	---	---	5	1	160
	1-4	0.95-1.15	0.6-2	0.17-0.20	2.0-6.0	3.0-6.0	.37	.37			
	4-15	1.30-1.40	0.6-2	0.09-0.12	0.2-1.0	0.5-2.0	.28	.49			
	15-60	1.50-1.60	0.6-2	0.12-0.14	0.0-0.5	0.0-0.4	.17	.32			
Dirrant	0-13	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	1	8	0
	13-17	1.30-1.40	0.6-2	0.09-0.12	0.0-0.5	0.2-0.6	.28	.49			
	17-60	---	0.000-0.001	---	---	0.0-0.2	.28	.49			
TS1:											
Boldrin	0-15	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	1	8	0
	15-30	1.30-1.40	0.6-2	0.12-0.15	0.0-1.0	0.2-0.6	.28	.49			
	30-60	---	0.000-0.001	---	---	0.0-0.2	.28	.49			
Peluk	0-16	0.05-0.20	6-20	0.32-0.35	---	65-90	---	---	2	8	0
	16-60	---	0.000-0.001	---	---	8.0-20	.28	.49			
TS2:											
Distin	0-1	0.05-0.15	6-20	0.32-0.35	---	65-90	---	---	2	1	160
	1-2	0.90-1.15	0.6-2	0.17-0.20	2.0-6.0	8.0-12	.37	.37			
	2-14	1.30-1.40	0.6-2	0.09-0.12	0.2-1.0	0.2-0.6	.28	.49			
	14-60	1.30-1.40	0.6-2	0.09-0.12	0.2-1.0	0.0-0.0	.28	.49			
	>60	---	0.000-0.001	---	---	0.0-0.0	.28	.49			
Cassiterite	0-1	0.05-0.15	2-20	0.32-0.35	---	65-90	---	---	2	3	86
	1-9	0.95-1.15	0.6-2	0.17-0.20	2.0-6.0	2.0-4.0	.37	.37			
	9-35	1.10-1.30	0.6-2	0.12-0.15	0.2-1.0	1.0-3.0	.24	.24			
	35-60	1.50-1.60	6-20	0.02-0.04	0.0-0.2	0.0-0.2	.10	.64			

Table 12. Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction
	In.	meq/100 g	meq/100 g	pH
AF1:				
Agiapuk	0-1	---	20-40	3.9-4.7
	1-2	---	10-20	4.2-5.4
	2-16	---	3-8	4.9-6.2
	16-60	---	1-3	5.2-5.4
Pinguk	0-2	---	20-40	3.8-4.8
	2-5	---	8-15	4.0-5.6
	5-15	4-10	---	4.6-6.2
	15-60	4-10	---	5.0-6.4
BS1:				
Sinuktuk	0-1	---	20-40	4.0-5.8
	1-3	---	8-15	4.3-6.0
	3-16	---	3-8	4.7-6.4
	16-38	4-10	---	5.4-7.8
	38-60	---	---	---
Kiglauik	0-2	65-95	---	5.1-7.1
	2-5	10-16	---	5.2-6.6
	5-17	6-12	---	5.4-7.6
	17-33	4-10	---	5.9-7.8
	33-60	---	---	---
BSL1:				
Sinuktuk	0-1	---	20-40	4.0-5.8
	1-3	---	8-15	4.3-6.0
	3-16	---	3-8	4.7-6.4
	16-38	4-10	---	5.4-7.8
	38-60	---	---	---
Kiglauik	0-2	65-95	---	5.1-7.1
	2-5	10-16	---	5.2-6.6
	5-17	6-12	---	5.4-7.6
	17-33	4-10	---	5.9-7.8
	33-60	---	---	---
BSS1:				
Sinuktuk	0-1	---	20-40	4.0-5.8
	1-3	---	8-15	4.3-6.0
	3-16	---	3-8	4.7-6.4
	16-38	4-10	---	5.4-7.8
	38-60	---	---	---
Kiglauik	0-2	65-95	---	5.1-7.1
	2-5	10-16	---	5.2-6.6
	5-17	6-12	---	5.4-7.6
	17-33	4-10	---	5.9-7.8
	33-60	---	---	---
Rock outcrop	---	---	---	---

Table 12. Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction
	In.	meq/100 g	meq/100 g	pH
FP1:				
Nuluk	0-1	60-95	---	4.8-5.9
	1-3	16-24	---	5.0-6.1
	3-19	12-20	---	5.0-6.5
	19-60	1-4	---	5.6-6.9
Belmezok	0-2	12-20	---	5.2-7.4
	2-60	1-4	---	5.8-7.6
FS1:				
Boldrin	0-15	60-95	---	4.4-7.2
	15-30	10-16	---	4.6-7.2
	30-60	10-16	---	4.6-7.2
Peluk	0-16	---	20-40	3.1-5.5
	16-60	12-20	---	4.4-5.9
FS2:				
Tuksuk	0-7	60-95	---	5.6-7.3
	7-15	16-24	---	5.7-6.9
	15-39	4-10	---	6.2-6.6
	39-60	---	---	---
Kiglauik	0-2	65-95	---	5.1-7.1
	2-5	10-16	---	5.2-6.6
	5-17	6-12	---	5.4-7.6
	17-33	4-10	---	5.9-7.8
	33-60	---	---	---
GM1:				
Tisuk	0-1	---	20-40	3.8-5.0
	1-4	---	10-20	4.2-5.6
	4-15	4-12	---	4.6-6.2
	15-60	4-12	---	5.0-6.5
Kuzitrin	0-1	---	20-40	4.7-6.0
	1-3	---	10-20	4.8-5.7
	3-15	12-20	---	4.4-5.9
	15-60	1-4	---	5.6-6.2
SU1:				
Tigaraha	0-0	---	20-40	4.0-5.0
	0-2	---	8-15	4.3-5.0
	2-15	---	3-8	4.7-5.5
	15-23	---	3-8	5.1-5.6
	23-60	---	---	---
Rock outcrop	---	---	---	---
SU2:				
Boldrin	0-15	60-95	---	4.4-7.2
	15-30	10-16	---	4.6-7.2
	30-60	10-16	---	4.6-7.2
Sinuktuk	0-1	---	20-40	4.0-5.8
	1-3	---	8-15	4.3-6.0
	3-16	---	3-8	4.7-6.4
	16-38	4-10	---	5.4-7.8
	38-60	---	---	---

Table 12. Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction
	In.	meq/100 g	meq/100 g	pH
SU3:				
Kanauguk---------------	0-1	60-95	---	7.1-7.6
	1-11	4-10	---	7.6-8.0
	11-17	4-10	---	7.6-8.3
	17-60	---	---	---
Rock outcrop-----------	---	---	---	---
TP1:				
Tisuk----------------------	0-1	---	20-40	3.8-5.0
	1-4	---	10-20	4.2-5.6
	4-15	4-12	---	4.6-6.2
	15-60	4-12	---	5.0-6.5
Dirrant--------------------	0-13	---	20-40	5.1-6.2
	13-17	---	4-12	5.0-6.6
	17-60	---	---	5.4-6.2
TP2:				
Imuruk-------------------	0-1	---	20-40	3.4-4.6
	1-2	---	10-20	3.8-5.5
	2-18	---	1-3	4.6-5.8
	18-60	1-4	---	5.2-6.0
Tisuk---------------------	0-1	---	20-40	3.8-5.0
	1-4	---	10-20	4.2-5.6
	4-15	4-12	---	4.6-6.2
	15-60	4-12	---	5.0-6.5
Dirrant--------------------	0-13	---	20-40	5.1-6.2
	13-17	---	4-12	5.0-6.6
	17-60	---	---	5.4-6.2
TS1:				
Boldrin-------------------	0-15	60-95	---	4.4-7.2
	15-30	10-16	---	4.6-7.2
	30-60	10-16	---	4.6-7.2
Peluk---------------------	0-16	---	20-40	3.1-5.5
	16-60	12-20	---	4.4-5.9
TS2:				
Distin---------------------	0-1	---	20-40	4.1-4.9
	1-2	---	8-15	4.1-4.9
	2-14	---	4-12	5.0-6.6
	14-60	4-10	---	5.0-6.6
	>60	4-10	---	5.0-6.6
Cassiterite--------------	0-1	65-95	---	5.1-6.0
	1-9	16-24	---	5.0-6.4
	9-35	12-20	---	5.6-6.0
	35-60	1-4	---	5.8-6.2

Table 13. Water Features

(See text for definitions of terms used in this table. Ponding depth is the estimated range in the depth of water on the surface. Soil moisture status depth is the upper and lower depth below the soil surface.)

Map symbol and soil name	Hydrologic group	Month	Flooding: Frequency	Flooding: Duration	Ponding: Frequency	Ponding: Duration	Ponding: Depth	Soil Moisture Status: Depth	Soil Moisture Status: Status
							In.	In.	
AF1:									
Agiapuk	A	Apr	None	---	None	---	---	0-60	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-60	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-60	Moist
		Jul-Aug	None	---	None	---	---	0-60	Moist
		Sep	None	---	None	---	---	0- 4	Moist, frozen
								4-60	Moist
Pinguk	C	Apr	None	---	None	---	---	0-39	Moist, frozen
								39-60	Moist
		May	None	---	None	---	---	0- 4	Wet
								4-39	Moist, frozen
								39-60	Moist
		Jun	None	---	None	---	---	0-10	Wet
								10-30	Moist, frozen
								30-60	Moist
		Jul	None	---	None	---	---	0-12	Moist
								12-20	Moist
								20-30	Wet
								30-60	Moist
		Aug-Sep	None	---	None	---	---	0-60	Moist
BS1:									
Sinuktuk	C	Apr	None	---	None	---	---	0-38	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-38	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-38	Moist
		Jul-Aug	None	---	None	---	---	0-38	Moist
		Sep	None	---	None	---	---	0- 4	Moist
								4-38	Moist
Kiglauik	C	Apr	None	---	None	---	---	0-33	Moist, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-33	Moist, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-33	Moist, frozen
		Jul	None	---	None	---	---	0-20	Moist
								20-30	Wet
								30-33	Moist
		Aug-Sep	None	---	None	---	---	0-33	Moist
BSL1:									
Sinuktuk	C	Apr	None	---	None	---	---	0-38	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-38	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-38	Moist
		Jul-Aug	None	---	None	---	---	0-38	Moist
		Sep	None	---	None	---	---	0- 4	Moist
								4-38	Moist

Table 13. Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Flooding Frequency	Flooding Duration	Ponding Frequency	Ponding Duration	Soil Moisture Status Depth	Soil Moisture Status Depth	Status
							In.	In.	
BSL1:									
Kiglauik------------------	C	Apr	None	---	None	---	---	0-33	Moist, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-33	Moist, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-33	Moist, frozen
		Jul	None	---	None	---	---	0-20	Moist
								20-30	Wet
								30-33	Moist
		Aug-Sep	None	---	None	---	---	0-33	Moist
BSS1:									
Sinuktuk-----------------	C	Apr	None	---	None	---	---	0-38	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-38	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-38	Moist
		Jul-Aug	None	---	None	---	---	0-38	Moist
		Sep	None	---	None	---	---	0- 4	Moist
								4-38	Moist
Kiglauik------------------	C	Apr	None	---	None	---	---	0-33	Moist, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-33	Moist, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-33	Moist, frozen
		Jul	None	---	None	---	---	0-20	Moist
								20-30	Wet
								30-33	Moist
		Aug-Sep	None	---	None	---	---	0-33	Moist
FP1:									
Nuluk---------------------	C	Apr	---	---	None	---	---	0-24	Moist, frozen
								24-47	Moist
								47-60	Wet
		May	Occasional	Brief	None	---	---	0-10	Moist
								10-20	Moist, frozen
								20-60	Wet
		Jun-Sep	Occasional	Brief	None	---	---	0-28	Moist
								28-60	Wet
Belmezok---------------	C	Apr	---	---	None	---	---	0-24	Moist, frozen
								24-47	Moist
								47-60	Wet
		May	Frequent	Brief	None	---	---	0-10	Moist
								10-20	Moist, frozen
								20-60	Wet
		Jun-Sep	Frequent	Brief	None	---	---	0-28	Moist
								28-60	Wet
FS1:									
Boldrin-------------------	D	Apr	None	---	None	---	---	0- 8	Moist, frozen
								8-60	Wet, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-60	Wet, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-60	Wet, frozen
		Jul-Sep	None	---	None	---	---	0- 8	Moist
								8-30	Wet
								30-60	Wet, frozen

Table 13. Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Flooding		Ponding		Soil Moisture Status		
			Frequency	Duration	Frequency	Duration	Depth	Depth	Status
							In.	In.	
FS1:									
Peluk	C	Apr	None	---	None	---	---	0-31	Moist, frozen
								31-60	Wet, frozen
		May-Jun	None	---	None	---	---	0- 4	Moist
								4-31	Moist, frozen
								31-60	Moist, frozen
		Jul-Sep	None	---	None	---	---	0- 8	Moist
								8-16	Wet
								16-31	Wet, frozen
								31-60	Wet, frozen
FS2:									
Tuksuk	D	Apr	None	---	None	---	---	0-30	Moist, frozen
								30-39	Wet
		May	None	---	None	---	---	0- 4	Wet
								4-10	Wet, frozen
								10-30	Moist, frozen
								30-39	Wet
		Jun	None	---	None	---	---	0-10	Wet
								10-20	Wet, frozen
								20-39	Wet
		Jul	None	---	None	---	---	0- 4	Moist
								4-39	Wet
		Aug-Sep	None	---	None	---	---	0-10	Moist
								10-39	Wet
Kiglauik	C	Apr	None	---	None	---	---	0-33	Moist, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-33	Moist, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-33	Moist, frozen
		Jul	None	---	None	---	---	0-20	Moist
								20-30	Wet
								30-33	Moist
		Aug-Sep	None	---	None	---	---	0-33	Moist
GM1:									
Tisuk	C	Apr	None	---	None	---	---	0-60	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-60	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-60	Moist
		Jul-Aug	None	---	None	---	---	0-60	Moist
		Sep	None	---	None	---	---	0- 4	Moist, frozen
								4-60	Moist
Kuzitrin	C	Apr	None	---	None	---	---	0-39	Moist, frozen
								39-60	Moist
		May	None	---	None	---	---	0- 4	Wet
								4-39	Moist, frozen
								39-60	Moist
		Jun	None	---	None	---	---	0-10	Wet
								10-30	Moist, frozen
								30-60	Moist
		Jul	None	---	None	---	---	0-12	Moist
								12-20	Moist
								20-30	Wet
								30-60	Moist
		Aug-Sep	None	---	None	---	---	0-60	Moist

Table 13. Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Flooding		Ponding		Soil Moisture Status		
			Frequency	Duration	Frequency	Duration	Depth	Depth	Status
							In.	In.	
SU1:									
Tigaraha	C	Apr	None	---	None	---	---	0-23	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-23	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-23	Moist, frozen
		Jul-Aug	None	---	None	---	---	0-23	Moist
		Sep	None	---	None	---	---	0- 4	Moist, frozen
								4-23	Moist
SU2:									
Boldrin	D	Apr	None	---	None	---	---	0- 8	Moist, frozen
								8-60	Wet, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-60	Wet, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-60	Wet, frozen
		Jul-Sep	None	---	None	---	---	0- 8	Moist
								8-30	Wet
								30-60	Wet, frozen
Sinuktuk	C	Apr	None	---	None	---	---	0-38	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-38	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-38	Moist
		Jul-Aug	None	---	None	---	---	0-38	Moist
		Sep	None	---	None	---	---	0- 4	Moist
								4-38	Moist
SU3:									
Kanauguk	C	Apr	None	---	None	---	---	0-17	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-17	Moist, frozen
		Jun-Sep	None	---	None	---	---	0-17	Moist
TP1:									
Tisuk	C	Apr	None	---	None	---	---	0-60	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-60	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-60	Moist
		Jul-Aug	None	---	None	---	---	0-60	Moist
		Sep	None	---	None	---	---	0- 4	Moist, frozen
								4-60	Moist
Dirrant	D	Apr	None	---	None	---	---	0- 8	Moist, frozen
								8-60	Wet, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-60	Wet, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-60	Wet, frozen
		Jul-Sep	None	---	None	---	---	0- 8	Moist
								8-17	Wet
								17-60	Wet, frozen

Table 13. Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Flooding		Ponding		Soil Moisture Status		
			Frequency	Duration	Frequency	Duration	Depth	Depth	Status
							In.	In.	
TP2:									
Imuruk	A	Apr	None	---	None	---	---	0-60	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-60	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-60	Moist
		Jul-Aug	None	---	None	---	---	0-60	Moist
		Sep	None	---	None	---	---	0- 4	Moist
								4-60	Moist
Tisuk	C	Apr	None	---	None	---	---	0-60	Moist, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-60	Moist, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-30	Moist, frozen
								30-60	Moist
		Jul-Aug	None	---	None	---	---	0-60	Moist
		Sep	None	---	None	---	---	0- 4	Moist, frozen
								4-60	Moist
Dirrant	D	Apr	None	---	None	---	---	0- 8	Moist, frozen
								8-60	Wet, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-60	Wet, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-60	Wet, frozen
		Jul-Sep	None	---	None	---	---	0- 8	Moist
								8-17	Wet
								17-60	Wet, frozen
TS1:									
Boldrin	D	Apr	None	---	None	---	---	0- 8	Moist, frozen
								8-60	Wet, frozen
		May	None	---	None	---	---	0- 4	Wet
								4-60	Wet, frozen
		Jun	None	---	None	---	---	0-10	Wet
								10-60	Wet, frozen
		Jul-Sep	None	---	None	---	---	0- 8	Moist
								8-30	Wet
								30-60	Wet, frozen
Peluk	C	Apr	None	---	None	---	---	0-31	Moist, frozen
								31-60	Wet, frozen
		May-Jun	None	---	None	---	---	0- 4	Moist
								4-31	Moist, frozen
								31-60	Moist, frozen
		Jul-Sep	None	---	None	---	---	0- 8	Moist
								8-16	Wet
								16-31	Wet, frozen
								31-60	Wet, frozen

Table 13. Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Flooding Frequency	Flooding Duration	Ponding Frequency	Ponding Duration	Soil Moisture Status Depth	Soil Moisture Status Depth	Soil Moisture Status Status
							In.	In.	
TS2:									
Distin----------------------	D	Apr	None	---	None	---	---	0-39	Moist, frozen
								39-60	Wet, frozen
		May	None	---	None	---	---	0- 4	Moist
								4-39	Moist, frozen
								39-60	Wet, frozen
		Jun	None	---	None	---	---	0-20	Moist
								20-39	Moist, frozen
								39-60	Wet, frozen
		Jul	None	---	None	---	---	0-31	Moist
								31-39	Wet
								39-60	Wet, frozen
		Aug-Sep	None	---	None	---	---	0-39	Moist
								39-47	Wet
								47-60	Wet, frozen
Cassiterite--------------	C	Apr	---	---	None	---	---	0-24	Moist, frozen
								24-60	Moist
		May	Rare	---	None	---	---	0-10	Moist
								10-20	Moist, frozen
								20-60	Wet
		Jun	Rare	---	None	---	---	0-28	Moist
								28-60	Wet
		Jul-Sep	Rare	---	None	---	---	0-60	Moist

Table 14. Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer		Subsidence			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness	Initial	Total		Uncoated steel	Concrete
		In.		In.	In.			
AF1:								
Agiapuk	Strongly contrasting textural stratification	1-4	Noncemented	0	0	Low	High	High
Pinguk	Strongly contrasting textural stratification	4-7	Noncemented	0	0	High	Moderate	Low
BS1:								
Sinuktuk	Strongly contrasting textural stratification	2-6	Noncemented	0	0	Moderate	Moderate	Moderate
	Bedrock (paralithic)	27-38	Moderately cemented					
Kiglauik	Strongly contrasting textural stratification	4-7	Noncemented	0	0	High	Moderate	Low
	Bedrock (paralithic)	25-41	Moderately cemented					
BSL1:								
Sinuktuk	Strongly contrasting textural stratification	2-6	Noncemented	0	0	Moderate	Moderate	Moderate
	Bedrock (paralithic)	27-38	Moderately cemented					
Kiglauik	Strongly contrasting textural stratification	4-7	Noncemented	0	0	High	Moderate	Low
	Bedrock (paralithic)	25-41	Moderately cemented					
BSS1:								
Sinuktuk	Strongly contrasting textural stratification	2-6	Noncemented	0	0	Moderate	Moderate	Moderate
	Bedrock (paralithic)	27-38	Moderately cemented					
Kiglauik	Strongly contrasting textural stratification	4-7	Noncemented	0	0	High	Moderate	Low
	Bedrock (paralithic)	25-41	Moderately cemented					
Rock outcrop	none	---	---	---	---	---	---	---
FP1:								
Nuluk	Strongly contrasting textural stratification	9-33	Noncemented	0	0	High	Moderate	Low
Belmezok	Strongly contrasting textural stratification	1-2	Noncemented	0	0	Moderate	Moderate	Moderate
FS1:								
Boldrin	Permafrost	17-31	Strongly cemented	2-6	6-14	High	Moderate	Low
Peluk	Permafrost	15-18	Strongly cemented	28-59	39-59	High	High	High

Table 14. Soil Features—Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Restrictive layer: Hardness	Subsidence: Initial	Subsidence: Total	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In.		In.	In.			
FS2:								
Tuksuk	Strongly contrasting textural stratification	5-17	Noncemented	0	0	High	High	High
	Bedrock (paralithic)	32-60	Moderately cemented					
Kiglauik	Strongly contrasting textural stratification	4-7	Noncemented	0	0	High	Moderate	Low
	Bedrock (paralithic)	25-41	Moderately cemented					
GM1:								
Tisuk	Strongly contrasting textural stratification	2-5	Noncemented	0	0	Moderate	High	High
Kuzitrin	Strongly contrasting textural stratification	3-6	Noncemented	0	0	Moderate	High	High
SU1:								
Tigaraha	Strongly contrasting textural stratification	0-1	Noncemented	0	0	Moderate	Moderate	Moderate
	Bedrock (paralithic)	19-45	Moderately cemented					
Rock outcrop	none	---	---	---	---	---	---	---
SU2:								
Boldrin	Permafrost	17-31	Strongly cemented	2-6	6-14	High	Moderate	Low
Sinuktuk	Strongly contrasting textural stratification	2-6	Noncemented	0	0	Moderate	Moderate	Moderate
	Bedrock (paralithic)	27-38	Moderately cemented					
SU3:								
Kanauguk	Bedrock (lithic)	9-25	Strongly cemented	0	0	Moderate	Moderate	Moderate
Rock outcrop	none	---	---	---	---	---	---	---
TP1:								
Tisuk	Strongly contrasting textural stratification	2-5	Noncemented	0	0	Moderate	High	High
Dirrant	Permafrost	17-29	Strongly cemented	2-6	17-39	High	High	Low
TP2:								
Imuruk	Strongly contrasting textural stratification	2-11	Noncemented	0	0	Low	High	High
Tisuk	Strongly contrasting textural stratification	2-5	Noncemented	0	0	Moderate	High	High
Dirrant	Permafrost	17-29	Strongly cemented	2-6	17-39	High	High	Low

Table 14. Soil Features—Continued

Map symbol and soil name	Restrictive layer		Subsidence			Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Hardness	Initial	Total		Uncoated steel	Concrete
		In.		In.	In.			
TS1:								
Boldrin	Permafrost	17-31	Strongly cemented	2-6	6-14	High	Moderate	Low
Peluk	Permafrost	15-18	Strongly cemented	28-59	39-59	High	High	High
TS2:								
Distin	Strongly contrasting textural stratification	1-3	Noncemented	24-41	35-59	High	High	High
	Permafrost	47-60	Strongly cemented					
Cassiterite	Strongly contrasting textural stratification	9-33	Noncemented	0	0	High	Moderate	Low

Table 15. Classification of the Soils

Soil name	Family or higher taxonomic class
Agiapuk	Sandy-skeletal, mixed, subgelic Typic Dystrogelepts
Belmezok	Sandy-skeletal, mixed, subgelic Oxyaquic Gelorthents
Boldrin	Coarse-loamy, mixed, superactive, subgelic Typic Historthels
Cassiterite	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, subgelic Aquic Eutrogelepts
Dirrant	Coarse-loamy, mixed, superactive, subgelic Typic Historthels
Distin	Coarse-loamy, mixed, superactive, subgelic Ruptic-Histic Aquiturbels
Fluvaquentic Sapristels	Euic, subgelic Fluvaquentic Sapristels
Imuruk	Sandy-skeletal, mixed, subgelic Typic Haplogelods
Kanauguk	Loamy-skeletal, mixed, superactive, subgelic Lithic Haplogelolls
Kiglauik	Loamy-skeletal, paramicaceous, subgelic Humic Eutrogelepts
Kuzitrin	Loamy-skeletal, mixed, superactive, subgelic Typic Dystrogelepts
Nuluk	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, subgelic Aquic Gelifluvents
Peluk	Euic, subgelic Typic Folistels
Pinguk	Loamy-skeletal, mixed, superactive, subgelic Typic Eutrogelepts
Sinuktuk	Loamy-skeletal, paramicaceous, subgelic Typic Eutrogelepts
Tigaraha	Loamy-skeletal, paramicaceous, subgelic Typic Dystrogelepts
Tisuk	Loamy-skeletal, mixed, superactive, subgelic Typic Eutrogelepts
Tuksuk	Coarse-loamy, mixed, superactive, nonacid, subgelic Typic Gelaquepts
Typic Gelaquents	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, subgelic Typic Gelaquents

Plates

Plate 1. A typical landscape sequence along Stewart River including map units FP1—Nuluk-Belmezok complex, FS1—Boldrin-Peluk complex 5 to 12 percent slopes, BSL1—Sinuk-Kiglauik, 5 to 15 percent slopes and BS1—Sinuk-Kiglauik complex, 15 to 25 percent slopes.

Plate 2. Glacial plains and hills of map unit TP2—Imuruk-Dirrant complex, 0 to 30 percent slopes.

Plate 3. Steep slopes and schist rock outcrops typical of map unit BSS1—Sinuk-Kiglauik-Rock outcrop complex. Dwarf shrub/lichen scrub vegetation is typical of upper mountain slopes throughout the area.

Plate 4. Typical landscape of a map unit FS2—Tuksuk-Kiglauik complex, 5 to 12 percent slopes in the mid-ground. Tuksuk soils are wet during much of the year and Kiglauik soils are seasonally wet from snowmelt.

Plate 5. Typical landscape of map unit TS1—Boldrin-Peluk complex, 0 to 5 percent slopes and FS1—Boldrin-Peluk complex, 5 to 12 percent slopes. Convex micro-relief consists of ice cored mounds associated with Peluk soils. Boldrin soils are in light green areas between mounds with sedge wet meadow vegetation.

Plate 6. A broad mountain summit typical of map unit SU1—Tigaraha-Rock outcrop complex, 0 to 15 percent slopes.

Plate 7. The two soil components of map units TS1 and FS1 with near-surface permafrost. Peluk (left) are formed in thick organic material, well drained and ice-rich, and found on ice-cored mounds and Boldrin (right) has a thick surface organic mat, and is very poorly drained in inter-mound areas (scale is in centimeters).

Plate 8. A broad mountain summit typical of map unit SU2—Boldrin-Sinuk, 0 to 15 percent slopes. This represents the only map unit on upper mountain slopes with significant permafrost.

Plate 9. A landscape sequence including map units TS1—Boldrin-Peluk complex, 0 to 5 percent slopes, BSL1—Sinuk-Kaglauik complex, 5 to 15 percent slopes, BS1—Sinuk-Kiglauik complex, 15 to 25 percent slopes and BSS1—Tigaraha-Kiglauik-Rock outcrop complex, 25 to 65 percent slopes.

Plate 10. Rock outcrop, a component of map unit BSS1—Tigaraha-Kiglauik-Rock outcrop complex, 25 to 60 percent slopes.

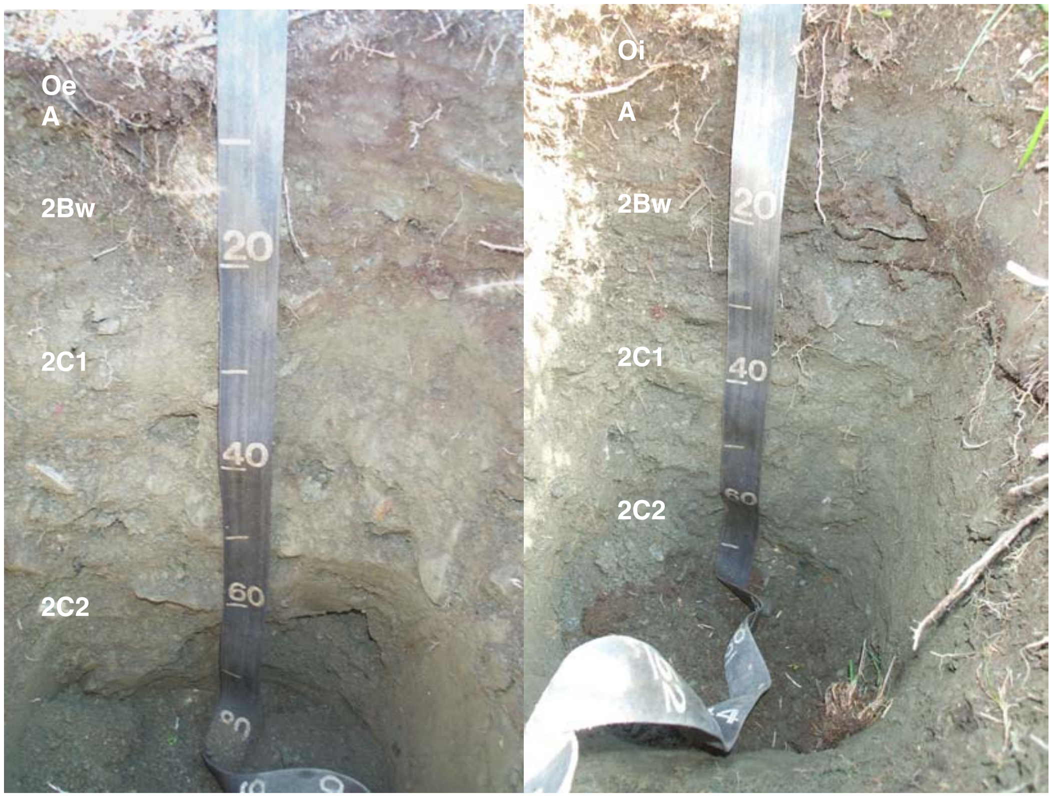

Plate 11. Gravelly till parent materials of Tisuk (right) and Kuzitrin (left) soils, components of map unit GM1—Tisuk-Kuzitrin complex, 5 to 20 percent slopes (scales are in centimeters).

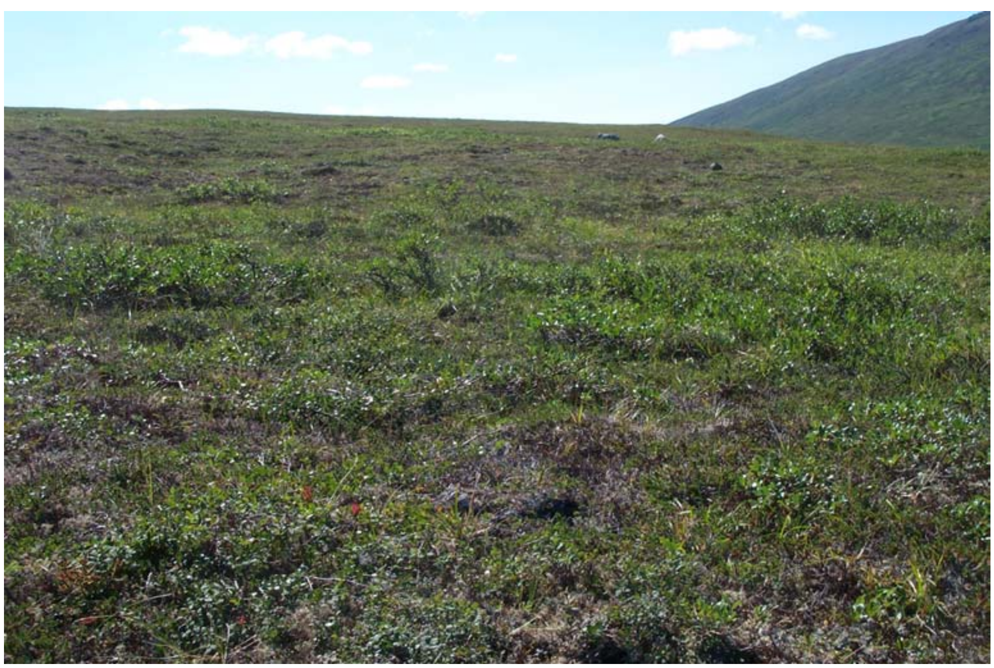

Plate 12. Typical landscape of Tisuk soil, a component of map unit GM1—Tisuk-Kuzitrin complex, 5 to 20 percent slopes.

Plate 13. Two soils formed in different rock types. The acidic Tigaraha soil (left) from map unit SU1—Tigaraha-Rock outcrop complex, 0 to 15 percent slopes, is moderately deep over schist bedrock and the calcareous Kanauguk soil (right) from map unit SU3—Kanauguk-Rock outcrop complex, 5 to 2 percent slopes, is shallow over marble (scales are in centimeters).

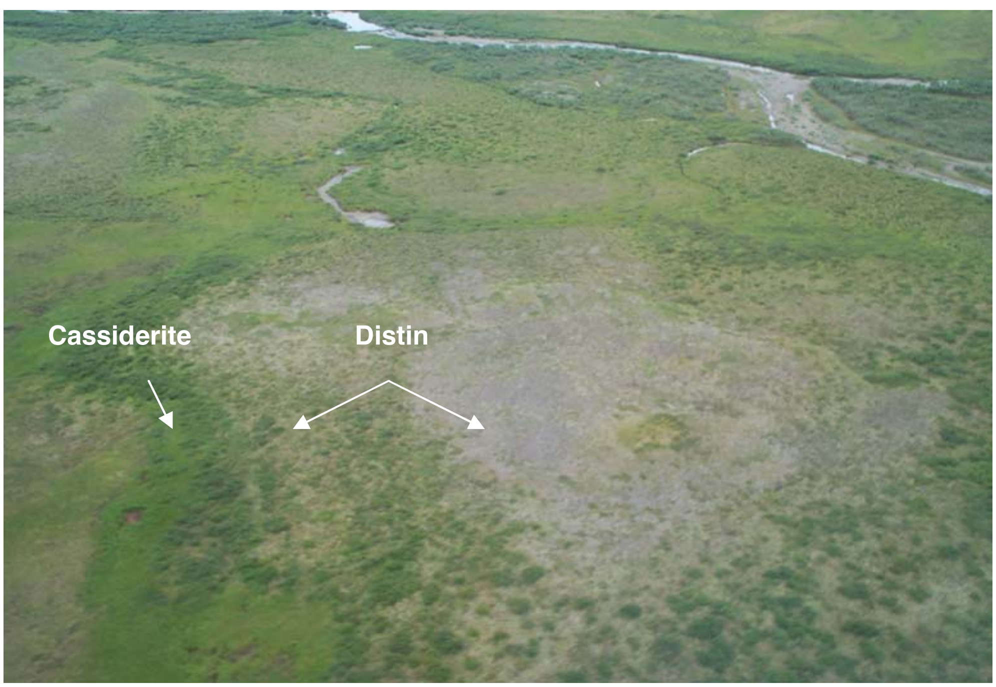

Plate 14. Map unit TS2—Distin-Cassiderite complex in foreground. Distin soils occupy the light tonal areas with Cassiderite in the dark linear feature at photo-left.

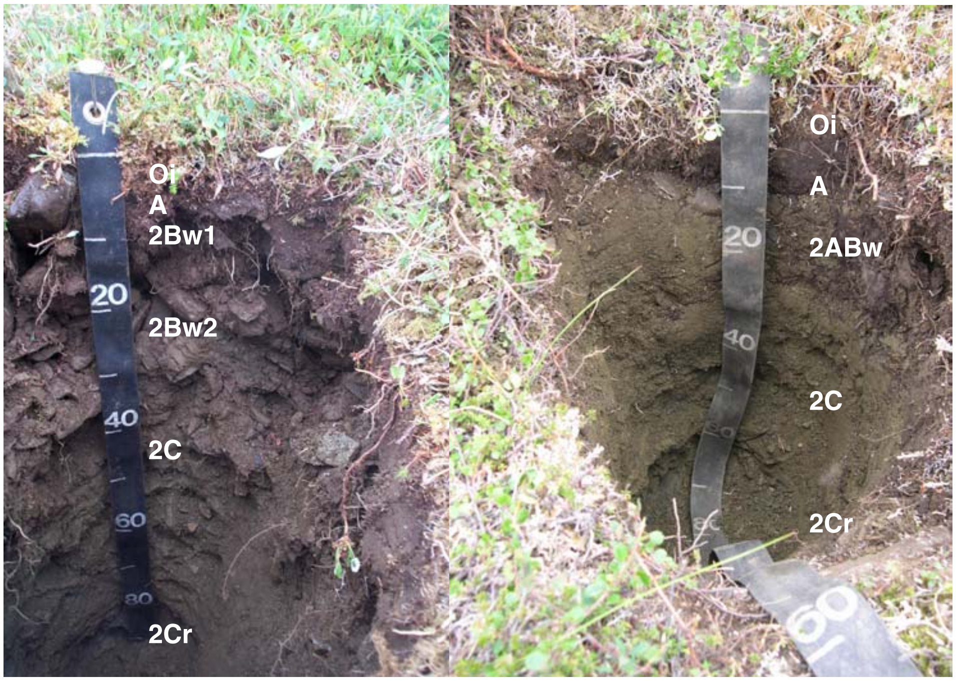

Plate 15. Sinuk (left) are well drained soils formed in thin silty eolian deposits over gravelly colluvium. Kiglauik soils (right) are soil on solifluction lobes that remain wet into late spring from snowmelt (scales are in centimeters). The subsurface “Bw” horizons indicate weathering and translocation of primary soil minerals and is an indication of the braunification process.

Plate 16. Soil profiles of two flood plains soils, the gravelly Belmezok soil on the left and the stratified loamy Nuluk soil on the right. Both are components of map unit FP1—Nuluk-Belmezok complex. A local water table associated with the riverine system underlies these soils. Periodic flooding prevents the development of horizons other than an “AC” and therefore these soils are considered as young (scales are in centimeters).

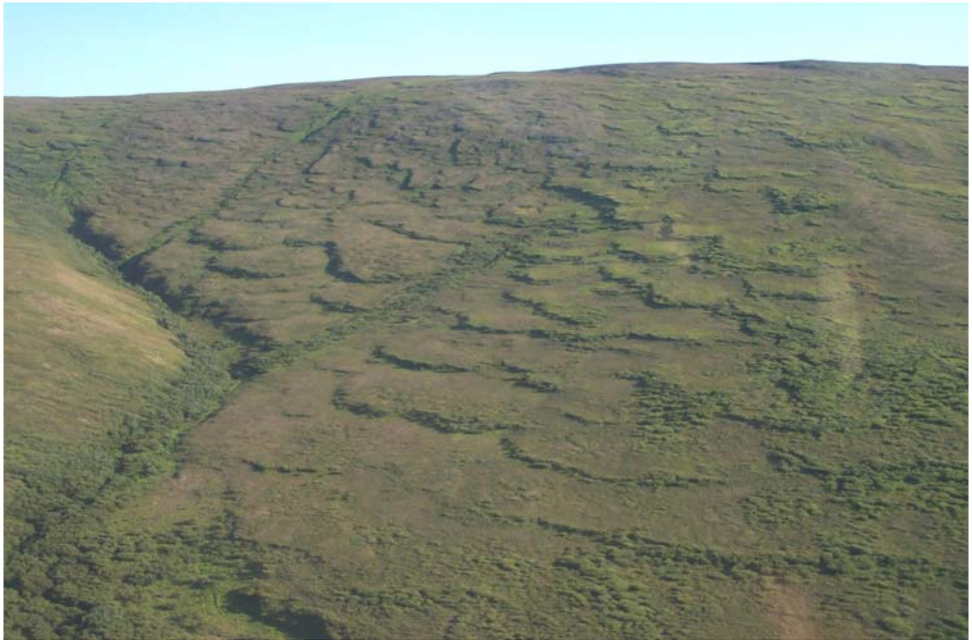

Plate 17. Crescent shaped solifluction lobes are periglacial landforms common to Kigauik soils, a major component in map unit BS1—Sinuk-Kiglauik complex, 15 to 25 percent slopes.

Plate 18. Note the churned horizon topography characteristic of the cryoturbation process in Distin soil (left). The nearly level terraces where this soil occurs is illustrated on the right (scale is in centimeters). Circles are micro-relief features associated with Distin soils and are surface indicators of cryoturbation.

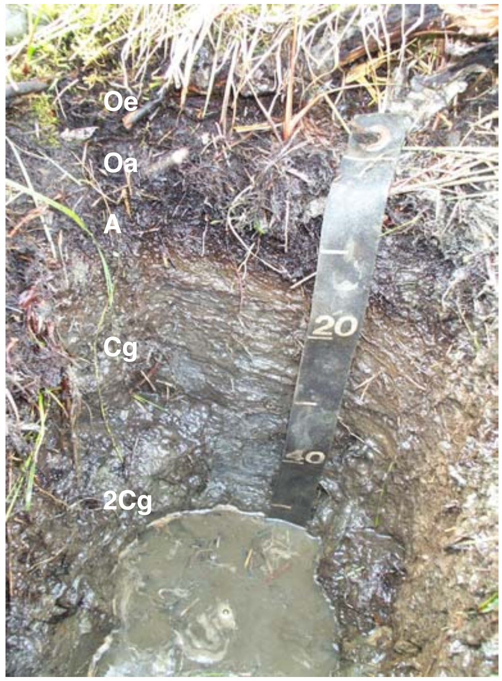

Plate 19. Tuksuk soils are found in depressions and remain saturated through much of the summer (scale is in centimeters). The neutral gray color in the “Cg” and “2Cg” horizons represent a depleted matrix, an primary indicator of hydromorphism, the process associated with saturated conditions. Map unit FS2—Tuksuk-Kiglauik complex 5 to 12 percent slopes.

Plate 20. The excessively drained Imuruk soil (left) illustrates the podzolization process as indicated by a thin surface “E’ horizon over a reddish brown “Bs” horizon. The poorly drained, moderately deep over permafrost Dirrant soils (right) are formed in gravelly till. Permafrost in Dirrant consists of fine ice crystals between soil grains and occasional lenses and seams.

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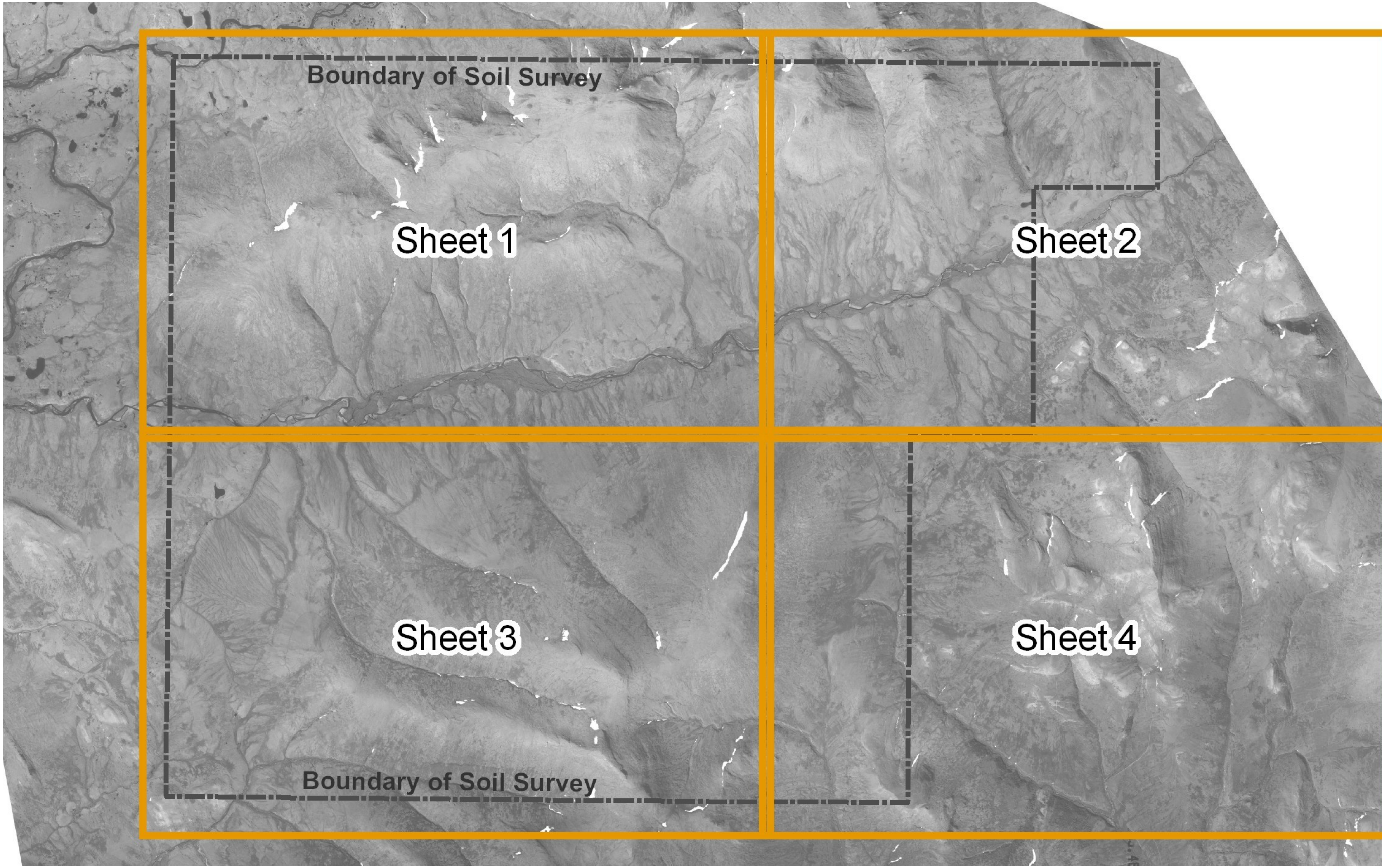
Boundary of Soil Survey
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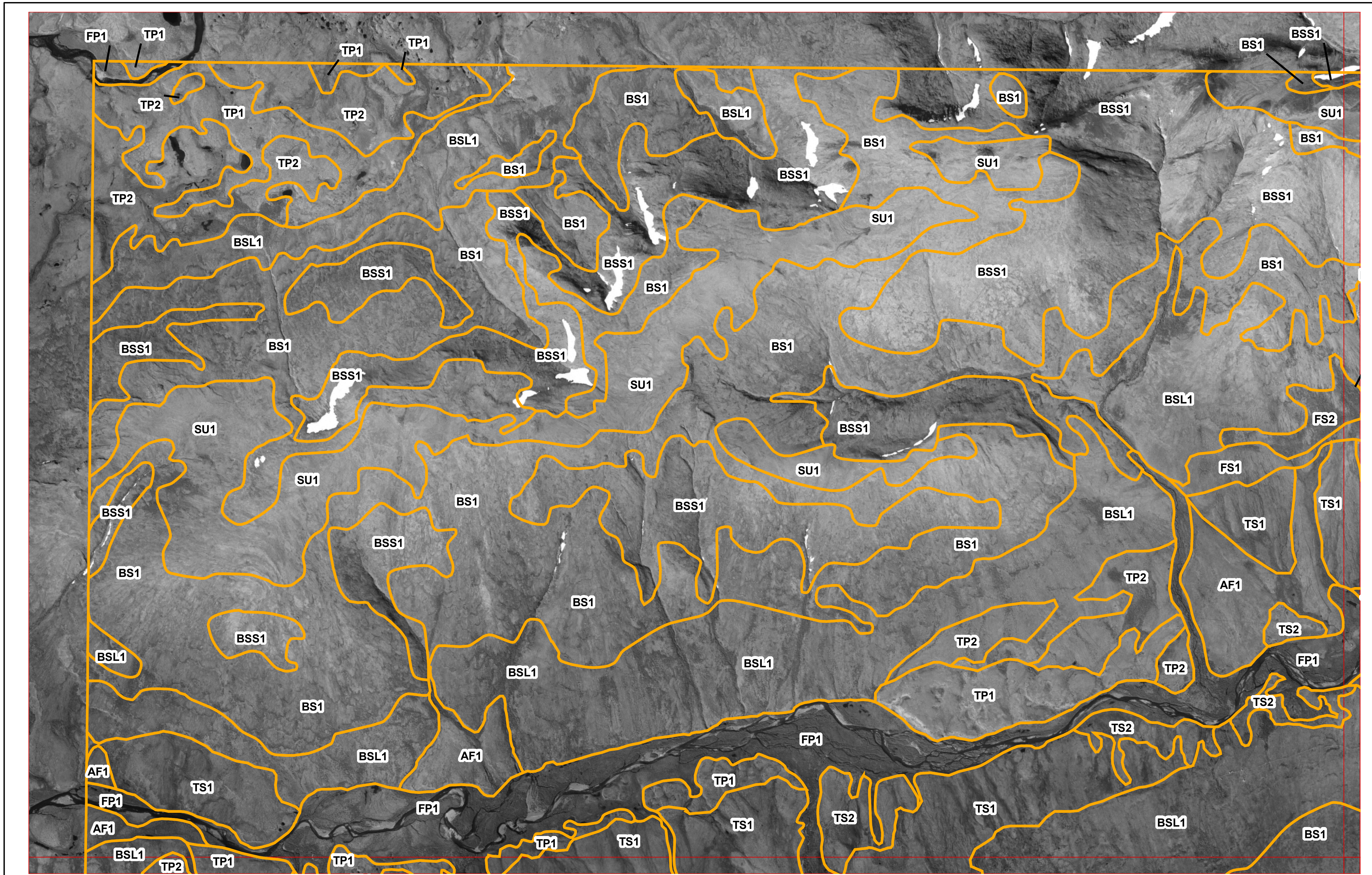
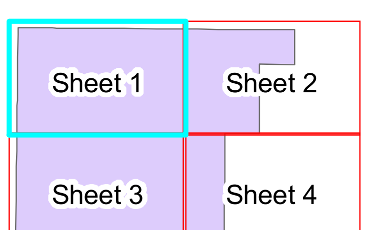
Sheet 4
Boundary of Soil Survey





Soil Survey of the Stewart River Area, Alaska

Sheet 1 of 4

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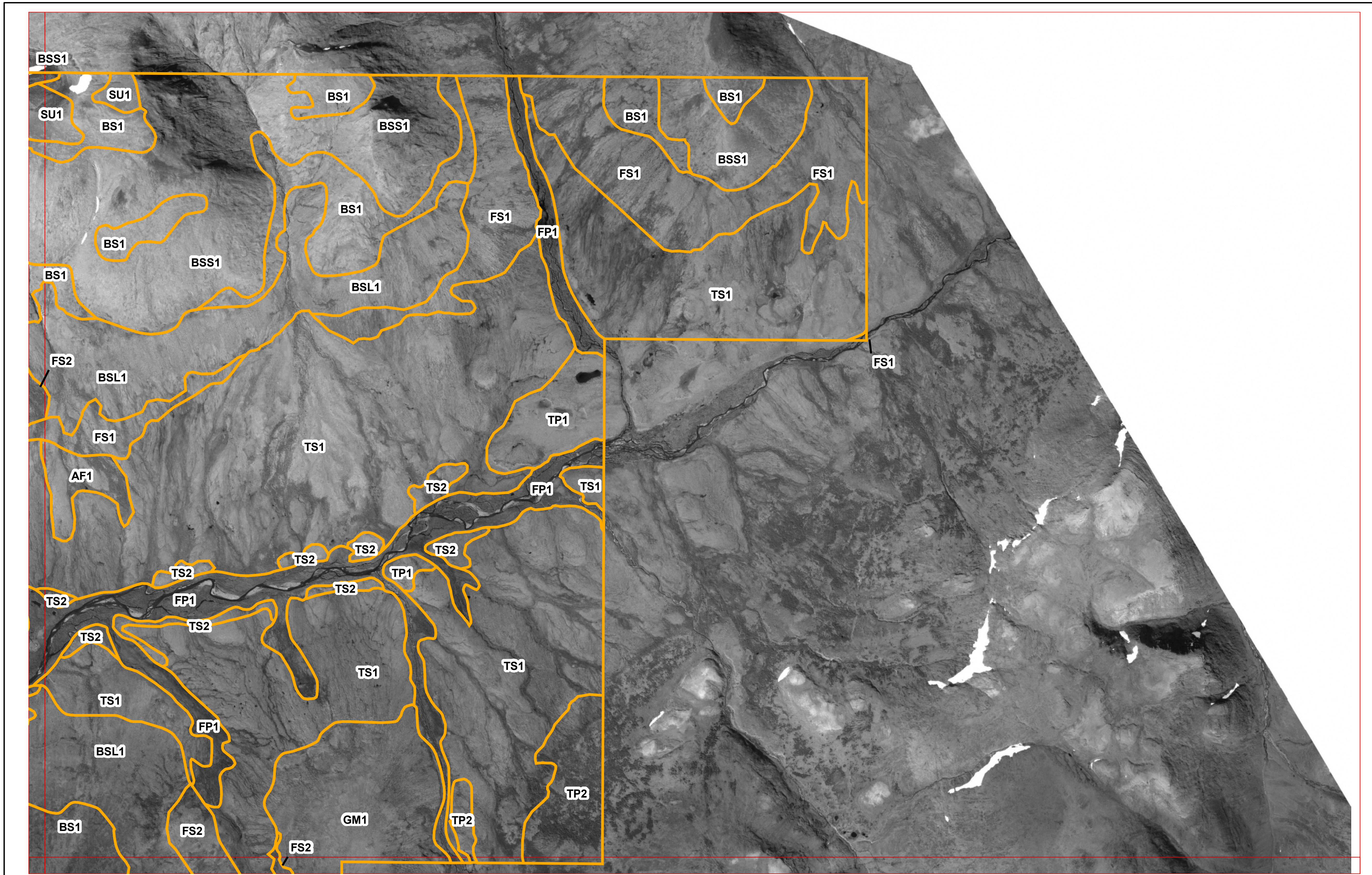

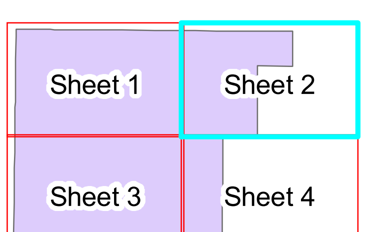

Soil Survey of the Stewart River Area, Alaska

Sheet 2 of 4

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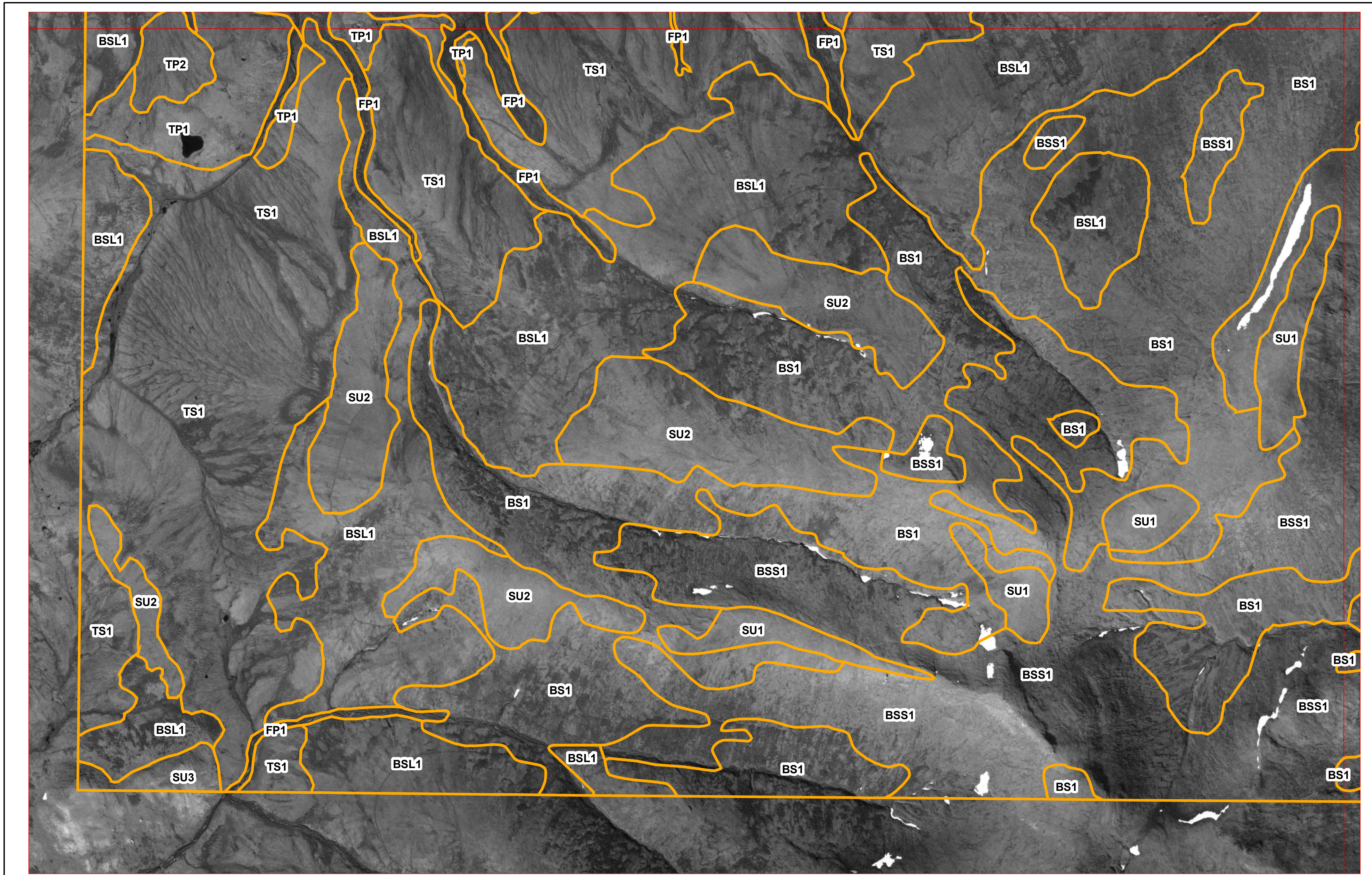
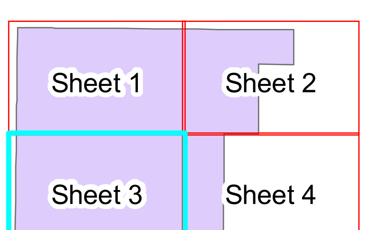


Soil Survey of the Stewart River Area, Alaska

Sheet 3 of 4



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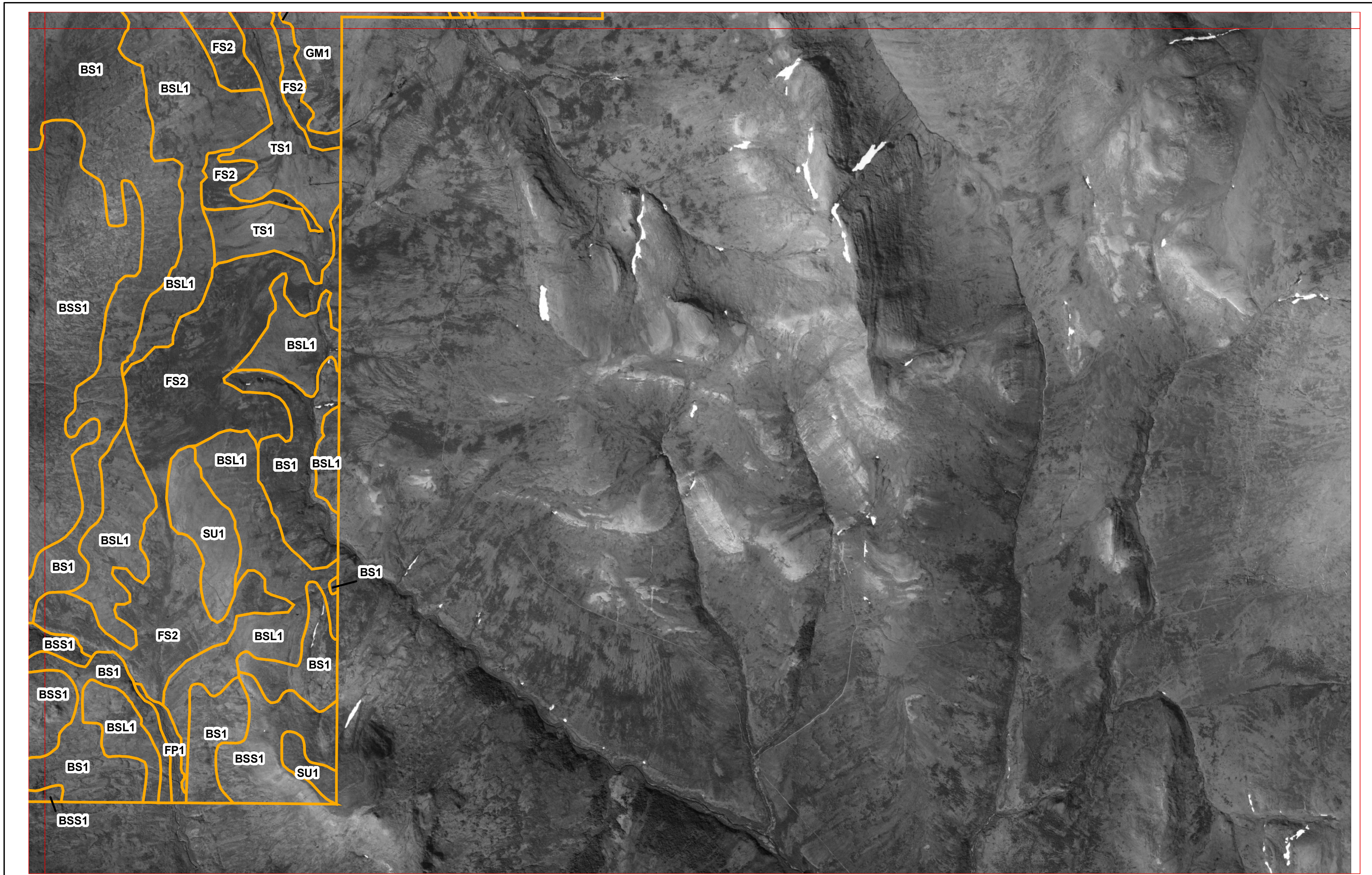

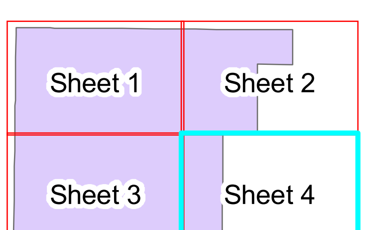

Soil Survey of the Stewart River Area, Alaska

Sheet 4 of 4

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