United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the U.S. Department of the Interior, National Park Service, and the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station

Soil Survey of Yukon-Charley Rivers National Preserve Area, Alaska

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By:
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In cooperation with:
United States Department of the Interior, National Park Service, and the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station

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Maps and spatial data for this survey are available online at http://websoilsurvey.nrcs.usda.gov.

Cover: A meandering portion of the Charley River, a National Wild and Scenic River. This is one of the few rivers that has this designation for its entire length (about 170 kilometers). The exceptionally clear Charley River is completely contained within the Yukon-Charley Rivers National Preserve (445,000-hectare watershed). The river drops 5.8 meters per kilometer in its upper reaches and offers whitewater challenges during periods of high water. Dall sheep, caribou, peregrine falcon, moose, and bears can be seen along its banks. Uplands surrounding this reach of the Charley River consist of hills with some escarpments around meander bends. Soils in this area consist of gravelly colluvium (uplands) and gravelly alluvium (flood plains of the Charley River), which are typical of detailed soil map units D31CF1—Boreal and Subalpine Hills with Extensive Permafrost (uplands) and D31UC4—Boreal Flood Plains with Common Permafrost (Charley River corridor).

How To Use This Soil Survey

Detailed Soil Maps

Hard copy detailed soil maps were not created for this survey. The maps and spatial data are available online at http://websoilsurvey.nrcs.usda.gov.

The Contents lists the map units by symbol and name and shows the page where each map unit is described. It 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, Natural Resources Conservation Service, and the United States Department of the Interior, National Park Service. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

The Natural Resources Conservation Service was responsible for the survey design and methodology, data collection and analysis, and completion of this report. Fieldwork was completed in June, July, August, and September of 2008, 2009, and 2010. Soil names and descriptions were approved in 2012. Unless indicated otherwise, maps and supporting documentation in this report refer to conditions in the survey area in 2012. This soil survey was made cooperatively by the Natural Resources Conservation Service, the National Park Service, and the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station.

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.

Acknowledgements

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Contents

Foreword

This soil survey was developed in conjunction with the National Park Service Inventory and Monitoring Program. It serves as the official source document for soils in the Yukon-Charley Rivers National Preserve Area, Alaska. The survey contains predictions of soil behavior for selected land uses. It 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.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS state soil scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock or to permafrost. Some are too unstable to be used as a foundation for buildings or roads. Wet soils are poorly suited to use for waste treatment systems. A high water table makes a soil poorly suited to basements or underground installations.

Many soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the Anchorage field office of the Natural Resources Conservation Service or the Alaska Cooperative Extension.

Robert N. Jones, State Conservationist
Natural Resources Conservation Service

Location of the Yukon-Charley Rivers National Preserve Area in Alaska (in red). The major road system within the State is represented in blue.

Soil Survey of Yukon-Charley Rivers National Preserve Area, Alaska

Introduction

The Yukon-Charley Rivers National Preserve Area is in the far eastern part of interior Alaska, along the border with Canada. It is about 193 kilometers east of Fairbanks. The survey area is in two major land resource areas (MLRAs), 231—Interior Alaska Highlands and 232—Yukon Flats Lowlands (fig. 1). The area includes Alaska Native land, nonfederal land, and public land administered by the National Park Service (NPS). Primary land uses include recreation and fish and wildlife habitat. The area was first designated as a National monument in 1978. On December 2, 1980, the area was designated as a National preserve and the Charley River was designated as part of the National Wild and Scenic River System by the Alaska National Interest Lands Conservation Act. The survey area is about 1,022,021 hectares (2,523,509 acres) in size. This encompasses a corridor that is about 185 kilometers, along the Yukon River, and the entire Charley River watershed.

Survey Purpose and Product Limitations

The primary purpose of the survey is to describe and map the soils and ecological sites of the area. The soils were mapped at a scale of 1:63,360, and detailed descriptions of the map units, soil types, and ecological sites were developed, including historic climax plant communities and major seral communities. MLRAs are used at State and National levels to geographically divide different landscapes. They are intended to represent areas of subregional physiographic and geomorphic patterns and processes and general vegetation potentials (USDA, 2006). Within an MLRA, there are relatively consistent patterns and kinds of landforms, soils, surficial geologic and soil parent material, and geomorphic and soil-forming processes. The detailed soil maps can also be integrated into a multilevel ecological stratification of the area, based on ecological units, to aid in understanding the ecological aspects of the soil information (Bailey and others, 1994). Subsection level units (fig. 2) at a scale of 1:250,000 were established by Swanson (Swanson, 2001). The scale of the map base imposes certain cartographic limitations in terms of the minimum size of individual delineations that can be made while maintaining map legibility and the maximum location accuracy of polygon boundaries. On detailed soil maps compiled at a scale of 1:63,360, map unit delineations (or polygons) of less than about 1 square centimeter, or about 16 hectares, result in a reduction in map legibility and generally were not used. Maximum location accuracy of polygon lines that can be expected at this map scale is about 15 meters. The subsection map was compiled at a scale of 1:250,000, resulting in a minimum legible delineation of about 251 hectares. These are important caveats when using digital spatial data in the geographic information system (GIS) environment in which scale is easily manipulated.

Products

This report provides comprehensive documentation of the results of the survey. The content, including maps, tables, and descriptions, is derived dominantly from spatial data and associated attribute data. These include the following:

1. Soil Survey Geographic Database (SSURGO) dataset and standard products of the National Cooperative Soil Survey (NCSS) for the Yukon-Charley Rivers National Preserve, which includes:
    - Project area boundary as provided by the National Park Service
    - Soil map unit polygons (developed and certified at a scale of 1:63,360)
    - Attribute database (aggregate data exported from the National Soil Information System [NASIS]) linked to map unit polygons with Map Unit Key (MUKEY). (See documentation in metadata and system reports in attribute database.)
    - Metadata
2. Other spatial layers, including special themes and orthophotograhic images
3. PEDON_PC and AKVEG databases of point data collected during the survey, including:
    - Soils and vegetation field data collected at 922 sample points
    - Links to SSURGO data with MUKEY and soil component code (See documentation in database.)
4. Digital photographs, landscape illustrations, and map unit distribution maps

All products of this survey are available at the following locations:

- National Park Service, Yukon-Charley Rivers National Preserve Headquarters
- National Park Service, Regional Office, Anchorage, Alaska
- Natural Resources Conservation Service, Palmer, Alaska

Survey Methods

The Natural Resources Conservation Service (NRCS) developed inventory objectives and procedures in conjunction with potential National Park Service (NPS) users and then developed a Memorandum of Understanding. The map base for the detailed soil maps is color infrared orthophotography at a scale of 1:63,360. This mosaic of aerial imagery was completed in 2007. The MLRA map for Alaska and the ecological subsection map by Swanson (Swanson, 2001) served as primary references for understanding general soil-landform and soil-vegetation relationships of the survey area as well as for use as a planning tool for fieldwork. Aerial imagery was used to estimate the distribution and extent of landforms and vegetation patterns at the scale of 1:63,360. Other information on climate, geology, geomorphology, hydrology, and vegetation was used in the refinement of the map units and soil components and in development of the ecological site concepts. A geographic area of approximately 343,995 hectares was mapped each year. Using the recent aerial photography and derived digital elevation model data and GIS as well as the more traditional stereoscopic mapping methods, tentative map units (polygons) were delineated on mylar overlays of the aerial photography. Initial map unit assignments were made based on apparent landform and vegetation patterns.

Representative map units were then selected for field evaluation and documentation of soil and vegetation conditions. Two teams transected several tentative map units each day using the line intercept method. This approach minimized expense and

helicopter activity in the survey area while providing supporting documentation for mapping. Field documentation includes 243 transects and 922 stops. Observations include major soil types and associated landforms, site properties, and plant communities. Each transect consisted of one to several stops in an individual map unit. The number of stops was determined by the complexity of the map unit. Corresponding soils and vegetation data and other notes were linked using the transect and stop numbers. All transect and stop locations were recorded with a global positioning system (GPS) and referenced during map preparation and data analysis. During the fieldwork, draft maps were evaluated for accuracy of line placement and map unit assignments. Samples of some of the soils in the area were collected for laboratory analyses. Laboratory data, together with the observed soil characteristics and properties, were used to determine baseline soil properties.

Following each field season, data were entered into the PEDON_PC and AKVEG databases for management and analysis. Polygons from draft field mapping on aerial high altitude photographs were then transferred to overlays of the orthophotography, scanned, and digitized. A re-evaluation of the draft field mapping was completed using the orthophotography and a geographic information system (GIS) and the documented field data. Results of the data analysis were entered into the standard NASIS database.

General Nature of the Survey Area

The survey area extends from about latitude 64°29’ to 65°38’ N and longitude 141°01’ to 144°02’ W. The area is only accessible by boat or aircraft. Just south of the survey area, the Taylor Highway terminates in Eagle, Alaska (NPS headquarters for Yukon-Charley Rivers National Preserve). From Eagle, it is about 19 river kilometers to the southern boundary of the preserve. East-northeast of the preserve is the terminus of the Steese Highway, which is 259 kilometers east of Fairbanks, at Circle, Alaska. Coal Creek and Three Finger Charley provide bush strips for access to the preserve.

Major tributaries include the Charley, Kandik, Seventymile, Tatonduk, and Nation Rivers, all of which flow into the Yukon River. The Yukon River flows southeast-to-northwest through the preserve, at about 13 kilometers per hour. It flows between valley walls that range from steep bluffs to terraces, which is representative of several stages of river downcutting.

Glaciation in the survey area was confined mainly to the upper valley channels and cirque basins, leaving many areas free of ice. Glacier coverage occurred during the Pleistocene, the Illinoian, and the less extensive Wisconsin glacial limits. Fire is the major ecological disturbance on the uplands in the survey area. Episodic large- and small-scale wildland fires burn across the area, caused mainly by lightning strikes. Flooding is common along the streams and rivers, and this natural disturbance influences plant community development.

Climate

The climate of Interior Alaska is subarctic continental and is characterized by long, exceptionally cold winters and short, warm summers. The mean temperature in January is -12.5 degrees F at Eagle (south of the preserve and outside of the survey area) (table 1). Daily low temperatures of -50 degrees or lower occur frequently in winter. Periods of severe cold weather that last 2 weeks or longer are common. The mean temperature in July is 60 degrees at Eagle. Daily high temperatures in summer occasionally exceed 80 degrees. The daily minimum temperature in summer generally is 40 to 45 degrees; however, freezing temperatures have been recorded in every month. The autumn freeze usually occurs in September, and the spring thaw normally occurs late in May or early in June. The mean annual precipitation at Eagle is

12 inches, and the average annual snowfall is 59 inches (table 2). The maximum rainfall occurs late in summer, mainly as a result of thunderstorms. Because of the low precipitation, the amount of water available for weathering and translocation of soil minerals is minimal and soil horizon expression generally is weak or moderate.

Physiography

The survey area is in two MLRAs, 231—Interior Alaska Highlands and 232—Yukon Flats Lowlands. The MLRAs are described in the section “General Resource Descriptions.” Most of the preserve is in MLRA 231 (USDA, 2006). Only about 26,103 hectares is in MLRA 232, which is in the far northwestern part of the preserve, south of the Yukon River.

Elevation ranges from about 183 meters along the Yukon River to about 2,134 meters in the upper Charley River headwaters area. The Tintina Fault divides the preserve into two distinct geologic areas. It is a strike-slip fault that runs parallel to the Yukon River corridor, about 9.7 to 19.3 kilometers south of the river. The fault is one of the great fault systems in western North America, extending about 966 kilometers from northeastern British Columbia into Alaska. Northeast of the Tintina Fault is a triangular area that is formed by the Nation and Yukon Rivers and the Canadian border and has a high diversity of bedrock. This area is the only portion of east-central Alaska thought to be part of the original North American plate, and it is comprised of a sequence of unmetamorphosed sediment (Precambrian, Cambrian, Ordovician, Silurian, Devonian, and Mississippian). This sedimentary rock was once part of a continental margin and contains a record of marine faunal evolution that includes ammonites, trilobites, brachiopods, and coral. The oldest known microfossils from northwestern North America are also in this triangular area. The area southwest of the Tintina Fault is a sequence of complex igneous rock, metasedimentary rock, and volcanic rock. This rock probably was metamorphosed and reformed when several small plates collided to form Alaska during the Cretaceous.

Peat and other organic deposits are in minor areas in depressions on flood plains, terraces, and loess plains. These areas have a surface organic mat that is several centimeters thick to peat deposits in bogs, fens, and wet meadows that are several meters thick. Ice-cored organic mounds are on terraces and pond margins in the preserve. A mantle of silty loess, which originated from nonvegetated flood plains in and adjacent to the area, covers many surfaces. Most of the loess was deposited rapidly at the end of the last glaciation, when receding glaciers left large areas of ground exposed to wind. Common miscellaneous areas include surface bedrock, talus slopes, riverwash, and surface water. Placer mine tailings are still in drainageways in the preserve, mainly in Coal Creek and Woodchopper Creek drainageways. The soils in the survey area have a gelic or cryic soil temperature regime; an aquic, udic, or ustic soil moisture regime, and mixed mineralogy.

Permafrost

This survey area is in a zone of discontinuous permafrost (Péwé, 1975). Permafrost is extensive in the loamy soils within the boreal biome and is only in some areas of gravelly alpine soils. Commonly, landscapes underlain by permafrost support open dwarf spruce forest or woodland and the trees are tipped in various directions as a result of frost heave. Isolated masses of ground ice are in deep loess deposits on terraces and lower side slopes of hills. Permafrost generally is not present on active flood plains or south-facing slopes of steep mountains. Commonly, Gelisols are shallow to moderately deep over permafrost and are poorly drained or very poorly drained. Wildfires can disturb the insulating organic surface material, lowering the permafrost table and eliminating the perched water table from the Gelisols, thus

changing the classification. The short-term impact of most wildfires is warming of the permafrost and an increase in the thickness of the active layer, which is the upper part of the soils that thaws in summer. As the permafrost thaws, a large volume of water either accumulates in depressions or runs off through surface or subsurface drainage outlets. Differential subsidence of the soil surface and slumping on steeper slopes can occur, depending on the ice content of the permafrost and the rate of thawing. Depending on fire frequency, landform position, and particle size, these soils might or might not revert back to Gelisols. Evidence of fire, such as charcoal, is common in the soils.

The mean annual air temperature at Eagle, Alaska, is less than about -4 degrees C (25 degrees F). Permafrost occurs in a large percentage of the landscape, and it typically is in areas on terraces, loess plains, toeslopes and footslopes of hills and mountains, depressions, and some moderately sloping to steep backslopes of hills and mountains (especially on north aspects) that have a thick organic mat. The depth at which permafrost occurs and the ice content vary widely. In most places, small crystals and thin veins of ice are disseminated throughout the soil. On gently sloping summits of hills or mountains, terraces, loess plains, and alluvial fans, the permafrost restricts drainage, resulting in a perched water table and saturated conditions. Peat mounds typically have permafrost at a shallow depth and a core of massive ice. The surface peat commonly is well drained and relatively dry.

Wildlife

Approximately 39 species of mammals, 169 species of birds, 18 species of fish, and more than 880 species of vascular plants are known to inhabit the Yukon-Charley Rivers National Preserve. Fortymile caribou use the area in spring and fall each year. Moose have a small, but stable, presence in the preserve. Black bear and grizzly bear inhabit the area. Black bear intensively use the boreal forest or woodland, and grizzly bear are throughout the boreal and alpine/subalpine zones. Approximately 14 species of other furbearers are in the survey area, including coyote, red fox, marten, mink, lynx, marmot, muskrat, and beaver. Snowshoe hare and porcupine are common and can cause considerable damage to trees. Wolves are throughout the area, commonly following the migrating caribou herd. Dall sheep inhabit the high elevation mountains that consist dominantly of frost-shattered bedrock.

Many of the bird species are spring and fall migrants to the area. Numerous species of waterfowl, including tundra swan and sandhill crane, use the lakes and ponds in the area. Along the Yukon River is the largest area of nesting habitat in North America for American peregrine falcon. Spruce grouse are common in the spruce forests throughout the area. Year-round residents include raven and ptarmigan.

Arctic grayling use the tannic-stained tributaries throughout the area for spawning. Annual summer runs of Chinook and chum salmon are in the middle Yukon River.

Recreation

The preserve provides excellent remote and backcountry recreational opportunities, including flatwater and whitewater boating; camping; sheep, moose, and caribou hunting; fishing; wildlife viewing; and hiking. Many visitors float the Yukon River in summer and snow machine or dog mush the river in winter. Each winter, mushers in the Yukon Quest International Sled Dog Race travel through the preserve, traversing the Yukon River. In summer, adventurous visitors enjoy the more than 161 kilometers of clear, cold whitewater of the Charley River. The preserve has seven public use cabins that are available on a first-come, first-served basis. The historic cabins are named Nation Bluff, Glenn Creek, Kandik River, Slaven's Roadhouse, Slaven’s, Coal Creek Camp, and Smith. The Slaven's Roadhouse, built in the 1930's, is the only remaining example of the historic roadhouses that served as stopovers for weary

travelers and mail carriers along the Yukon River route. Coal Creek Dredge can be reached by walking 1 mile up from Slaven's Roadhouse. About 3 kilometers below Washington Creek is an old steam tractor artifact.

General Resource Descriptions

Two general physiographic/ecological maps are used to group the resources in the Yukon-Charley Rivers National Preserve Area—the NRCS major land resource area map and the Unified Ecoregions Map of Alaska (Nowacki and others, 2001).

The major land resource areas (MLRAs) are geographically associated land resource units (LRUs). Identification of these large areas is important in statewide agricultural planning and in interstate, regional, and National planning. The criteria for these units are based heavily on agricultural use and management. Soil map units are unique to an MLRA. Most of the preserve is in MLRA 231, and a small part is in MLRA 232. Complete descriptions of the MLRAs of the United States and a comparison of the various physiographic maps are available in the USDA Agriculture Handbook (USDA, 2006).

The Unified Ecoregions Map of Alaska combines the Bailey and Omernik approaches to ecoregion mapping (Bailey and others, 1994; Cleland and others, 1997). The ecoregions were developed cooperatively by the Forest Service, National Park Service, U.S. Geological Survey, Nature Conservancy, and personnel from many other agencies and private organizations. Ecoregions are large areas that have similar climate and in which ecosystems recur in predictable patterns. The ecoregions hierarchy provides resources and education on the origins of these patterns and their relevance to sustainable design and planning. The Unified Ecoregions Map of Alaska includes the upper levels in the ecological hierarchy down to the section level. This map is available online at http://agdc.usgs.gov/data/usgs/erosafo/ecoreg/index.html. Swanson provides another level of detail, called subsections, to the ecoregions map (Swanson, 2001). This subsection map is included in this section. It provides the basic framework for the next level of resolution in the hierarchy, which is landtype associations (fig. 2). Landtype associations are synonymous with the detailed soil map units in this report.

The map units have been incorporated into the MLRA map and the ecoregions subsection map. The MLRA for each map unit is given in the section “Detailed Soil Map Units.” The complete ecoregions hierarchy for the Yukon-Charley Rivers National Preserve Area is in table 3.

MLRAs and Associated Map Units

Figure 1.—Yukon-Charley Rivers National Preserve (outlined in red) with respect to MLRAs 231 and 232. The blue outlined areas represent all of the MLRAs within Land Resource Region X1—Interior Alaska.

MLRA 231—Interior Alaska Highlands

Physiography and Geology

Landforms include hills, low to moderately high mountains, and valleys (fig. 1). The mountains and hills are mantled with gravelly colluvium and slope alluvium originating from the underlying bedrock. The valley bottoms are filled with Holocene fluvial deposits and slope alluvium from adjacent mountain slopes. Periglacial features, such as pingos, thermokarst pits and mounds, ice-wedge polygons, and earth hummocks, are on the lower slopes and in upland valleys, particularly in the Davidson Mountains, in the northwestern part of the area. A mantle of silty loess, which originated from nonvegetated flood plains in and adjacent to the area, covers many surfaces. On the low hills near major river valleys, the loess is meters thick. On the high ridges, the loess is less than about 30 centimeters thick. The highest ridges have exposed bedrock. The dominant types of bedrock include Paleozoic sedimentary rock and Permian through Jurassic igneous rock in the northeast, Permian and lower Cretaceous sedimentary and metamorphic rock in the east, and Precambrian and

Paleozoic metamorphic and sedimentary rock with some Cretaceous intrusive rock in the southwest and west.

Climate

The average annual precipitation is less than 255 millimeters (10 inches) on the valley bottoms and lowlands in the northeastern part of the area and 510 to 1,015 millimeters (20 to 40 inches) at the higher elevations. The maximum rainfall occurs late in summer, mainly as a result of thunderstorms. Short, warm summers and long, cold winters characterize the subarctic continental climate of the area. The average annual snowfall ranges from about 115 to 255 centimeters (45 to 100 inches). The average annual temperature is about -12 to -9 degrees C (10 to 16 degrees F) in the northern part of the area and
-7 to -4 degrees C (20 to 25 degrees F) in the southern part. The frost-free period at the lower elevations averages about 60 to 100 days, and the temperature usually remains above freezing from June through mid-September.

Elevation

Elevation ranges from about 125 meters (400 feet) in the west, along the boundary with the Interior Alaska Lowlands (MLRA 229), to 2,007 meters (6,583 feet) at the summit of Mount Harper, in the southeast.

Soils

The dominant soil orders in this MLRA are Gelisols, Inceptisols, Entisols, and Spodosols. Within the boreal life zone, soils have a subgelic soil temperature class or cryic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. Many of the soils have a significant content of mica derived from micaceous parent material. Gelic subgroups of Inceptisols, Mollisols, and Entisols are common throughout the alpine life zone.

Vegetation/Land Cover

This area is forested below an elevation of about 550 to 610 meters (1,800 to 2,000 feet). White spruce, paper birch, quaking aspen, and mixed forests cover most of the slopes. White spruce forests and mixed white spruce-balsam poplar forests are common on the high flood plains and low terraces. Black spruce woodland is on the steep, north-facing slopes, on the high stream terraces, and in other areas that have poor drainage and permafrost at a shallow depth. Tussock-forming sedges commonly are dominant in the ground layer. Low to tall willow and alder scrub are extensive on the low flood plains. Lightning-caused wildfires are common, often burning many thousands of hectares during a single fire.

Permafrost

The area is within the zone of discontinuous permafrost. Permafrost commonly is close to the surface in the finer-textured sediment throughout the MLRA and is especially prevalent on the north aspects, broad mountain summits, and footslopes and toeslopes of hills and mountains. Isolated masses of ground ice are in thick deposits of loess on terraces and the lower side slopes of hills. Permafrost generally does not occur on the low flood plains and south-facing slopes of steep mountains. Fire has a profound effect on the presence of permafrost at a shallow depth throughout the MLRA.

Soil Map Units (Landtype Associations)

D31BH1—Boreal Sedimentary Hills
D31BH2—Boreal Dark Sedimentary Escarpments
D31BH3—Boreal Hills with Common Permafrost
D31BH5—Boreal Valley Bottoms
D31BH6—Boreal Escarpments
D31BH7—Boreal and Subalpine Hills with Common Permafrost
D31CF1—Boreal and Subalpine Hills with Extensive Permafrost
D31HL1—Boreal Eolian Hills with Common Permafrost
D31HL2—Boreal Eolian Hills with Extensive Permafrost
D31KT1—Boreal Eolian Plains with Extensive Permafrost, Wet
D31LB1—Boreal Hills with Common Permafrost, Thin Surface
D31LB2—Boreal Hills with Common Permafrost, Steep
D31MT1—Alpine Granitic Mountains, Dry
D31MT2—Alpine Granitic Mountains
D31MT3—Alpine Rounded Mountains with Common Permafrost
D31OF1—Boreal Hills with Common Permafrost, Nonacid
D31OM1—Alpine Angular Mountains
D31OM2—Alpine Lower Mountain Slopes
D31SD1—Alpine Rounded Mountains with Extensive Permafrost
D31TE1—Boreal Eolian Terraces with Extensive Permafrost
D31TE2—Boreal Terraces with Extensive Permafrost, Wet
D31TF1—Subalpine Hills
D31TF2—Subalpine Glaciated Hills
D31TH1—Boreal Hills with Extensive Permafrost
D31TL1—Boreal Eolian Plains with Extensive Permafrost, Moist
D31UC1—Boreal Eolian Hills with Common Permafrost, Wet
D31UC2—Subalpine and Boreal Hills
D31UC3—Boreal Plains with Extensive Permafrost
D31UC4—Boreal Flood Plains with Common Permafrost
D31UC5—Alpine Glaciated Mountains
D31WA1—Alpine and Subalpine Water
D31YV1—Boreal Flood Plains, Wet
D31YV2—Boreal Terraces and Flood Plains with Common Permafrost
D31YV3—Boreal Terraces with Extensive Permafrost
D31YV8—Boreal Low Flood Plains
D31YV9—Boreal High Flood Plains

MLRA 232—Yukon Flats Lowlands

Physiography and Geology

This area consists of a broad expanse of lowlands and low hills adjacent to the middle reaches of the Yukon River, known locally as the Yukon Flats (fig. 1). The area is within the Northern Uplands and Lowlands physiographic province of the Intermontane Uplands and Lowlands system (Wahrhaftig, 1965). The terrain of this MLRA consists primarily of a marshy complex of nearly level to undulating stream terraces and flood plains adjacent to the Yukon River. Thousands of lakes, ponds, and interconnecting wetlands fill depressions, shallow basins, and abandoned river channels across the stream terraces. Flood plain features include multiple channels and islands, meander scars, oxbow lakes, sloughs, and low escarpments. The Yukon Flats Lowlands is a broad, intermontane, tectonic basin filled with Quaternary and earlier glaciofluvial and fluvial sediment. In the central part of the basin, the glaciofluvial and fluvial deposits are underlain by lacustrine sediment. The unconsolidated sediment is estimated to be 90 to 120 meters (300 to 400 feet) thick or

more near the center of the basin. Along the edge of the basin, much of the landscape is mantled with a thick layer of silty loess of the Pleistocene and Holocene. Sand dunes cover some areas. Fluvial and eolian sediment is continuously being deposited. The underlying bedrock is completely buried by unconsolidated sediment.

Climate

Short, warm summers and long, very cold winters characterize the subarctic continental climate of the area. The surrounding hills and mountains partially isolate this MLRA from weather systems affecting other interior lowlands. This results in temperatures that are generally warmer in summer and colder in winter than other areas at comparable latitude. The average annual precipitation ranges from about 152 millimeters (6 inches) in the central basin to 381 millimeters (15 inches) along the boundary with surrounding highlands. The maximum precipitation occurs late in summer, mainly as a result of thunderstorms. The average annual snowfall is about 114 to 140 centimeters (45 to 55 inches). The average annual temperature ranges from about -6.6 to -3.8 degrees C (20 to 25 degrees F). The average frost-free period is 70 to 120 days. The temperature commonly remains above freezing from early in June through late in August.

Elevation

Elevation ranges from about 91 meters (300 feet) to about 305 meters (1,000 feet).

Soils

The dominant soil orders in this MLRA are Gelisols, Inceptisols, and Entisols. Gelisols have a subgelic soil temperature class or cryic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. Many of the soils have a significant content of secondary calcium carbonate.

Vegetation/Land Cover

Vegetation on the productive, well drained, upland soils includes white spruce, paper birch, quaking aspen, and mixed white spruce-paper birch-quaking aspen forests. Balsam poplar and mixed white spruce-hardwood forests are on the high flood plains and low stream terraces. Stunted black spruce and low-producing white spruce woodland is on the high stream terraces and in cold, wet areas that have permafrost at a shallow depth. Tussock-forming sedges and moss commonly are dominant in the ground cover. Paper birch and, in places, tamarack are in association with spruce on permafrost flats. Lightning-caused wildfires are common, often burning many thousands of hectares during a single fire. Following wildfires, willow, shrub birch, and ericaceous scrub invade most sites and are eventually replaced by forest vegetation. On all forest and woodland sites, the post-fire succession results in a relatively rapid accumulation of organic matter and moss on the surface. This leads to a decrease in soil temperature, biologic activity, nutrient availability, and site productivity. Tall and low scrub that consists dominantly of willow and alder are common on the low flood plains. Vegetation in the wettest areas is dominantly tall to low alder and willow scrub, sedge-shrub meadows, sedge meadows, and sedge-moss bog meadows.

Permafrost

The area is within the zone of discontinuous permafrost (Péwé, 1975). Permafrost is extensive throughout the MLRA, except on the low flood plains. Fire has a profound effect on the distribution of permafrost near the surface.

Soil Map Units (Landtype Associations)

D32TL1—Boreal Eolian Plains with Common Permafrost
D32TL2—Boreal Escarpments with Common Permafrost
D32TL4—Boreal Eolian Plains with Extensive Permafrost

Ecoregion Subsections and Associated Map Units (Landtype Associations)

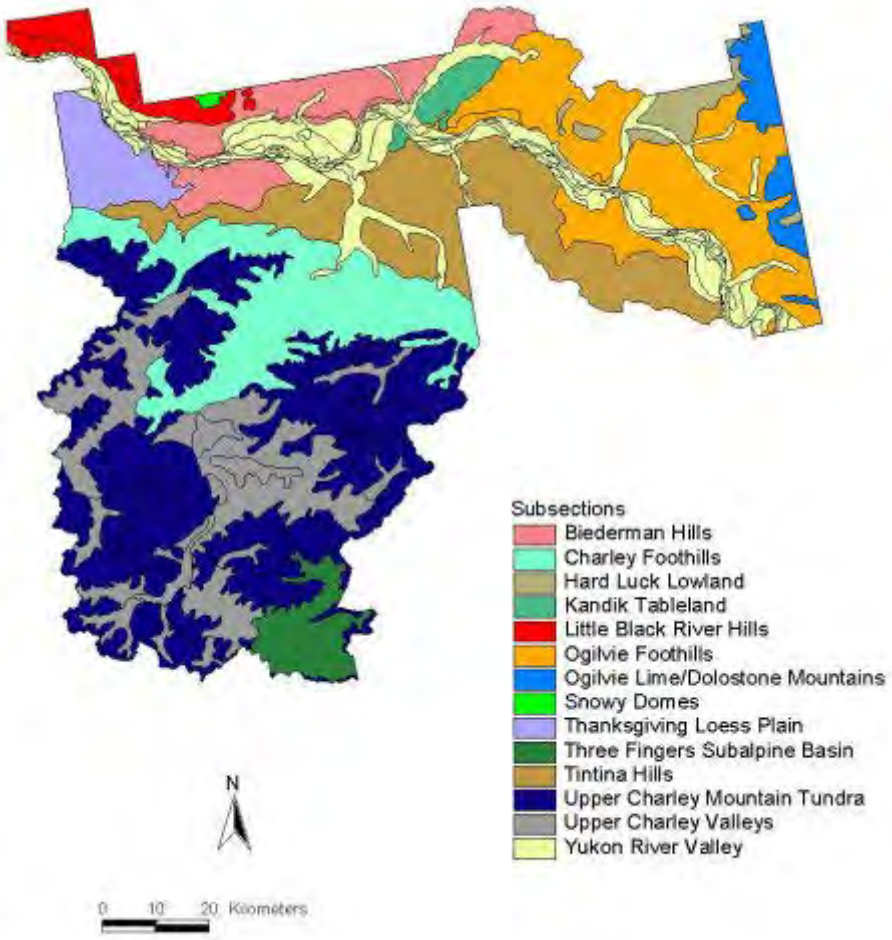


Figure 2.—Ecoregions subsection map of the Yukon-Charley Rivers National Preserve (Swanson, 2001).

Biederman Hills Subsection

Geology and physiography: Moderately steep, forested hills and steep, south-facing bluffs composed of sedimentary rock (mostly argillite), dominantly north of the Yukon River

Elevation: 244 to 853 meters (800 to 2,800 feet)

Soils: Dominantly dry and rocky soils derived from bedrock and colluvium on south-facing slopes; wetter soils with permafrost on north-facing slopes and lower lying slopes

Vegetation/land cover: Dominantly paper birch forest in burned areas and mixed birch and white spruce forest in unburned areas; black spruce forest on some north-facing slopes and lower lying slopes; primarily steppe sparsely vegetated areas, scree, and exposed rock on south-facing slopes

Fire history: Major burns in 1950 and 1986

Soil map units (landtype associations):

D31BH1—Boreal Sedimentary Hills
D31BH2—Boreal Dark Sedimentary Escarpments
D31BH3—Boreal Hills with Common Permafrost
D31BH5—Boreal Valley Bottoms
D31BH6—Boreal Escarpments
D31BH7—Boreal and Subalpine Hills with Common Permafrost

Charley Foothills Subsection

Geology and physiography: Hills and low mountains composed of granitic and metamorphic rock, south of the Yukon River
Elevation: 488 to 1,158 meters (1,600 to 3,800 feet)
Soils: Dominantly dry and rocky soils derived from bedrock and colluvium on upper slopes and south-facing slopes; wetter soils with permafrost on north-facing slopes and nearly level summits
Vegetation/land cover: Dominantly sparse spruce forest, but paper birch forest on south-facing slopes and sedge tussocks or low shrubs on summits
Fire history: Fire in 1991 largely confined to this subsection; other fires in 1950, 1969, and 1993; in some areas, no recorded burns and vegetation appears to be late-successional (dominantly spruce)
Soil map unit (landtype association):
D31CF1—Boreal and Subalpine Hills with Extensive Permafrost

Hard Luck Lowland Subsection

Geology and physiography: Gently sloping basins with soft (Cretaceous and Tertiary) sandstone, mudstone, and conglomerate covered with loess, north of the Yukon River, near the Ogilvie Mountains

Elevation: 305 to 914 meters (1,000 to 3,000 feet)

Soils: Dominantly wet and fine grained; in burned areas, permafrost has receded a few meters below the surface and soils are drier

Vegetation/land cover: Dominantly tussock wetland and black spruce woodland

Fire history: The southern half of the Hard Luck Lowland apparently burned in 1957 and 1967. Exact boundaries of the 1967 fire are not available, so the extent of the overlap is not known. The northern half of the lowland has no recorded fires and appears (on photographs) to be at an advanced successional stage.

Soil map units (landtype associations):

D31HL1—Boreal Eolian Hills with Common Permafrost
D31HL2—Boreal Eolian Hills with Extensive Permafrost

Kandik Tableland Subsection

Geology and physiography: Gently sloping areas dissected on the surface by small streams and composed of Cretaceous argillite; dominantly north of the Yukon River

Elevation: 305 to 655 meters (1,000 to 2,150 feet)

Soils: Dominantly wet, fine grained soils with permafrost, but permafrost has receded in some areas to several meters below the surface as a result of fire; drier, rocky soils without permafrost on steeper slopes

Vegetation/land cover: Dominantly sparse black spruce forest; birch forest on steeper slopes, especially in burned areas

Fire history: Fires occurred in 1950 and 1969. Examination of aerial photographs suggests that the 1950 fire was more extensive than indicated by the fire map overlay. Only the far northeastern part of this subsection appears to have been unaffected by fire for a significant period of time.

Soil map unit (landtype association):

D31KT1—Boreal Eolian Plains with Extensive Permafrost, Wet

Little Black River Hills Subsection

Geology and physiography: Gently sloping forested hills and south- and west-facing slopes composed of Paleozoic and older sedimentary rock with a cover of loess in some areas; north of the Yukon River

Elevation: 213 to 792 meters (700 to 2,600 feet)

Soils: Vary greatly according to fire succession and slope position. Unburned areas appear to have rather wet soils with permafrost, except on hill crests. In burned areas, the permafrost has receded a few meters below the surface and the soils are drier. The soils on bluffs are dry and rocky.

Vegetation/land cover: Dominantly scrub in the extensive 1986 burn area; in other burned areas, dominantly black spruce forest with paper birch forest, especially on steeper slopes

Fire history: Burned in 1954, 1977, and 1986. Areas without recorded burns and that support what appears on aerial photographs to be late-successional vegetation (dominantly spruce) are just north of the 1986 burn area.

Soil map units (landtype associations):

D31LB1—Boreal Hills with Common Permafrost, Thin Surface
D31LB2—Boreal Hills with Common Permafrost, Steep

Ogilvie Foothills Subsection

Geology and physiography: Steep, forested hills composed of complexly folded and faulted, hard sedimentary rock
Elevation: 244 to 1,158 meters (800 to 3,800 feet)
Soils: Dry, rocky soils derived from bedrock and colluvium
Vegetation/land cover: Paper birch (especially in burned areas), spruce, and aspen forest with some rock rubble on slopes; sparse vegetation in steppe areas and in areas of scree and exposed rock
Fire history: Burned in 1969 and 1971; some areas have no recorded burns and support what appears on aerial photographs to be late-successional vegetation (dominantly spruce)
Soil map unit (landtype association):
D31OF1—Boreal Hills with Common Permafrost, Nonacid

Ogilvie Lime/Dolostone Mountains Subsection

Geology and physiography: Steep mountains with cliffs and sharp ridgelines; composed of limestone, dolostone, and other sedimentary rock
Elevation: 610 to 1,463 meters (2,000 to 4,800 feet)
Soils: Dry, rocky soils derived from bedrock and colluvium
Vegetation/land cover: Sparse vegetation and some rock rubble and bedrock exposed at the surface on ridges; dry, herbaceous vegetation or shrubs on slopes; and birch and spruce forest at low elevations
Fire history: Most areas burned during period of record, which began in the 1950's; small area might have burned in 1996
Soil map units (landtype associations):
D31OM1—Alpine Angular Mountains
D31OM2—Alpine Lower Mountain Slopes

Snowy Domes Subsection

Geology and physiography: Steep, but generally rounded, mountains composed of sedimentary rock (conglomerate); north of the Yukon River and dominantly above the treeline
Elevation: 792 to 975 meters (2,600 to 3,200 feet)
Soils: Dry, rocky soils derived from bedrock and colluvium; probably some wet soils with permafrost in areas that support tussocks
Vegetation/land cover: Dominantly low or dwarf shrub and tussock tundra; some spruce woodland near the treeline
Fire history: Fire in 1986 probably affected the area near the treeline; little fuel present to sustain fire above the treeline
Soil map unit (landtype association):
D31SD1–Alpine Rounded Mountains with Extensive Permafrost

Thanksgiving Loess Plain Subsection

Geology and physiography: Gently sloping plains with thick cover of loess; some steep slopes in areas that have been dissected by small streams south of the Yukon River, in the far northwestern corner of the preserve

Elevation: 305 to 610 meters (1,000 to 2,000 feet)

Soils: Dominantly wet, fine grained soils with permafrost in unburned areas; in burned areas soils are drier and permafrost may have receded to several meters below the surface; drier soils on steep slopes near streams

Vegetation/land cover: Dominantly open black spruce forest in unburned areas and birch forest or bog birch scrub in burned areas; birch forest on steep slopes in unburned areas

Fire history: Portions burned in 1957, 1993, and 1996. Areas that have no recorded fires appear on aerial photographs to be at an advanced successional stage.

Soil map units (landtype associations):

D32TL1—Boreal Eolian Plains with Common Permafrost
D32TL2—Boreal Escarpments with Common Permafrost
D32TL4—Boreal Eolian Plains with Extensive Permafrost

Three Fingers Subalpine Basin Subsection

Geology and physiography: Hills composed of granitic rock and schist; near the treeline in the upper Charley River area
Elevation: 914 to 1,280 meters (3,000 to 4,200 feet)
Soils: Derived from weathered bedrock and colluvium and have a surface layer of peat in low areas. Soils in lowlands are wet and have permafrost, and soils on higher slopes are dry and rocky.
Vegetation/land cover: Dominantly sedges (tussocks) and low shrubs in low areas, shrubs with a few trees on higher slopes, and herbaceous vegetation or dwarf shrubs on hilltops
Fire history: No recorded fires. Vegetation has relatively low flammability, and no obvious fire scars were seen on aerial photographs.
Soil map units (landtype associations):
D31TF1—Subalpine Hills
D31TF2—Subalpine Glaciated Hills

Tintina Hills Subsection

Geology and physiography: Relatively gently sloping forested hills composed of soft sandstone, mudstone, and conglomerate; south of the Yukon River

Elevation: 305 to 762 meters (1,000 to 2,500 feet)

Soils: Dominantly dry, rocky soils derived from bedrock and colluvium on upper slopes and south-facing slopes; wetter soils with permafrost on north-facing slopes and lower slopes

Vegetation/land cover: Dominantly paper birch forest in burned areas and mixed birch and white spruce forest in unburned areas; black spruce forest on some north-facing slopes and lower slopes

Fire history: A small portion of this subsection burned in 1950 and most of it burned in 1969. Areas that have no recorded burns and support what appears on aerial photographs to be late-successional vegetation (dominantly spruce) are in the far western and far eastern parts.

Soil map unit (landtype association):

D31TH1—Boreal Hills with Extensive Permafrost

Upper Charley Mountain Tundra Subsection

Geology and physiography: Steep mountains with cliffs, sharp ridgelines, and cirques; composed of granitic rock and schist; above the treeline in the upper Charley River area

Elevation: 792 to 2,012 meters (2,600 to 6,600 feet)

Soils: Dry, rocky soils derived from bedrock and colluvium above 1,463 meters (4,800 feet); some finer grained, wetter soils with permafrost near the surface in gently sloping, concave areas below 1,463 meters

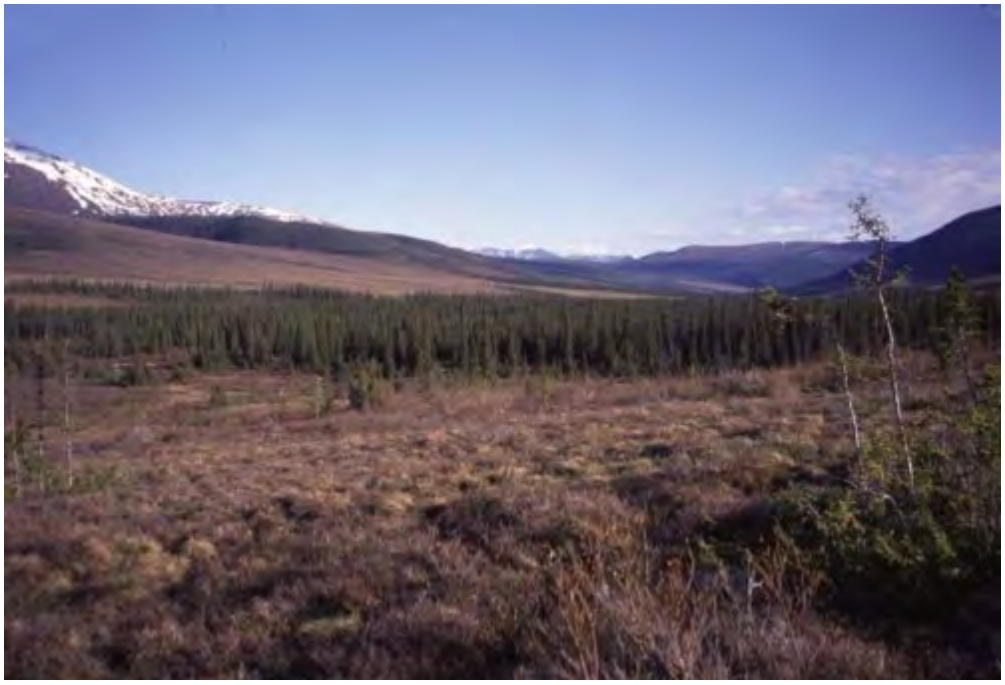
Vegetation/land cover: Sparsely vegetated with considerable rock rubble and bedrock exposed at the surface of cliffs and patches of herbaceous plants or dwarf shrubs in gently sloping areas above 1,463 meters; dominantly shrub vegetation with some tussock tundra with sparsely vegetated areas below 1,463 meters

Fire history: No recorded fires. Almost no fuel present to sustain fires.

Soil map units (landtype associations):

D31MT1–Alpine Granitic Mountains, Dry
D31MT2–Alpine Granitic Mountains
D31MT3–Alpine Rounded Mountains with Common Permafrost
D31WA1–Alpine and Subalpine Water

Upper Charley Valleys Subsection



Geology and physiography: Round-bottomed valleys of mountains composed of granitic rock and schist; near the treeline in the upper Charley River area
Elevation: 549 to 1,219 meters (1,800 to 4,000 feet)
Soils: Derived from weathered bedrock and colluvium and have a surface layer of peat in low areas. Soils in lowlands are wet and have permafrost, and soils in higher areas are dry and rocky.
Vegetation/land cover: Sparse spruce forest on slopes; tussocks and low shrubs in valley bottoms
Fire history: No recorded fires. Vegetation has relatively low flammability, and no obvious fire scars were seen on aerial photographs.
Soil map units (landtype associations):
D31UC1—Boreal Eolian Hills with Common Permafrost, Wet
D31UC2—Subalpine and Boreal Hills
D31UC3—Boreal Plains with Extensive Permafrost
D31UC4—Boreal Flood Plains with Common Permafrost
D31UC5—Alpine Glaciated Mountains

Yukon River Valley Subsection

Geology and physiography: Flood plains, terraces, and islands of the Yukon River
Elevation: 183 to 305 meters (600 to 1,000 feet)
Soils: Soils on flood plains are derived from river deposits of silt, sand, and gravel. Significant areas are well drained and do not have permafrost. Soils on terraces are derived from river deposits of silt, sand, and gravel and some loess and have a surface layer of peat and extensive permafrost.
Vegetation/land cover: Little vegetation in highly disturbed areas on low flood plains; shrubs, poplar and white spruce forest, and black spruce forest on mid-elevation to high flood plains; sparse spruce forests with sedge bog in depressions on terraces
Fire history: Some areas probably burned in 1969, but most areas are unburned. Area is protected by natural firebreaks (Yukon River and sloughs), and some of the vegetation has inherent low flammability.
Soil map units (landtype associations):

D31YV1—Boreal Flood Plains, Wet
D31YV2—Boreal Terraces and Flood Plains with Common Permafrost
D31YV3—Boreal Terraces with Extensive Permafrost
D31YV8—Boreal Low Flood Plains
D31YV9—Boreal High Flood Plains
D31TE1—Boreal Eolian Terraces with Extensive Permafrost
D31TE2—Boreal Terraces with Extensive Permafrost, Wet
D31TL1—Boreal Eolian Plains with Extensive Permafrost, Moist

Detailed Soil Map Units

The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses, and to plan the management needed for those uses. More information about each map unit is provided in the section “Use and Management of the Soils.”

Each of the delineations on the detailed soil maps has a map unit symbol to indicate the map unit and to link it to the corresponding map unit description. Each of these delineations represents an area on the landscape and consists of one or more soils or miscellaneous areas. A map unit is identified and named according to the order of mapping scale, major land resource area code, and dominant landform code. On the landscape, however, the soils and miscellaneous areas are natural phenomena. 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 soils or miscellaneous areas and "included" areas that belong to other taxonomic classes.

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

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, 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. All map unit symbols begin with a “D” prefix, which designates them as detailed reconnaissance level units. This letter is followed by a two-digit identifier that corresponds to the last two digits of the MLRA. Since all MLRAs in Alaska begin with “2,” the first digit of the MLRA has been omitted from the map unit symbol. The next two characters signify the ecoregion subsection code. Subsection codes are described in table 3. A map unit designated as “D31BH1” is a detailed reconnaissance level unit in MLRA 231 and ecoregion subsection BH—Beiderman Hills. The final digit of the map unit symbol identifies each unique map unit within the subsection.

Each map unit description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soil components, the building blocks of map units, for this survey area are classified to the taxonomic categories at the family level. Each soil component is assigned to an ecological site. A complete description of the relationship between soils and ecological sites is provided in the section “Ecological Sites.”

Most map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or consociations.

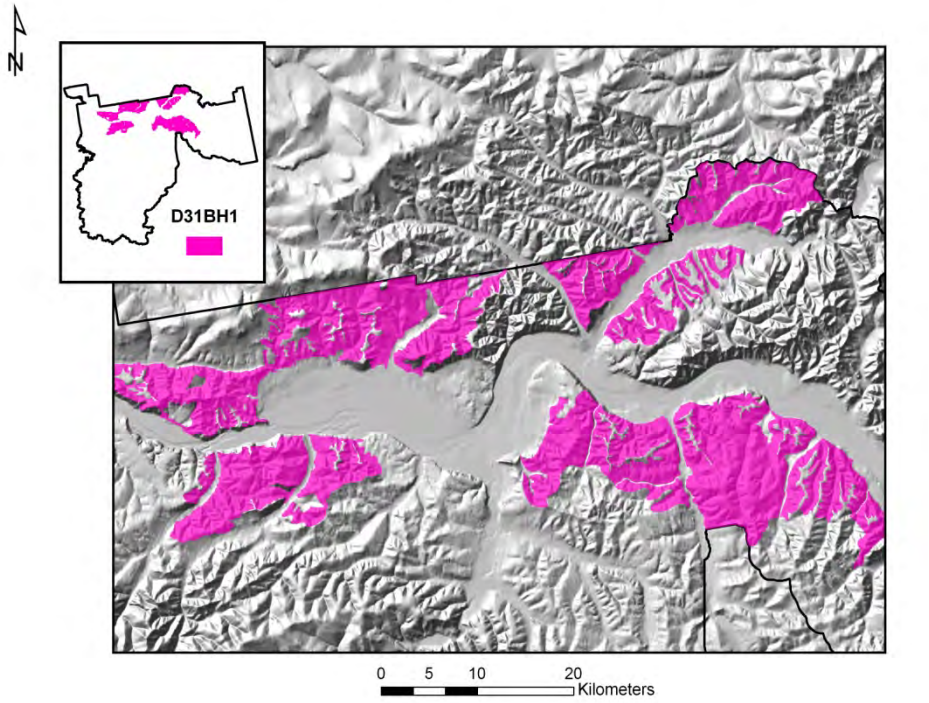
A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. D31BH1—Boreal Sedimentary Hills is an example.

In a *consociation,* delineated areas are dominantly a single soil taxon (or miscellaneous area) and similar soils. As a rule, at least one-half of the pedons in each delineation of a soil consociation are of the same soil component that provided the name for the map unit. D31WA1—Alpine and Subalpine Water is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. D31—Boreal Riverwash is an example.

Table 4 gives the acreage/hectarage and proportionate extent of each map unit. Table 5 lists the ecological site correlated to each map unit component. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses and the classification and description of the soils. Plates 1 through 10 give additional illustrations of the map units that comprise the majority of the soil survey area. They include a three-dimensional representation of the map unit setting and a photograph of a typical landscape and a soil profile for one of the major components of the map unit. Detailed descriptions of the ecological sites included in the following map unit descriptions are in the section “Ecological Sites.” The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

D31BH1—Boreal Sedimentary Hills



Major land resource area: 231—Interior Alaska Highlands
Elevation: 200 to 1,000 meters
Mean annual precipitation: 244 to 705 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal forest rocky colluvial slopes: 34 percent
D31—Boreal forest rocky sedimentary colluvial slopes: 24 percent
D31—Boreal taiga silty eolian slopes, frozen: 17 percent
Dissimilar minor components: 25 percent

D31—Boreal Forest Rocky Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): East to west (clockwise)
Slope range: 15 to 70 percent
Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 12.4 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis (F231XY182AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 8 centimeters; slightly decomposed plant material
A—8 to 14 centimeters; silt loam
2Bw—14 to 42 centimeters; very cobbly loam
2C—42 to 152 centimeters; extremely gravelly coarse sandy loam

D31—Boreal Forest Rocky Sedimentary Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): Northeast to southwest (clockwise)
Slope range: 40 to 85 percent

Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 2 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 14.2 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum (F231XY110AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 10 centimeters; stony silt loam
Bw—10 to 41 centimeters; very gravelly loam
C—41 to 152 centimeters; extremely gravelly sandy loam

D31—Boreal Taiga Silty Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Shoulders
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over loamy cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 10.7 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haploturbels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam

Cjj—28 to 53 centimeters; silt loam
Cf—53 to 152 centimeters; permanently frozen silt loam

Minor Components

D31—Boreal Taiga Silty Colluvial Slopes, Frozen

Percentage of map unit: 11 percent
Slope: 5 to 50 percent
Landform: Hills
Ecological site: *Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum* (F231XY111AK)
Hydric soil status: Not hydric

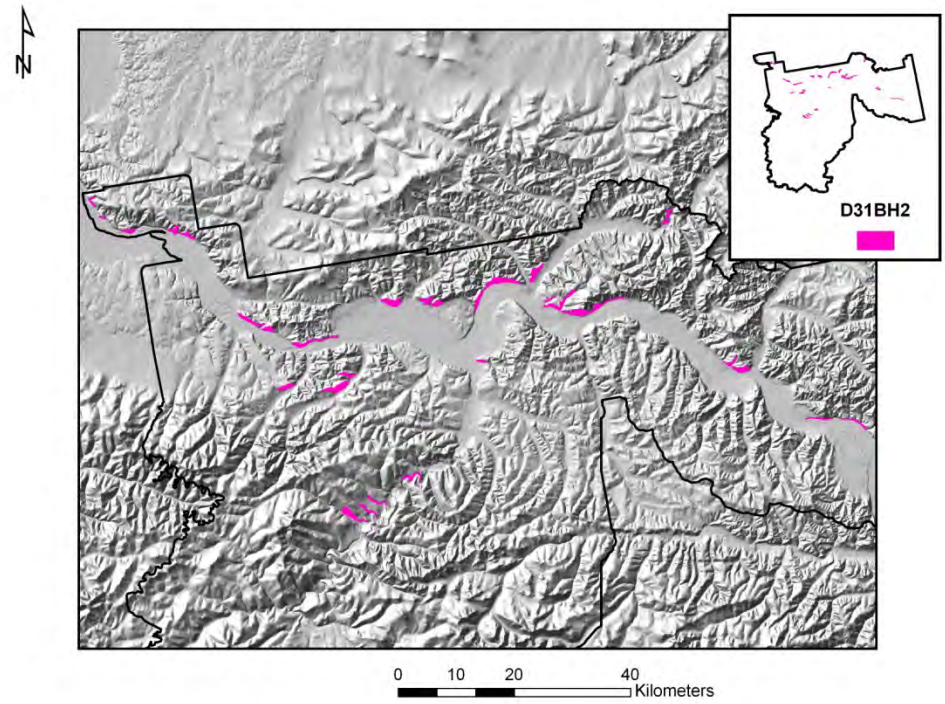
D31—Boreal Woodland Silty Eolian Slopes, Frozen

Percentage of map unit: 9 percent
Slope: 10 to 75 percent
Landform: Hills
Ecological site: *Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii* (F231XY118AK)
Hydric soil status: Hydric

D31—Boreal Taiga Silty Drainages, Frozen

Percentage of map unit: 5 percent
Slope: 1 to 15 percent
Landform: Drainageways
Ecological site: *Picea mariana/Salix-Ledum groenlandicum* (F231XY193AK)
Hydric soil status: Hydric

D31BH2—Boreal Dark Sedimentary Escarpments



Major land resource area: 231—Interior Alaska Highlands
Elevation: 150 to 1,000 meters
Mean annual precipitation: 242 to 688 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal forest rocky sedimentary colluvial slopes: 39 percent
D31—Boreal forest rocky colluvial escarpments: 31 percent
Dissimilar minor components: 30 percent

D31—Boreal Forest Rocky Sedimentary Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): Northeast to southwest (clockwise)
Slope range: 40 to 85 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 2 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 14.2 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum (F231XY110AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 10 centimeters; stony silt loam
Bw—10 to 41 centimeters; very gravelly loam
C—41 to 152 centimeters; extremely gravelly sandy loam

D31—Boreal Forest Rocky Colluvial Escarpments

Landform: Escarpments
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): Northeast to west (clockwise)
Slope range: 55 to 85 percent
Parent material: Organic material over gravelly colluvium

Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 3.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 2 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 6.9 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum (F231XY110AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Ustic Haplocryepts
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 10 centimeters; very flaggy sandy loam
Bw—10 to 43 centimeters; extremely flaggy loam
C—43 to 152 centimeters; extremely channery sandy loam

Minor Components

D31—Boreal Forest Rocky Colluvial Slopes

Percentage of map unit: 12 percent
Slope: 15 to 70 percent
Landform: Hills
Ecological site: Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis (F231XY182AK)
Hydric soil status: Not hydric

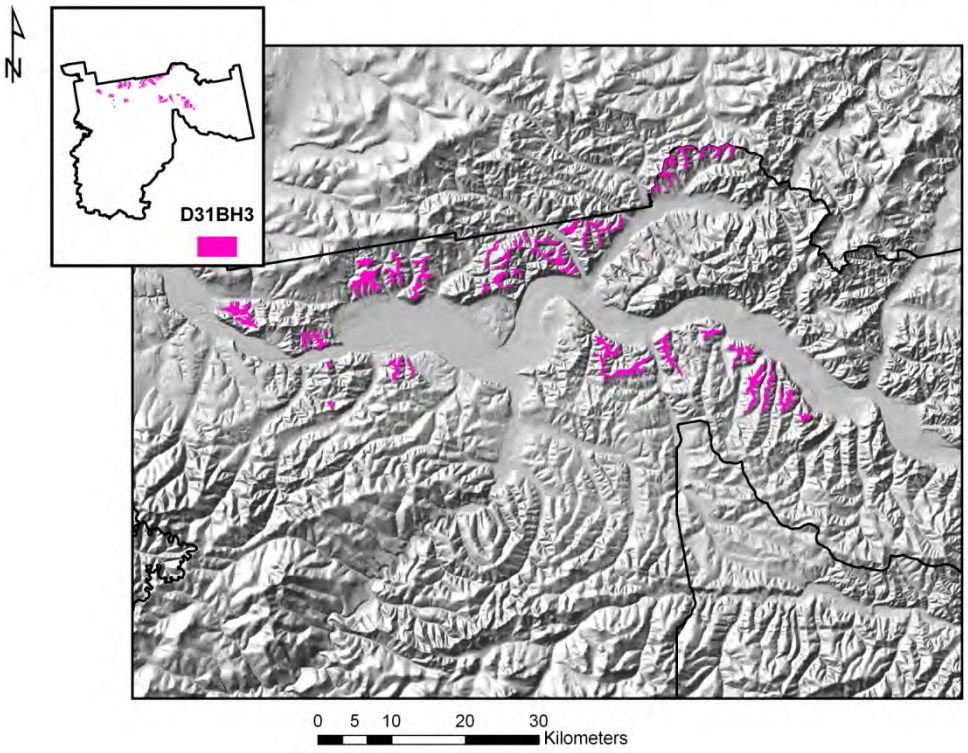
D31—Boreal Scrub Rocky Colluvial Escarpments

Percentage of map unit: 11 percent
Slope: 50 to 100 percent
Landform: Escarpments
Ecological site: Boreal Scrub Gravelly Slopes, Dry (R231XY109AK)
Hydric soil status: Not hydric

D31—Boreal Bedrock

Percentage of map unit: 7 percent
Slope: 60 to 100 percent
Landform: Hills
Ecological site: Boreal Lichen Rock Outcrops Slopes (R231XY120AK)
Hydric soil status: Not hydric

D31BH3—Boreal Hills with Common Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 250 to 900 meters
Mean annual precipitation: 244 to 705 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga silty eolian slopes, frozen: 59 percent
D31—Boreal taiga organic eolian slopes, frozen: 33 percent
Dissimilar minor component: 8 percent

D31—Boreal Taiga Silty Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Shoulders
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over loamy cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 10.7 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haploturbels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
Cjj—28 to 53 centimeters; silt loam
Cf—53 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Concave
Across-slope shape: Linear
Slope range: 1 to 10 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)

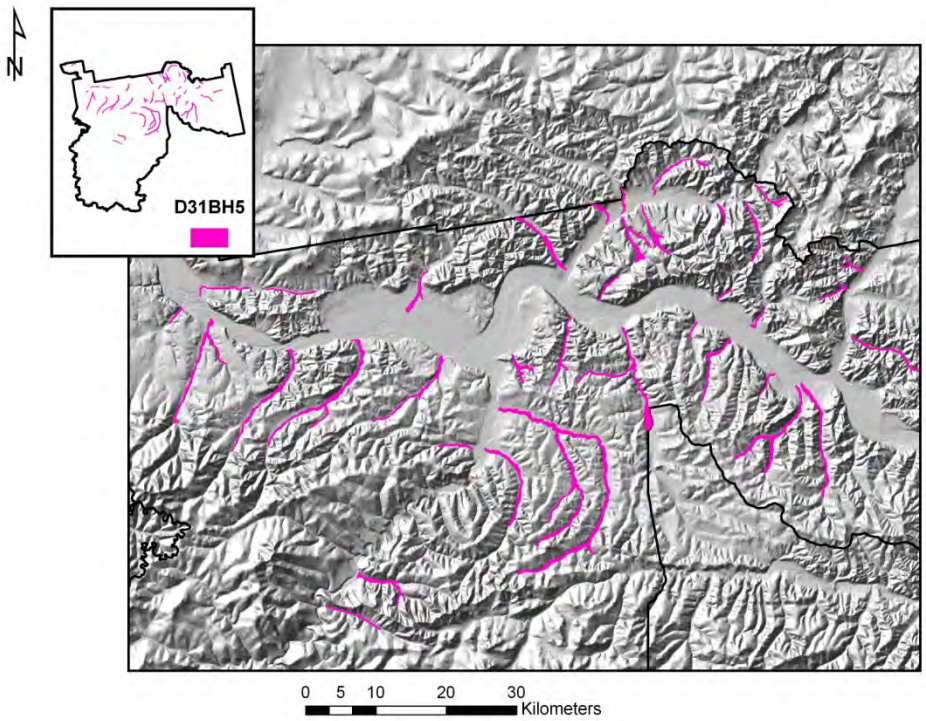
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

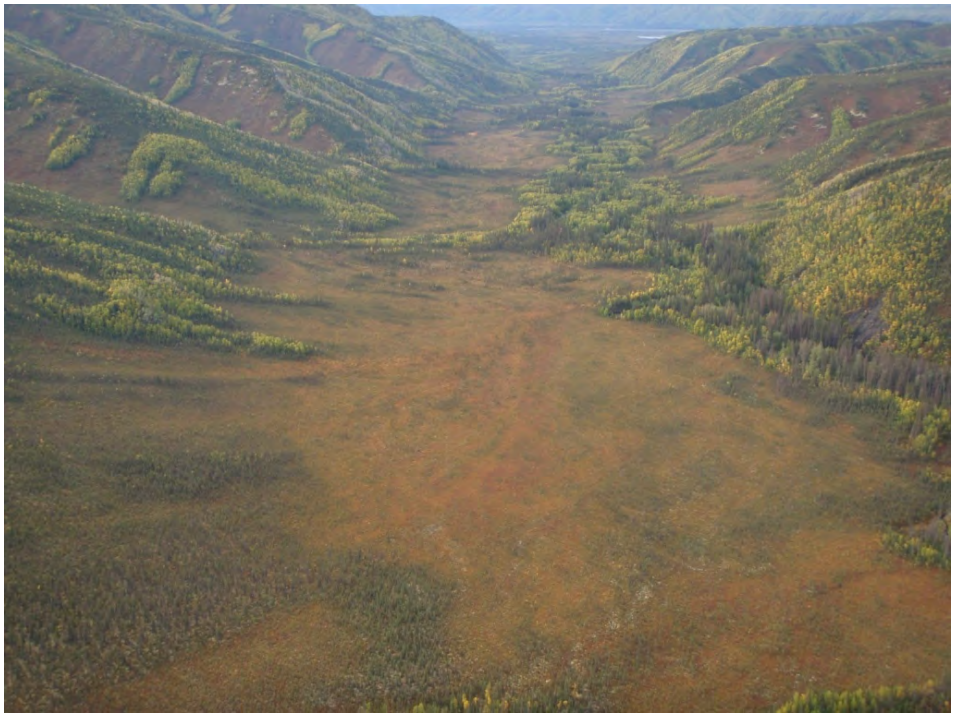
Minor Component

D31—Boreal Woodland Gravelly Residual Slopes

Percentage of map unit: 8 percent
Slope: 1 to 15 percent
Landform: Hills
Ecological site: Picea mariana-Betula neoalaskana/Vaccinium uliginosum/Cladonia (F231XY162AK)
Hydric soil status: Not hydric

D31BH5—Boreal Valley Bottoms





Major land resource area: 231—Interior Alaska Highlands
Elevation: 100 to 2,000 meters
Mean annual precipitation: 233 to 705 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga/tussock organic terraces, frozen: 36 percent
D31—Boreal forest loamy high flood plains: 28 percent
D31—Boreal scrub rocky drainages: 19 percent
Dissimilar minor components: 17 percent

D31—Boreal Taiga/Tussock Organic Terraces, Frozen

Landform: Terraces
Landform position (three-dimensional): Treads
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 10.8 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum (F231XY169AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 54 centimeters; silt loam
Cjjf—54 to 152 centimeters; permanently frozen silt loam

D31—Boreal Forest Loamy High Flood Plains

Landform: High flood plains
Downslope shape: Convex
Across-slope shape: Convex
Slope range: 1 to 10 percent
Parent material: Organic material over sandy and gravelly alluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 3 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates

Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: Rare
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 11.9 centimeters)
Land capability subclass (nonirrigated): 4c
Ecological site: *Picea glauca/Rosa acicularis/Lupinus arcticus* (F231XY131AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Sandy or sandy-skeletal, mixed Typic Cryorthents
Typical profile:
O—0 to 13 centimeters; slightly decomposed plant material
A—13 to 18 centimeters; sandy loam
C—18 to 152 centimeters; stratified very gravelly loamy coarse sand to gravelly sandy loam

D31—Boreal Scrub Rocky Drainages

Landform: Drainageways
Downslope shape: Linear
Across-slope shape: Concave
Slope range: 3 to 20 percent
Parent material: Organic material over gravelly alluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 3 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Moderately well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 10 centimeters)
Land capability subclass (nonirrigated): 5w
Ecological site: Boreal Scrub Gravelly Drainages (R231XY195AK)
Hydric soil status: Not hydric
Hydrologic soil group: B/D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryofluvents
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 14 centimeters; stratified sandy loam to silt loam
C—14 to 152 centimeters; stratified very gravelly loamy sand to very gravelly sandy loam

Minor Components

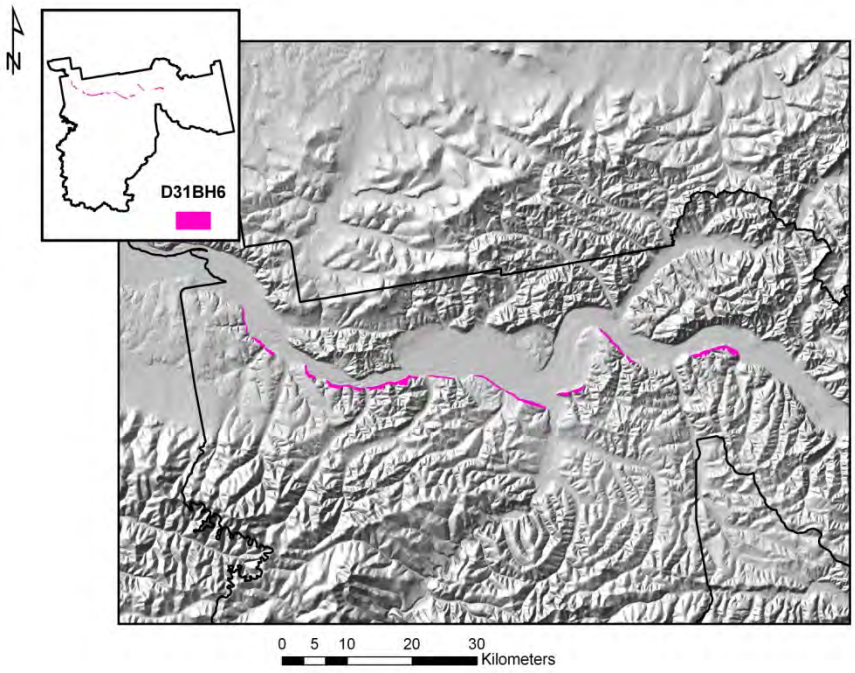
D31—Boreal Woodland Rocky Low Flood Plains

Percentage of map unit: 11 percent
Slope: 1 to 5 percent
Landform: Low flood plains
Ecological site: *Populus balsamifera/Salix alaxensis/Calamagrostis canadensis* (F231XY130AK)
Hydric soil status: Not hydric

D31—Boreal Water, Flowing

Percentage of map unit: 6 percent
Slope: 0 to 2 percent
Ecological site: Boreal Water, Non-Vegetated (R231XY194AK)
Hydric soil status: Not rated

D31BH6—Boreal Escarpments



Major land resource area: 231—Interior Alaska Highlands
Elevation: 150 to 900 meters
Mean annual precipitation: 242 to 705 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal forest gravelly colluvial escarpments: 56 percent
D31—Boreal rubble land: 25 percent
Dissimilar minor components: 19 percent

D31—Boreal Forest Gravelly Colluvial Escarpments

Landform: Escarpments
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northeast
Aspect (range): Northwest to southeast (clockwise)
Slope range: 50 to 95 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 9.4 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: *Picea glauca/Rosa acicularis* (F231XY181AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive, nonacid Typic Cryorthents
Typical profile:
O—0 to 14 centimeters; slightly decomposed plant material
A—14 to 22 centimeters; cobbly sandy loam
C—22 to 152 centimeters; extremely cobbly coarse sandy loam

D31—Boreal Rubble Land

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Convex
Across-slope shape: Convex
Aspect (representative): South
Aspect (range): Southeast to northwest (clockwise)
Slope range: 0 to 85 percent
Parent material: Gravelly colluvium over residuum
Depth to restrictive feature: 45 to 60 centimeters to lithic bedrock
Shrink-swell potential: Low (linear extensibility percentage about 1)

Salinity (maximum based on representative value): Nonsaline
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 0.5 centimeter)
Land capability subclass (nonirrigated): 8s
Ecological site: Boreal Lichen Rock Outcrops Slopes (R231XY120AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Typical profile:
C—0 to 55 centimeters; extremely cobbly sandy loam
2R—55 to 152 centimeters; bedrock

Minor Components

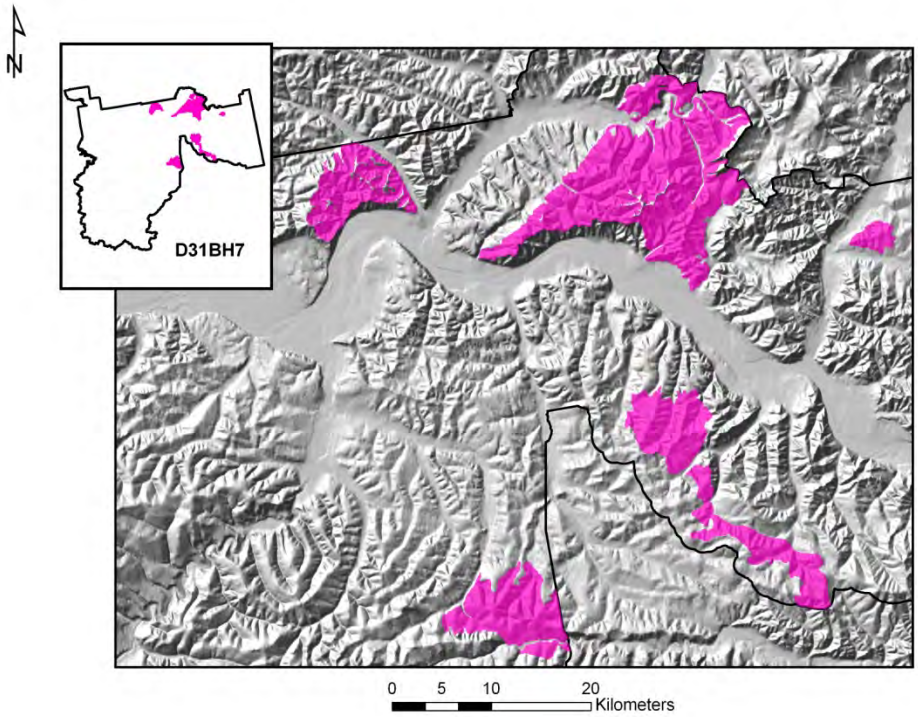
D31—Boreal Forest Loamy Depressions, Frozen

Percentage of map unit: 10 percent
Slope: 20 to 55 percent
Landform: Hills
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric

D31—Boreal Taiga Gravelly Drainages

Percentage of map unit: 9 percent
Slope: 5 to 80 percent
Landform: Drainageways
Ecological site: Picea mariana/Alnus viridis ssp. fruticosa/Calamagrostis canadensis (F231XY192AK)
Hydric soil status: Not hydric

D31BH7—Boreal and Subalpine Hills with Common Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 240 to 1,000 meters
Mean annual precipitation: 244 to 688 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Subalpine woodland rocky colluvial slopes: 26 percent
D31—Boreal forest rocky colluvial slopes: 24 percent
D31—Boreal forest gravelly colluvial slopes, frozen: 20 percent
Dissimilar minor components: 30 percent

D31—Subalpine Woodland Rocky Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Convex, linear
Across-slope shape: Linear, convex
Aspect (representative): West
Aspect (range): South to north (clockwise)
Slope range: 20 to 60 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 1.7 centimeters)
Land capability subclass (nonirrigated): 4c
Ecological site: *Picea glauca/Betula glandulosa-Empetrum nigrum* (F231XY164AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Fragmental, mixed Typic Haplocryepts
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 8 centimeters; cobbly silt loam
Bw—8 to 27 centimeters; extremely cobbly sandy loam
C—27 to 152 centimeters; cobbles

D31—Boreal Forest Rocky Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): East to west (clockwise)
Slope range: 15 to 70 percent
Parent material: Organic material over loess over gravelly colluvium

Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 12.4 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis (F231XY182AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 8 centimeters; slightly decomposed plant material
A—8 to 14 centimeters; silt loam
2Bw—14 to 42 centimeters; very cobbly loam
2C—42 to 152 centimeters; extremely gravelly coarse sandy loam

D31—Boreal Forest Gravelly Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northeast
Aspect (range): North to south (clockwise)
Slope range: 15 to 65 percent
Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: 50 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1 millimho per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 5 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 8.9 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels

Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 26 centimeters; silt loam
2C—26 to 58 centimeters; very gravelly fine sandy loam
2Cf—58 to 152 centimeters; permanently frozen extremely stony sandy loam

Minor Components

D31—Boreal Forest Rocky Sedimentary Colluvial Slopes

Percentage of map unit: 13 percent
Slope: 40 to 85 percent
Landform: Hills
Ecological site: *Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum* (F231XY110AK)
Hydric soil status: Not hydric

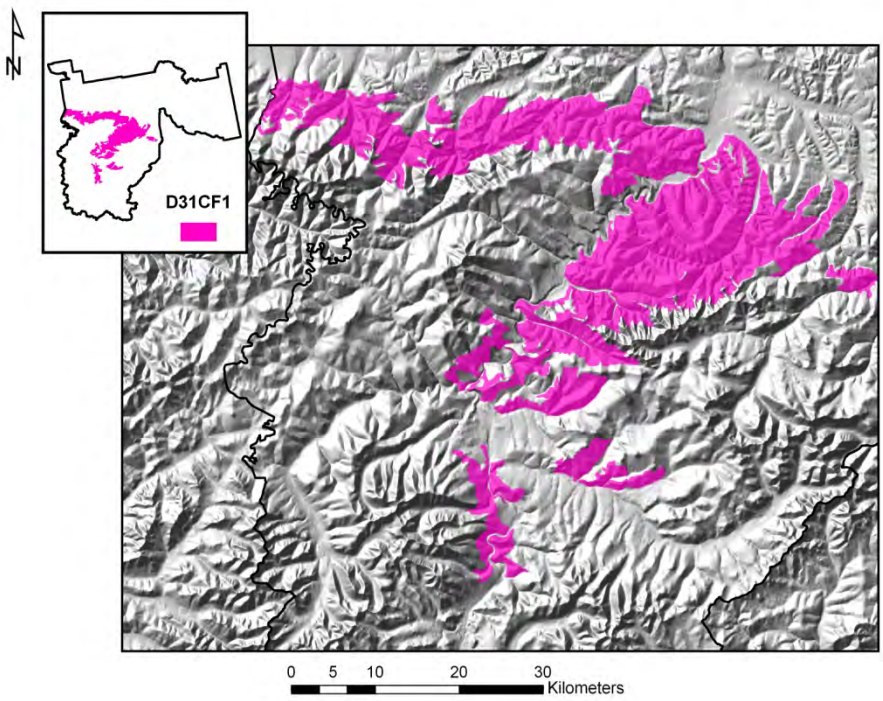
D31—Boreal Woodland Silty Eolian Slopes, Frozen

Percentage of map unit: 10 percent
Slope: 10 to 75 percent
Landform: Hills
Ecological site: *Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii* (F231XY118AK)
Hydric soil status: Hydric

D31—Boreal Scrub Rocky Drainages

Percentage of map unit: 7 percent
Slope: 3 to 20 percent
Landform: Drainageways
Ecological site: Boreal Scrub Gravelly Drainages (R231XY195AK)
Hydric soil status: Not hydric

D31CF1—Boreal and Subalpine Hills with Extensive Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 251 to 1,200 meters
Mean annual precipitation: 242 to 705 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal forest gravelly colluvial slopes, frozen: 32 percent
D31—Boreal woodland silty eolian slopes, frozen: 29 percent
D31—Subalpine woodland silty colluvial slopes, frozen: 20 percent
Dissimilar minor components: 19 percent

D31—Boreal Forest Gravelly Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northeast
Aspect (range): North to south (clockwise)
Slope range: 15 to 65 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: 50 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1 millimho per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 5 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 8.9 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 26 centimeters; silt loam
C—26 to 58 centimeters; very gravelly fine sandy loam
Cf—58 to 152 centimeters; permanently frozen extremely stony sandy loam

D31—Boreal Woodland Silty Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): North

Aspect (range): Southwest to east (clockwise)
Slope range: 10 to 75 percent
Parent material: Mossy organic material over gravelly cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 8.2 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, acid, subgelic Typic Histoturbels
Typical profile:
Oi—0 to 25 centimeters; peat
Cjj—25 to 50 centimeters; gravelly silt loam
Cf—50 to 152 centimeters; permanently frozen very gravelly sandy loam

D31—Subalpine Woodland Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear, concave
Aspect (representative): West
Aspect (range): South to northeast (clockwise)
Slope range: 15 to 65 percent
Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 13.5 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca/Salix-Vaccinium uliginosum (F231XY184AK)
Hydric soil status: Not hydric
Hydrologic soil group: D

Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 30 centimeters; silt loam
2C—30 to 64 centimeters; gravelly sandy loam
2Cf—64 to 152 centimeters; permanently frozen very gravelly sandy loam

Minor Components

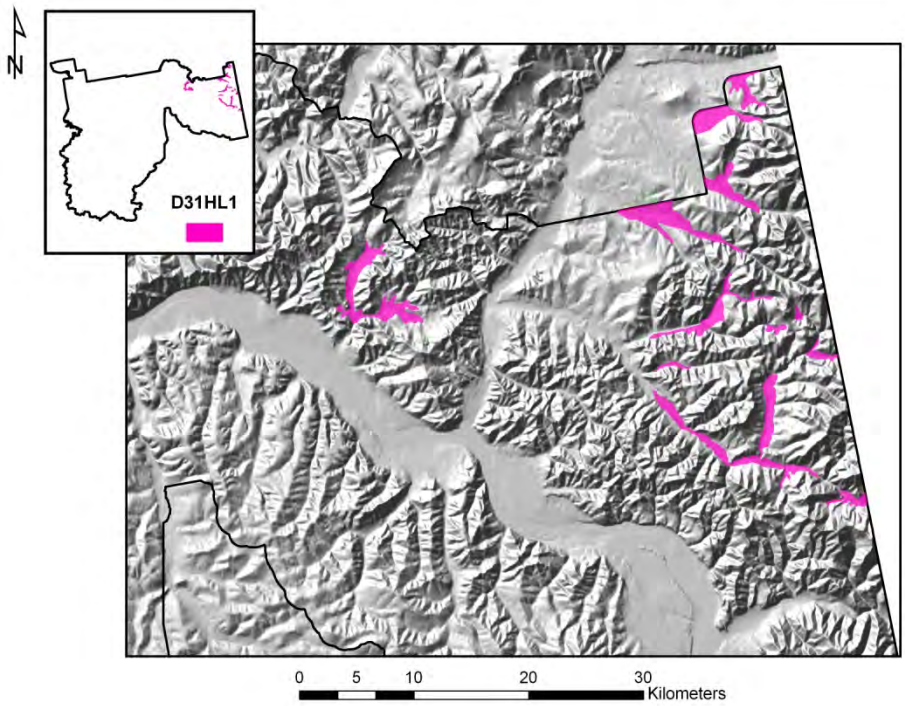
D31—Subalpine Woodland Rocky Residual Slopes

Percentage of map unit: 11 percent
Slope: 1 to 5 percent
Landform: Hills
Ecological site: *Picea glauca/Betula glandulosa-Empetrum nigrum* (F231XY164AK)
Hydric soil status: Not hydric

D31—Boreal Taiga Gravelly Drainages

Percentage of map unit: 8 percent
Slope: 5 to 80 percent
Landform: Drainageways
Ecological site: *Picea mariana/Alnus viridis ssp. fruticosa/Calamagrostis canadensis* (F231XY192AK)
Hydric soil status: Not hydric

D31HL1—Boreal Eolian Hills with Common Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 200 to 1,000 meters
Mean annual precipitation: 244 to 705 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga silty colluvial slopes, frozen: 37 percent
D31—Boreal taiga organic eolian slopes, frozen: 27 percent
Dissimilar minor components: 36 percent

D31—Boreal Taiga Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 5 to 35 percent
Parent material: Organic material over silty colluvium
Depth to restrictive feature: 50 to 100 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 11.6 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
C—28 to 60 centimeters; silt loam
Cf—60 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)

Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

Minor Components

D31—Boreal Scrub Rocky Drainages

Percentage of map unit: 14 percent
Slope: 3 to 20 percent
Landform: Drainageways
Ecological site: Boreal Scrub Gravelly Drainages (R231XY195AK)
Hydric soil status: Not hydric

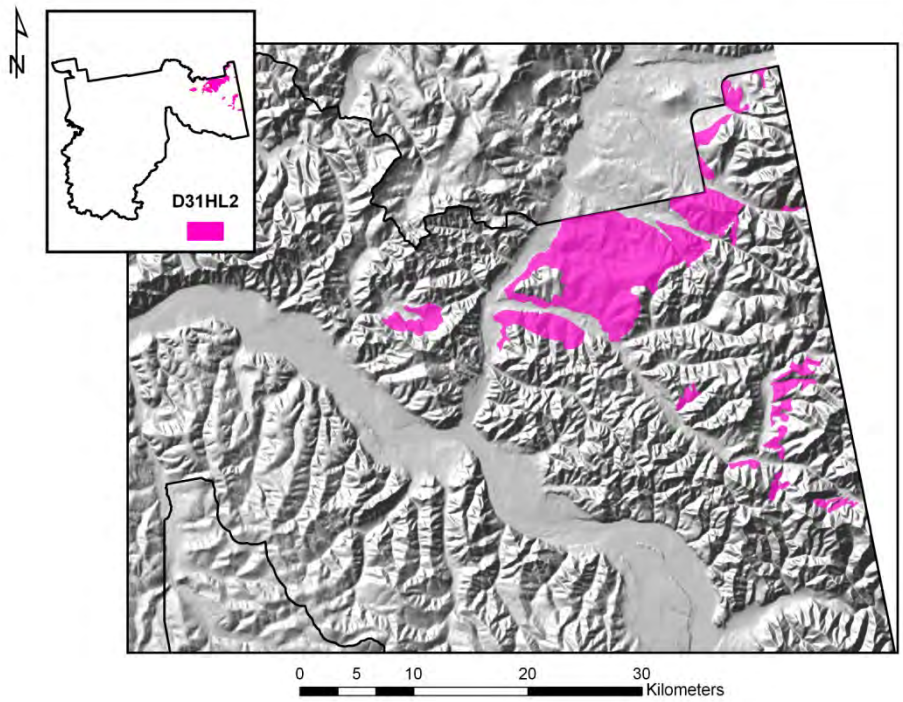
D31—Boreal Woodland Rocky Low Flood Plains

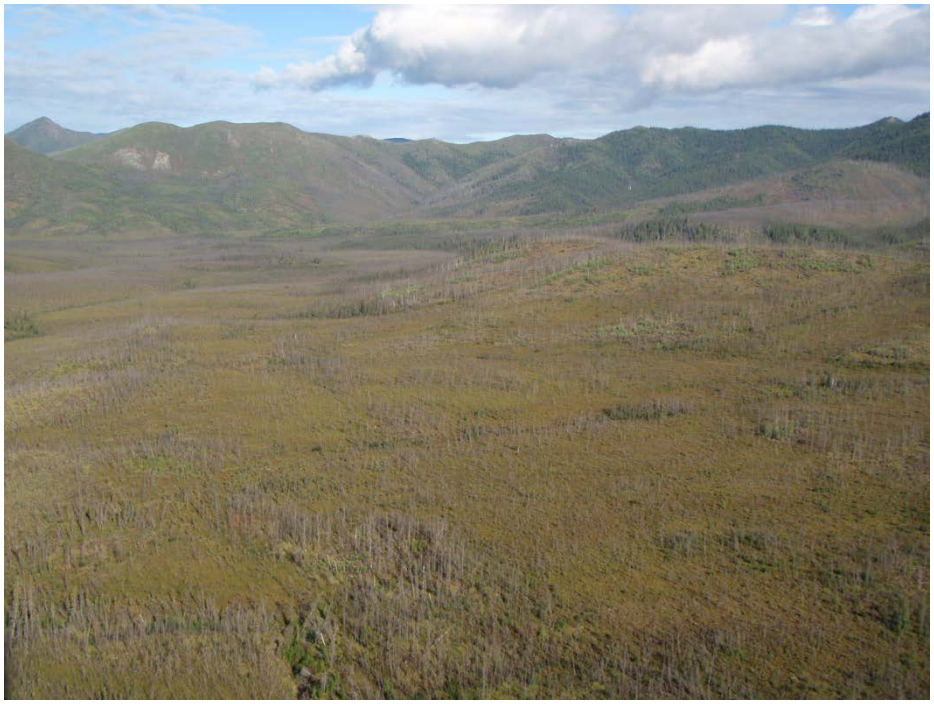
Percentage of map unit: 13 percent
Slope: 1 to 5 percent
Landform: Low flood plains
Ecological site: Populus balsamifera/Salix alaxensis/Calamagrostis canadensis (F231XY130AK)
Hydric soil status: Not hydric

D31—Boreal Forest Loamy High Flood Plains, Frozen

Percentage of map unit: 9 percent
Slope: 1 to 3 percent
Landform: High flood plains
Ecological site: Picea glauca/Alnus viridis ssp. fruticosa (F231XY151AK)
Hydric soil status: Not hydric

D31HL2—Boreal Eolian Hills with Extensive Permafrost





Major land resource area: 231—Interior Alaska Highlands
Elevation: 200 to 1,000 meters
Mean annual precipitation: 244 to 705 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga silty colluvial slopes, frozen: 47 percent
D31—Boreal taiga organic eolian slopes, frozen: 43 percent
Dissimilar minor component: 10 percent

D31—Boreal Taiga Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 5 to 35 percent
Parent material: Organic material over silty colluvium
Depth to restrictive feature: 50 to 100 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 11.6 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
C—28 to 60 centimeters; silt loam
Cf—60 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)

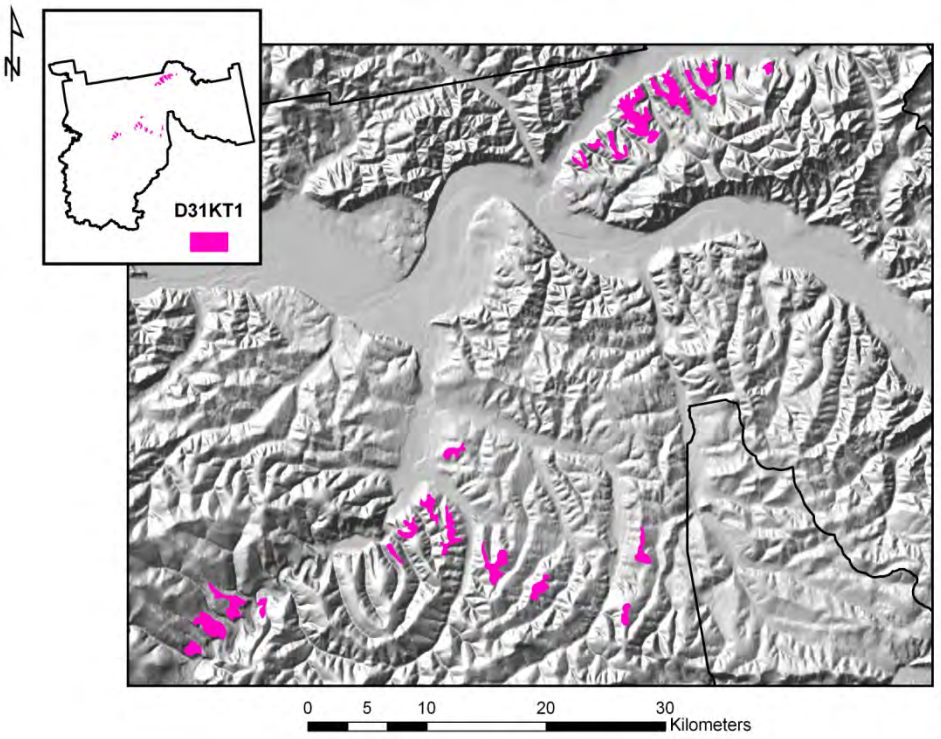
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

Minor Component

D31—Boreal Taiga Silty Drainages, Frozen

Percentage of map unit: 10 percent
Slope: 1 to 15 percent
Landform: Drainageways
Ecological site: Picea mariana/Salix-Ledum groenlandicum (F231XY193AK)
Hydric soil status: Hydric

D31KT1—Boreal Eolian Plains with Extensive Permafrost, Wet



Major land resource area: 231—Interior Alaska Highlands
Elevation: 250 to 800 meters
Mean annual precipitation: 244 to 705 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga organic eolian slopes, frozen: 79 percent
Dissimilar minor components: 21 percent

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

Minor Components

D31—Boreal Taiga Silty Eolian Slopes, Frozen

Percentage of map unit: 10 percent
Slope: 1 to 15 percent
Landform: Hills
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric

D31—Boreal Moss Organic Depressions

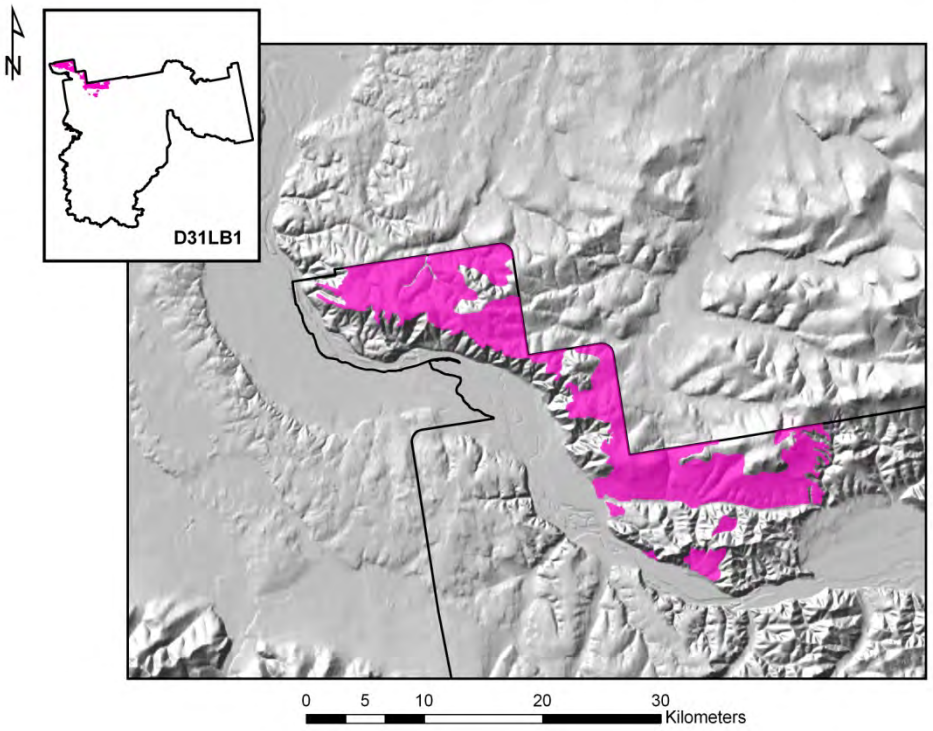
Percentage of map unit: 7 percent
Slope: 0 to 1 percent
Landform: Loess plains

Ecological site: Boreal Moss Peat Plain (R231XY150AK)
Hydric soil status: Hydric

D31—Boreal Scrub-Sedge Organic Depressions

Percentage of map unit: 4 percent
Slope: 0 to 2 percent
Landform: Loess plains
Ecological site: Boreal Scrub Peat Plains (R231XY158AK)
Hydric soil status: Hydric

D31LB1—Boreal Hills with Common Permafrost, Thin Surface



Major land resource area: 231—Interior Alaska Highlands
Elevation: 240 to 1,000 meters
Mean annual precipitation: 244 to 705 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga silty eolian slopes, frozen: 31 percent
D31—Boreal taiga organic eolian slopes, frozen: 26 percent
D31—Boreal forest rocky colluvial slopes: 23 percent
Dissimilar minor components: 20 percent

D31—Boreal Taiga Silty Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Shoulders
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over loamy cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 10.7 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haploturbels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
Cjj—28 to 53 centimeters; silt loam
Cf—53 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)

Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

D31—Boreal Forest Rocky Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): East to west (clockwise)
Slope range: 15 to 70 percent
Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 12.4 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis (F231XY182AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 8 centimeters; slightly decomposed plant material
A—8 to 14 centimeters; silt loam
2Bw—14 to 42 centimeters; very cobbly loam
2C—42 to 152 centimeters; extremely gravelly coarse sandy loam

Minor Components

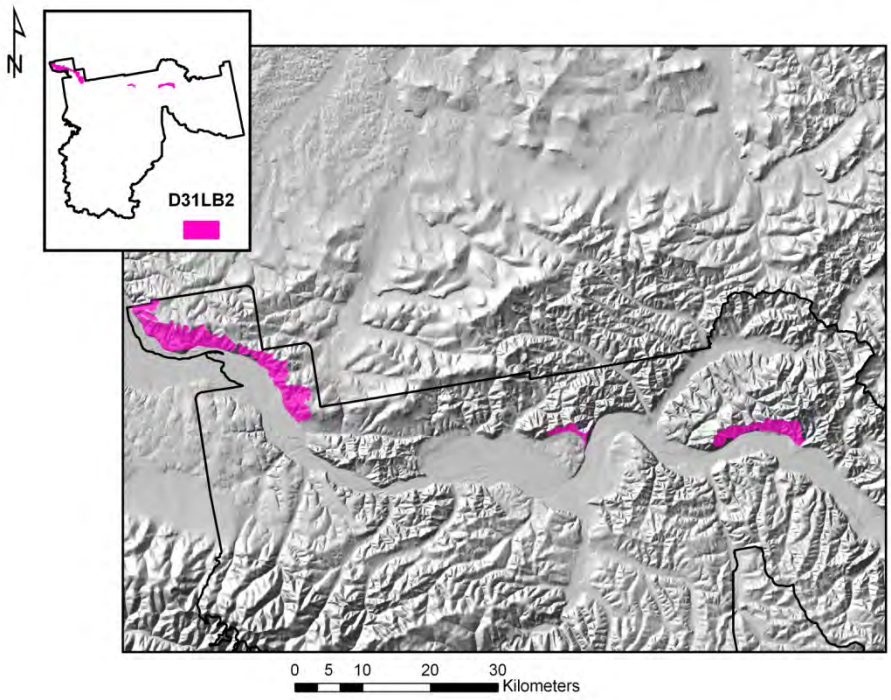
D31—Boreal Forest Rocky Sedimentary Colluvial Slopes

Percentage of map unit: 14 percent
Slope: 40 to 85 percent
Landform: Hills
Ecological site: *Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum* (F231XY110AK)
Hydric soil status: Not hydric

D31—Boreal Taiga Silty Drainages, Frozen

Percentage of map unit: 6 percent
Slope: 1 to 15 percent
Landform: Drainageways
Ecological site: *Picea mariana/Salix-Ledum groenlandicum* (F231XY193AK)
Hydric soil status: Hydric

D31LB2—Boreal Hills with Common Permafrost, Steep



Major land resource area: 231—Interior Alaska Highlands
Elevation: 196 to 1,000 meters
Mean annual precipitation: 245 to 688 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga silty colluvial slopes, frozen: 36 percent
D31—Boreal forest rocky sedimentary colluvial slopes: 34 percent
D31—Boreal forest rocky colluvial slopes: 27 percent
Dissimilar minor component: 3 percent

D31—Boreal Taiga Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 5 to 35 percent
Parent material: Organic material over silty colluvium
Depth to restrictive feature: 50 to 100 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 11.6 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
C—28 to 60 centimeters; silt loam
Cf—60 to 152 centimeters; permanently frozen silt loam

D31—Boreal Forest Rocky Sedimentary Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): Northeast to southwest (clockwise)

Slope range: 40 to 85 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 2 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 14.2 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum (F231XY110AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 10 centimeters; stony silt loam
Bw—10 to 41 centimeters; very gravelly loam
C—41 to 152 centimeters; extremely gravelly sandy loam

D31—Boreal Forest Rocky Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): East to west (clockwise)
Slope range: 15 to 70 percent
Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 12.4 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis (F231XY182AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts

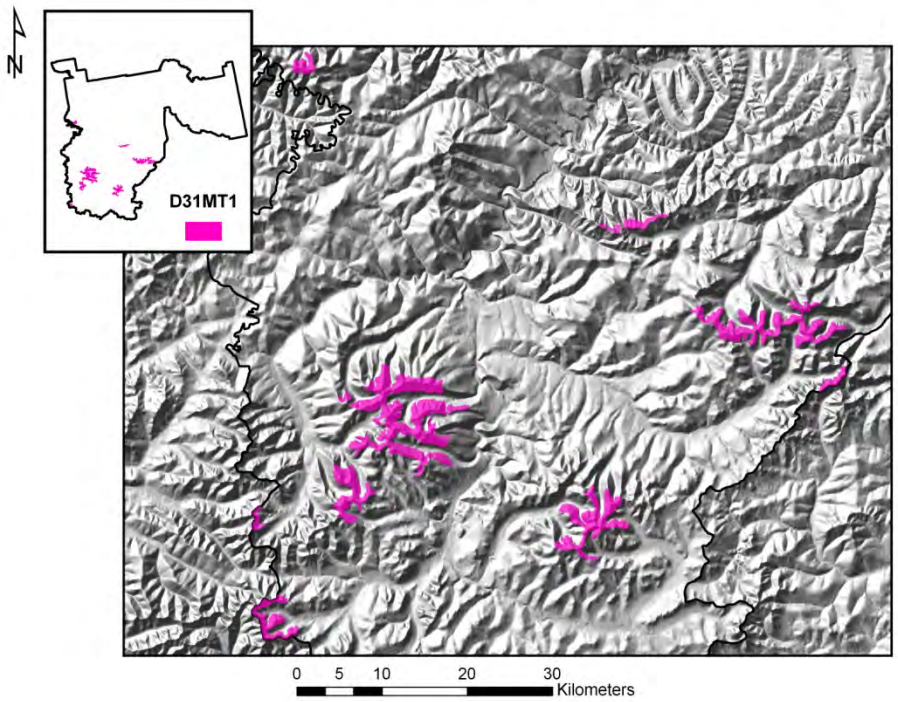
Typical profile:
O—0 to 8 centimeters; slightly decomposed plant material
A—8 to 14 centimeters; silt loam
2Bw—14 to 42 centimeters; very cobbly loam
2C—42 to 152 centimeters; extremely gravelly coarse sandy loam

Minor Component

D31—Boreal Scrub Rocky Colluvial Escarpments

Percentage of map unit: 3 percent
Slope: 50 to 100 percent
Landform: Escarpments
Ecological site: Boreal Scrub Gravelly Slopes, Dry (R231XY109AK)
Hydric soil status: Not hydric

D31MT1—Alpine Granitic Mountains, Dry



Major land resource area: 231—Interior Alaska Highlands
Elevation: 1,000 to 2,300 meters
Mean annual precipitation: 288 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 50 to 80 days

Map Unit Composition

D31—Alpine rubble land: 66 percent
D31—Alpine low scrub gravelly colluvial slopes: 22 percent
Dissimilar minor components: 12 percent

D31—Alpine Rubble Land

Landform: Mountains
Landform position (two-dimensional): Summits, shoulders, backslopes, toeslopes
Landform position (three-dimensional): Base slopes, crests, side slopes
Downslope shape: Convex
Across-slope shape: Convex
Aspect (representative): Northeast
Aspect (range): West to southeast (clockwise)
Slope range: 25 to 100 percent
Parent material: Gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity (maximum based on representative value): Nonsaline
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 0 centimeter)
Land capability subclass (nonirrigated): 8s
Ecological site: Alpine and Subalpine Lichen Rock Outcrops Slopes (R231XY127AK)
Hydric soil status: Not rated
Hydrologic soil group: D
Typical profile:
C—0 to 152 centimeters; cobbles

D31—Alpine Low Scrub Gravelly Colluvial Slopes

Landform: Mountains
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear, convex
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 20 to 70 percent
Parent material: Gravelly colluvium derived from acid igneous rock
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 1)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates

Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 12.7 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Circles, Steep (R231XY134AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts
Typical profile:
A—0 to 11 centimeters; stony silt loam
Bw—11 to 34 centimeters; very cobbly coarse sandy loam
C—34 to 152 centimeters; extremely stony coarse sandy loam

Minor Components

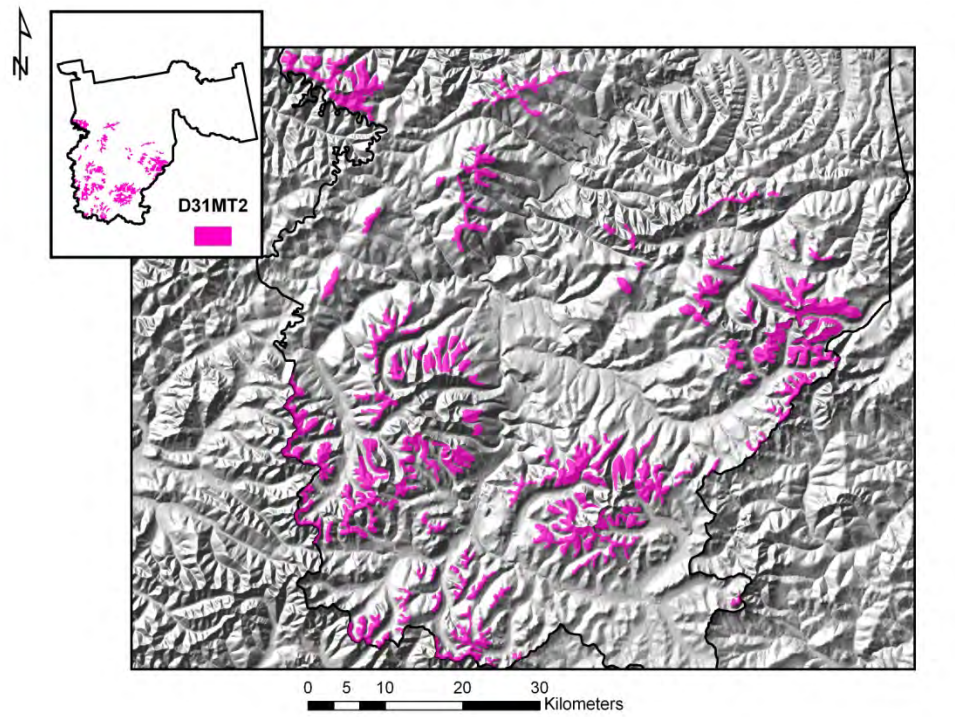
D31—Alpine Scrub Gravelly Circles

Percentage of map unit: 7 percent
Slope: 4 to 28 percent
Landform: Mountains
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly, Circles (R231XY134AK)
Hydric soil status: Not hydric

D31—Alpine Scrub Gravelly Circles, Acid

Percentage of map unit: 5 percent
Slope: 9 to 35 percent
Landform: Mountains
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock (R231XY101AK)
Hydric soil status: Not hydric

D31MT2—Alpine Granitic Mountains



Major land resource area: 231—Interior Alaska Highlands
Elevation: 1,000 to 2,300 meters
Mean annual precipitation: 288 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 50 to 80 days

Map Unit Composition

D31—Alpine low scrub gravelly colluvial slopes: 32 percent
D31—Alpine scrub gravelly circles: 30 percent
D31—Alpine rubble land: 24 percent
Dissimilar minor components: 14 percent

D31—Alpine Low Scrub Gravelly Colluvial Slopes

Landform: Mountains
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear, convex
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 20 to 70 percent
Parent material: Gravelly colluvium derived from acid igneous rock
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 1)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 12.7 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Circles, Steep (R231XY134AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts
Typical profile:
A—0 to 11 centimeters; stony silt loam
Bw—11 to 34 centimeters; very cobbly coarse sandy loam
C—34 to 152 centimeters; extremely stony coarse sandy loam

D31—Alpine Scrub Gravelly Circles

Landform: Mountains
Landform position (two-dimensional): Summits
Landform position (three-dimensional): Crests
Downslope shape: Linear
Across-slope shape: Convex
Aspect (representative): North
Aspect (range): Northwest to south (clockwise)

Slope range: 6 to 55 percent
Parent material: Gravelly cryoturbate
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 1)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 12.6 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly, Circles (R231XY134AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Typic Haplogelepts
Typical profile:
A—0 to 10 centimeters; gravelly silt loam
Bw—10 to 31 centimeters; very gravelly sandy loam
C—31 to 152 centimeters; extremely stony fine sandy loam

D31—Alpine Rubble Land

Landform: Mountains
Landform position (two-dimensional): Summits, shoulders, backslopes, toeslopes
Landform position (three-dimensional): Base slopes, crests, side slopes
Downslope shape: Convex
Across-slope shape: Convex
Aspect (representative): Northeast
Aspect (range): West to southeast (clockwise)
Slope range: 25 to 100 percent
Parent material: Gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity (maximum based on representative value): Nonsaline
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 0 centimeter)
Land capability subclass (nonirrigated): 8s
Ecological site: Alpine and Subalpine Lichen Rock Outcrops Slopes (R231XY127AK)
Hydric soil status: Not rated
Hydrologic soil group: D
Typical profile:
C—0 to 152 centimeters; cobbles

Minor Components

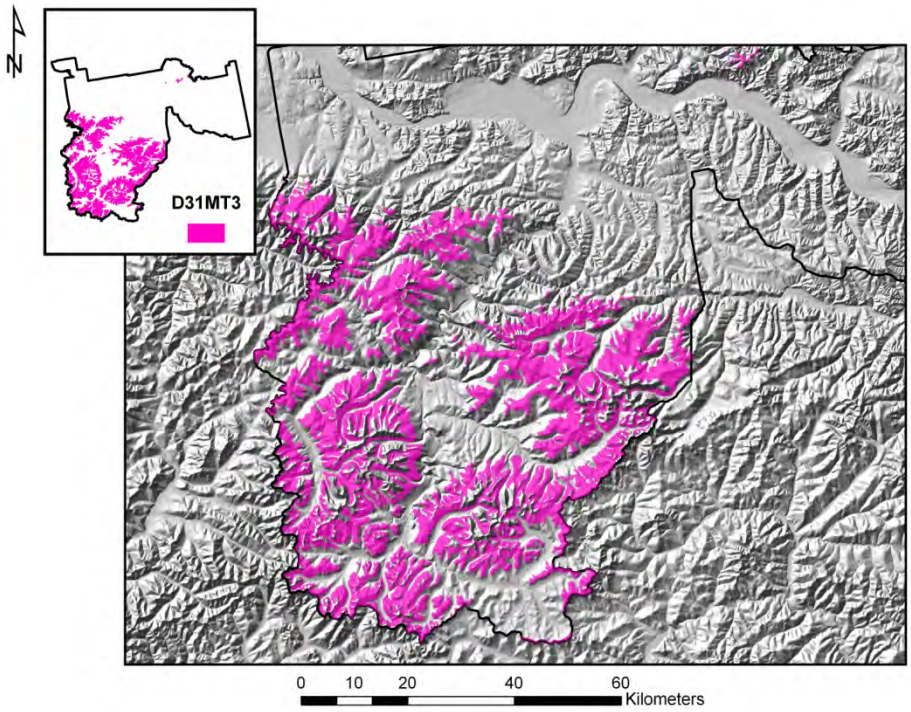
D31—Alpine Scrub Gravelly Circles, Acid

Percentage of map unit: 7 percent
Slope: 10 to 25 percent
Landform: Mountains
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock (R231XY101AK)
Hydric soil status: Not hydric

D31—Alpine Scrub Loamy Hummocks, Frozen

Percentage of map unit: 7 percent
Slope: 12 to 30 percent
Landform: Mountains
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Peat Hummock (R231XY114AK)
Hydric soil status: Not hydric

D31MT3—Alpine Rounded Mountains with Common Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 800 to 1,800 meters
Mean annual precipitation: 288 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Alpine low scrub organic hummocks, frozen: 25 percent
D31—Alpine scrub loamy hummocks, frozen: 25 percent
D31—Alpine low scrub loamy solifluction lobes: 22 percent
Dissimilar minor components: 28 percent

D31—Alpine Low Scrub Organic Hummocks, Frozen

Landform: Rounded mountains
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 12 to 25 percent
Parent material: Organic material over loamy colluvium
Depth to restrictive feature: 39 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 8.8 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Alpine Dwarf Scrub-Graminoid Mosaic Organic Frozen Mound (R231XY116AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 44 centimeters; peat
Cf—44 to 152 centimeters; permanently frozen silt loam

D31—Alpine Scrub Loamy Hummocks, Frozen

Landform: Mountains
Landform position (two-dimensional): Footslopes, toeslopes
Landform position (three-dimensional): Base slopes
Downslope shape: Convex
Across-slope shape: Linear, convex
Aspect (representative): North
Aspect (range): Northwest to south (clockwise)
Slope range: 6 to 20 percent
Parent material: Organic material over loamy cryoturbate

Depth to restrictive feature: 50 to 80 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Somewhat poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 10.1 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Peat Hummock (R231XY114AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haploturbels
Typical profile:
Oi—0 to 31 centimeters; slightly decomposed plant material
Cjj—31 to 57 centimeters; gravelly sandy loam
Cf—57 to 152 centimeters; permanently frozen cobbly coarse sandy loam

D31—Alpine Low Scrub Loamy Solifluction Lobes

Landform: Mountains
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): North
Aspect (range): East to west (clockwise)
Slope range: 20 to 55 percent
Parent material: Organic material over gravelly cryoturbate
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Moderate (about 20.1 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Alpine Dwarf Scrub-Graminoid Mosaic Loamy Mound (R231XY113AK)
Hydric soil status: Not hydric
Hydrologic soil group: B/D
Soil classification: Sandy or sandy-skeletal, mixed, subgelic Oxyaquic Gelorthents

Typical profile:
O—0 to 5 centimeters; slightly decomposed plant material
A—5 to 21 centimeters; stony silt loam
C—21 to 152 centimeters; very cobbly loamy coarse sand

Minor Components

D31—Subalpine Scrub Silty Till Slopes

Percentage of map unit: 10 percent
Slope: 15 to 65 percent
Landform: Mountains
Ecological site: Subalpine Scrub Loamy Hummock (R231XY148AK)
Hydric soil status: Not hydric

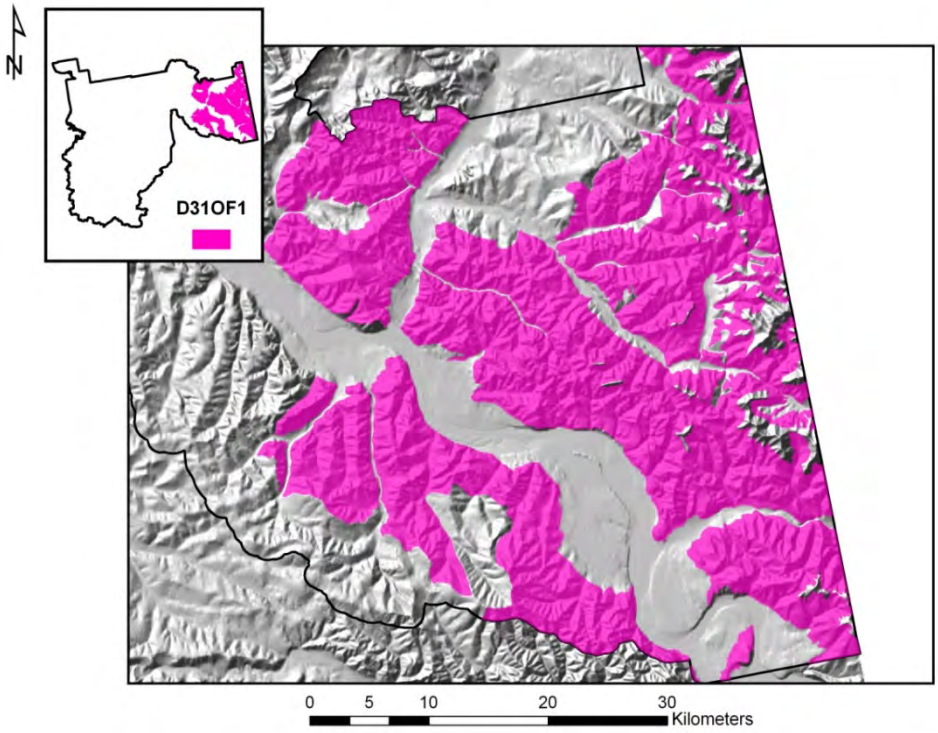
D31—Alpine Scrub Gravelly Circles, Acid

Percentage of map unit: 9 percent
Slope: 1 to 15 percent
Landform: Mountains
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock (R231XY101AK)
Hydric soil status: Not hydric

D31—Subalpine Tussock-Scrub Loamy Colluvial Slopes, Frozen

Percentage of map unit: 9 percent
Slope: 10 to 35 percent
Landform: Mountains
Ecological site: Subalpine Scrub-Tussock Loamy Frozen Hummock (R231XY185AK)
Hydric soil status: Hydric

D31OF1—Boreal Hills with Common Permafrost, Nonacid



Major land resource area: 231—Interior Alaska Highlands
Elevation: 240 to 1,000 meters
Mean annual precipitation: 244 to 688 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal forest gravelly colluvial slopes, frozen: 27 percent
D31—Boreal woodland silty eolian slopes, frozen: 24 percent
D31—Boreal forest rocky sedimentary colluvial slopes: 21 percent
Dissimilar minor components: 28 percent

D31—Boreal Forest Gravelly Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northeast
Aspect (range): North to south (clockwise)
Slope range: 15 to 65 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: 50 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1 millimho per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 5 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 8.9 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 26 centimeters; silt loam
C—26 to 58 centimeters; very gravelly fine sandy loam
Cf—58 to 152 centimeters; permanently frozen extremely stony sandy loam

D31—Boreal Woodland Silty Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): North

Aspect (range): Southwest to east (clockwise)
Slope range: 10 to 75 percent
Parent material: Mossy organic material over gravelly cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 8.2 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, acid, subgelic Typic Histoturbels
Typical profile:
Oi—0 to 25 centimeters; peat
Cjj—25 to 50 centimeters; gravelly silt loam
Cf—50 to 152 centimeters; permanently frozen very gravelly sandy loam

D31—Boreal Forest Rocky Sedimentary Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): Northeast to southwest (clockwise)
Slope range: 40 to 85 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 2 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 14.2 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum (F231XY110AK)
Hydric soil status: Not hydric
Hydrologic soil group: A

Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 10 centimeters; stony silt loam
Bw—10 to 41 centimeters; very gravelly loam
C—41 to 152 centimeters; extremely gravelly sandy loam

Minor Components

D31—Boreal Forest Rocky Colluvial Slopes

Percentage of map unit: 10 percent
Slope: 15 to 70 percent
Landform: Hills
Ecological site: *Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis* (F231XY182AK)
Hydric soil status: Not hydric

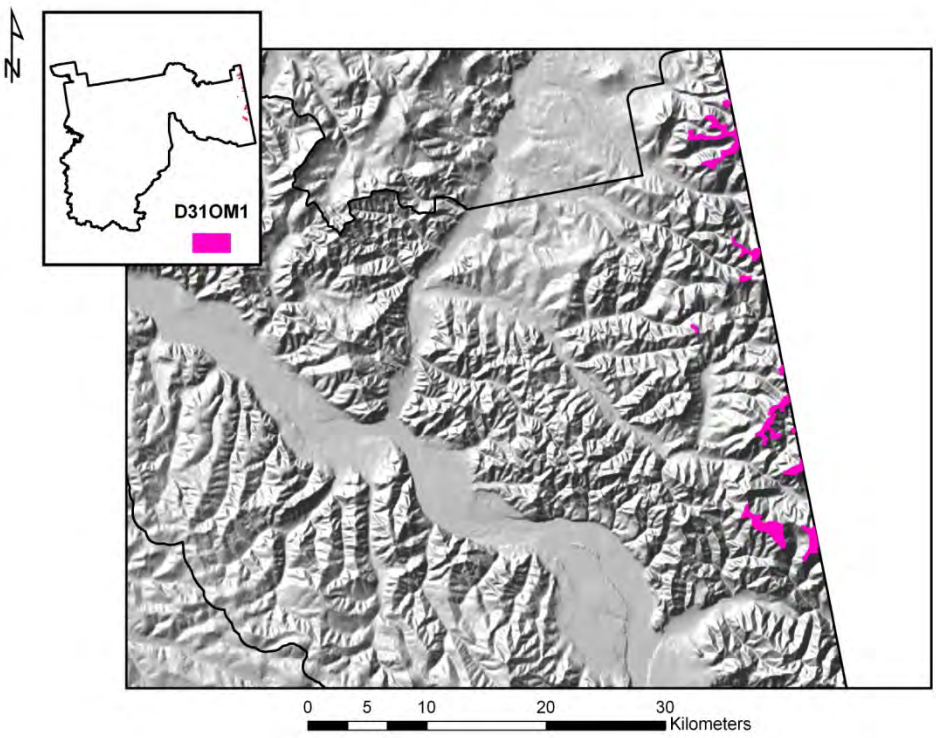
D31—Boreal Woodland Rocky Colluvial Slopes

Percentage of map unit: 10 percent
Slope: 10 to 70 percent
Landform: Hills
Ecological site: *Picea mariana-Betula neoalaskana/Vaccinium uliginosum/Cladonia* (F231XY162AK)
Hydric soil status: Not hydric

D31—Boreal Scrub Rocky Drainages

Percentage of map unit: 8 percent
Slope: 3 to 20 percent
Landform: Drainageways
Ecological site: Boreal Scrub Gravelly Drainages (R231XY195AK)
Hydric soil status: Not hydric

D31OM1—Alpine Angular Mountains



Major land resource area: 231—Interior Alaska Highlands
Elevation: 900 to 2,300 meters
Mean annual precipitation: 288 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 50 to 80 days

Map Unit Composition

D31—Alpine scrub silty circles: 57 percent
D31—Alpine rubble land: 30 percent
Dissimilar minor component: 13 percent

D31—Alpine Scrub Silty Circles

Landform: Mountains
Landform position (two-dimensional): Summits, backslopes
Landform position (three-dimensional): Side slopes, crests
Downslope shape: Convex
Across-slope shape: Convex
Aspect (representative): Northeast
Aspect (range): Southeast to northwest (clockwise)
Slope range: 25 to 75 percent
Parent material: Loess over gravelly cryoturbate
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 1)
Salinity (maximum based on representative value): Very slightly saline (about 3.3 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 8 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 13.4 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Slopes, Basic (R231XY105AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Loamy-skeletal, mixed, superactive, calcareous, subgelic Typic Haplogelolls
Typical profile:
A—0 to 11 centimeters; silt loam
Bw—11 to 29 centimeters; very gravelly sandy loam
C—29 to 152 centimeters; very stony sandy loam

D31—Alpine Rubble Land

Landform: Mountains
Landform position (two-dimensional): Summits, shoulders, backslopes, toeslopes
Landform position (three-dimensional): Base slopes, crests, side slopes
Downslope shape: Convex
Across-slope shape: Convex
Aspect (representative): Northeast
Aspect (range): West to southeast (clockwise)
Slope range: 25 to 100 percent

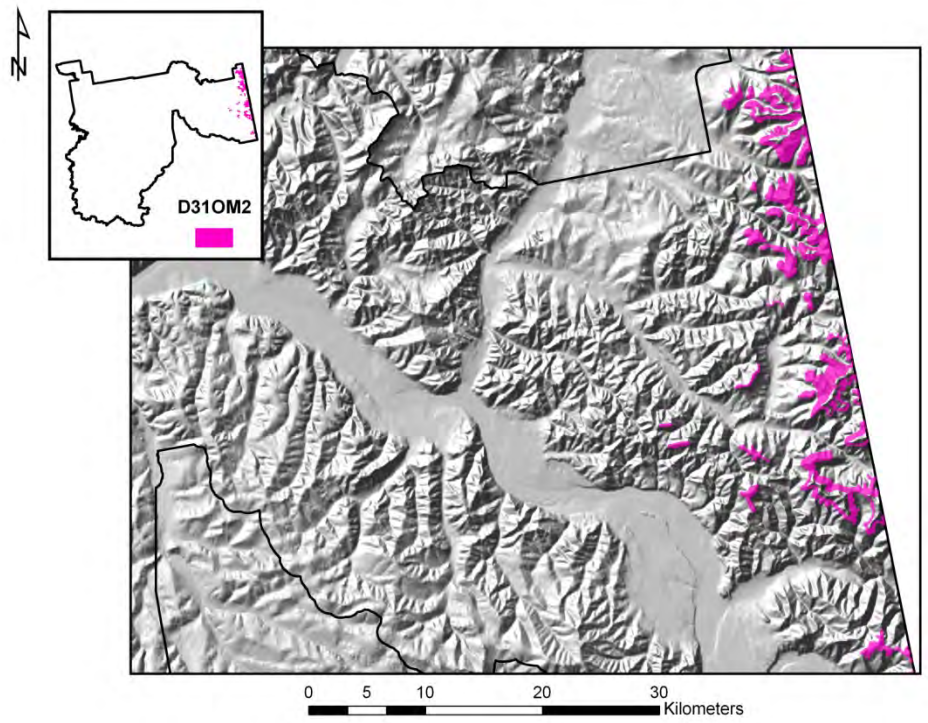
Parent material: Gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity (maximum based on representative value): Nonsaline
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Very low (about 0 centimeter)
Land capability subclass (nonirrigated): 8s
Ecological site: Alpine and Subalpine Lichen Rock Outcrops Slopes (R231XY127AK)
Hydric soil status: Not rated
Hydrologic soil group: D
Typical profile:
C—0 to 152 centimeters; cobbles

Minor Component

D31—Alpine Bedrock

Percentage of map unit: 13 percent
Slope: 25 to 100 percent
Landform: Mountains
Ecological site: Alpine and Subalpine Lichen Rock Outcrops Slopes (R231XY127AK)
Hydric soil status: Not rated

D31OM2—Alpine Lower Mountain Slopes



Major land resource area: 231—Interior Alaska Highlands
Elevation: 750 to 2,300 meters
Mean annual precipitation: 278 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Alpine scrub silty circles: 60 percent
D31—Subalpine woodland silty colluvial slopes, frozen: 18 percent
Dissimilar minor components: 22 percent

D31—Alpine Scrub Silty Circles

Landform: Mountains
Landform position (two-dimensional): Summits, backslopes
Landform position (three-dimensional): Side slopes, crests
Downslope shape: Convex
Across-slope shape: Convex
Aspect (representative): Northeast
Aspect (range): Southeast to northwest (clockwise)
Slope range: 25 to 75 percent
Parent material: Loess over gravelly cryoturbate
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 1)
Salinity (maximum based on representative value): Very slightly saline (about 3.3 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 8 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 13.4 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Slopes, Basic (R231XY105AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Loamy-skeletal, mixed, superactive, calcareous, subgelic Typic Haplogelolls
Typical profile:
A—0 to 11 centimeters; silt loam
Bw—11 to 29 centimeters; very gravelly sandy loam
C—29 to 152 centimeters; very stony sandy loam

D31—Subalpine Woodland Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear, concave
Aspect (representative): West
Aspect (range): South to northeast (clockwise)
Slope range: 30 to 65 percent

Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 13.5 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: *Picea glauca/Salix-Vaccinium uliginosum* (F231XY184AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 30 centimeters; silt loam
C—30 to 64 centimeters; gravelly sandy loam
Cf—64 to 152 centimeters; permanently frozen very gravelly sandy loam

Minor Components

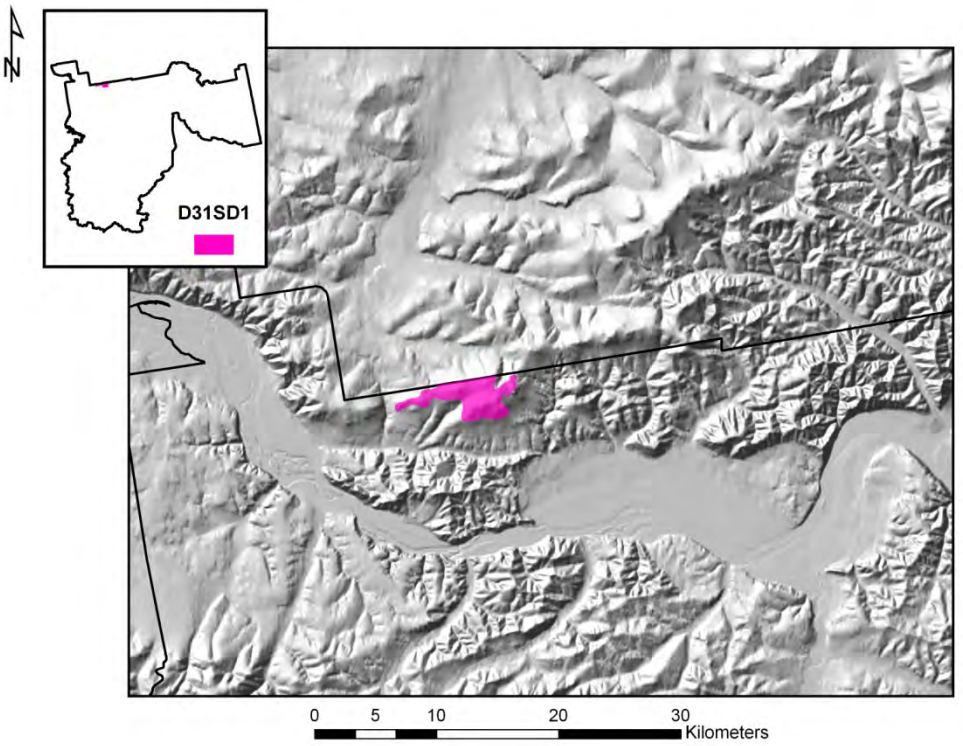
D31—Alpine Bedrock

Percentage of map unit: 14 percent
Slope: 25 to 100 percent
Landform: Mountains
Ecological site: Alpine and Subalpine Lichen Rock Outcrops Slopes (R231XY127AK)
Hydric soil status: Not rated

D31—Subalpine Woodland Silty Colluvial Slopes

Percentage of map unit: 8 percent
Slope: 15 to 45 percent
Landform: Hills
Ecological site: *Picea glauca/Salix pulchra/Carex* (F231XY140AK)
Hydric soil status: Not hydric

D31SD1—Alpine Rounded Mountains with Extensive Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 750 to 2,300 meters
Mean annual precipitation: 278 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Alpine low scrub organic hummocks, frozen: 48 percent
D31—Alpine tussock-scrub silty polygons, frozen: 29 percent
Dissimilar minor components: 23 percent

D31—Alpine Low Scrub Organic Hummocks, Frozen

Landform: Rounded mountains
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 5 to 20 percent
Parent material: Organic material over loamy colluvium
Depth to restrictive feature: 39 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 8.8 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Alpine Dwarf Scrub-Graminoid Mosaic Organic Frozen Mound (R231XY116AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 44 centimeters; peat
Cf—44 to 152 centimeters; permanently frozen silt loam

D31—Alpine Tussock-Scrub Silty Polygons, Frozen

Landform: Rounded mountains
Landform position (two-dimensional): Summits, shoulders
Landform position (three-dimensional): Crests
Downslope shape: Convex
Across-slope shape: Convex
Slope range: 1 to 10 percent
Parent material: Organic material over loamy cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)

Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 8.7 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Alpine Lichen Loamy Polygon (R231XY115AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Coarse-silty, mixed, superactive, acid, subgelic Typic Histoturbels
Typical profile:
Oi—0 to 27 centimeters; peat
A—27 to 35 centimeters; silt loam
Cjj—35 to 42 centimeters; silt loam
Cf—42 to 152 centimeters; permanently frozen silt loam

Minor Components

D31—Subalpine Woodland Silty Colluvial Slopes

Percentage of map unit: 11 percent
Slope: 5 to 20 percent
Landform: Hills
Ecological site: *Picea glauca/Salix pulchra/Carex* (F231XY140AK)
Hydric soil status: Not hydric

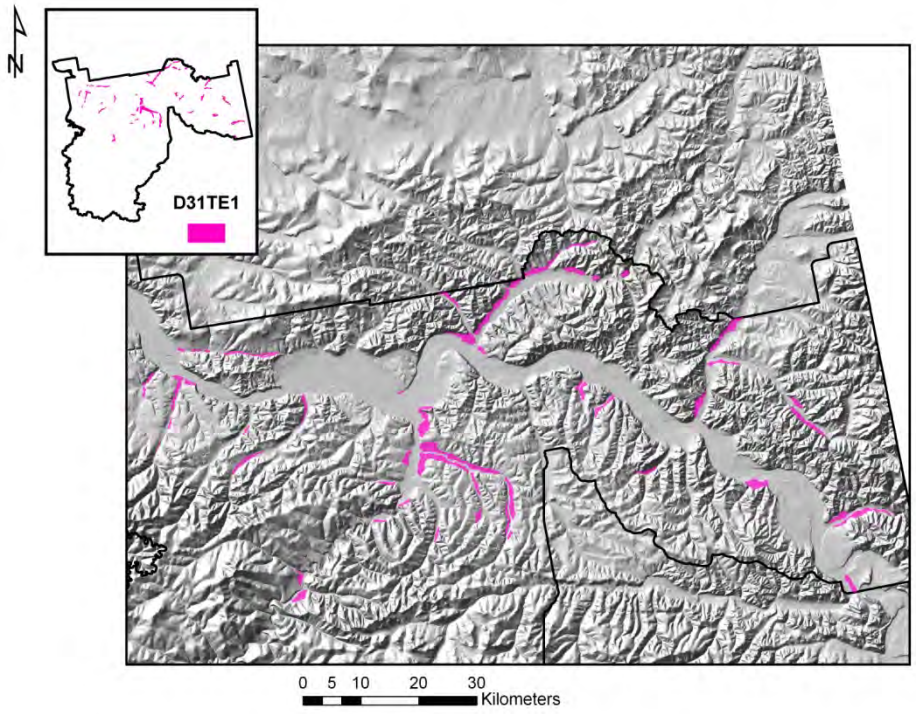
D31—Subalpine Scrub Loamy Colluvial Slopes, Frozen

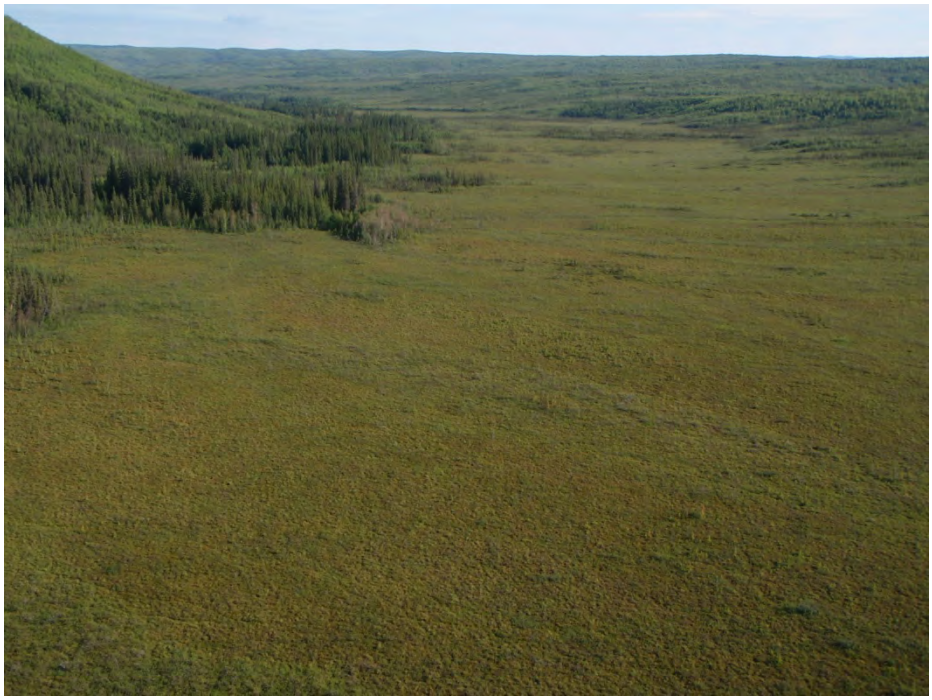
Percentage of map unit: 7 percent
Slope: 5 to 25 percent
Landform: Hills
Ecological site: Subalpine Scrub Loamy Frozen Circles (R231XY129AK)
Hydric soil status: Hydric

D31—Alpine Rubble Land

Percentage of map unit: 5 percent
Slope: 25 to 100 percent
Landform: Mountains
Ecological site: Alpine and Subalpine Lichen Rock Outcrops Slopes (R231XY127AK)
Hydric soil status: Not rated

D31TE1—Boreal Eolian Terraces with Extensive Permafrost





Major land resource area: 231—Interior Alaska Highlands
Elevation: 197 to 600 meters
Mean annual precipitation: 233 to 539 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal taiga/tussock organic terraces, frozen: 62 percent
D31—Boreal taiga silty terraces, frozen: 20 percent
Dissimilar minor components: 18 percent

D31—Boreal Taiga/Tussock Organic Terraces, Frozen

Landform: Terraces
Landform position (three-dimensional): Treads
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 10.8 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum (F231XY169AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 54 centimeters; silt loam
Cjjf—54 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Silty Terraces, Frozen

Landform: Terraces
Landform position (three-dimensional): Treads
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): East
Aspect (range): Northeast to southwest (clockwise)
Slope range: 5 to 30 percent
Parent material: Organic material over loamy alluvium
Depth to restrictive feature: 50 to 115 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)

Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 5 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 13.5 centimeters)
Land capability subclass (nonirrigated): 4s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Rosa acicularis (F231XY178AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Fluventic Haplorthels
Typical profile:
Oi—0 to 18 centimeters; slightly decomposed plant material
A—18 to 28 centimeters; silt loam
C—28 to 69 centimeters; sandy loam
Cf—69 to 152 centimeters; permanently frozen gravelly sandy loam

Minor Components

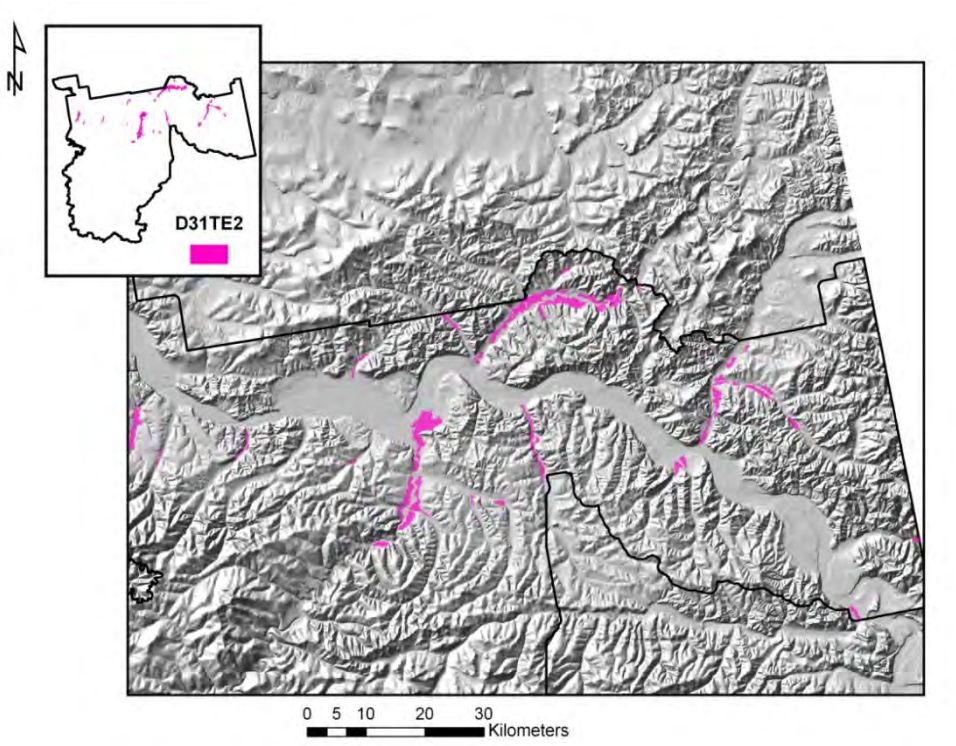
D31—Boreal Forest Silty Drainages, Frozen

Percentage of map unit: 10 percent
Slope: 1 to 10 percent
Landform: Drainageways
Ecological site: Betula neoalaskana/Alnus incana ssp. tenuifolia (F231XY197AK)
Hydric soil status: Hydric

D31—Boreal Grass Organic Depressions

Percentage of map unit: 8 percent
Slope: 0 to 1 percent
Landform: Terraces
Ecological site: Boreal Graminoid Peat Terrace, Depression (R231XY199AK)
Hydric soil status: Hydric

D31TE2—Boreal Terraces with Extensive Permafrost, Wet



Major land resource area: 231—Interior Alaska Highlands
Elevation: 197 to 600 meters
Mean annual precipitation: 233 to 539 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal taiga/tussock organic terraces, frozen: 78 percent
Dissimilar minor components: 22 percent

D31—Boreal Taiga/Tussock Organic Terraces, Frozen

Landform: Terraces
Landform position (three-dimensional): Treads
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 10.8 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum (F231XY169AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 54 centimeters; silt loam
Cjjf—54 to 152 centimeters; permanently frozen silt loam

Minor Components

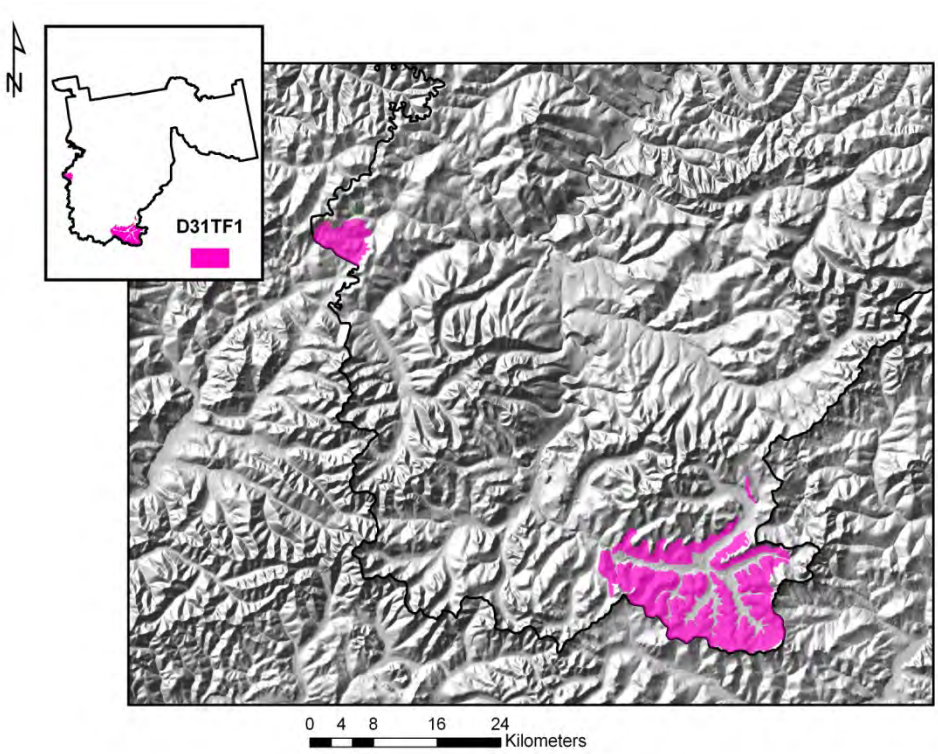
D31—Boreal Forest Silty Drainages, Frozen

Percentage of map unit: 12 percent
Slope: 1 to 10 percent
Landform: Drainageways
Ecological site: Betula neoalaskana/Alnus incana ssp. tenuifolia (F231XY197AK)
Hydric soil status: Hydric

D31—Boreal Grass Organic Depressions

Percentage of map unit: 10 percent
Slope: 0 to 1 percent
Landform: Terraces
Ecological site: Boreal Graminoid Peat Terrace, Depression (R231XY199AK)
Hydric soil status: Hydric

D31TF1—Subalpine Hills



Major land resource area: 231—Interior Alaska Highlands
Elevation: 800 to 1,350 meters
Mean annual precipitation: 278 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Subalpine woodland silty colluvial slopes: 55 percent
D31—Subalpine scrub loamy residual slopes: 34 percent
Dissimilar minor components: 11 percent

D31—Subalpine Woodland Silty Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): West
Aspect (range): South to northeast (clockwise)
Slope range: 5 to 20 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 10.3 centimeters)
Land capability subclass (nonirrigated): 5w
Ecological site: *Picea glauca/Salix pulchra/Carex* (F231XY140AK)
Hydric soil status: Not hydric
Hydrologic soil group: C/D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryorthents
Typical profile:
O—0 to 15 centimeters; peat
A—15 to 22 centimeters; silt loam
BCg—22 to 47 centimeters; gravelly sandy loam
C—47 to 152 centimeters; very gravelly sandy loam

D31—Subalpine Scrub Loamy Residual Slopes

Landform: Hills
Landform position (two-dimensional): Summits, shoulders
Landform position (three-dimensional): Crests
Downslope shape: Linear
Across-slope shape: Convex
Slope range: 1 to 5 percent
Parent material: Organic material over gravelly residuum
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)

Salinity (maximum based on representative value): Very slightly saline (about 3 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 7.8 centimeters)
Land capability subclass (nonirrigated): 4c
Ecological site: Subalpine Scrub Loamy Slopes (R231XY139AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 12 centimeters; slightly decomposed plant material
A—12 to 19 centimeters; loam
Bw—19 to 54 centimeters; very gravelly sandy loam
C—54 to 152 centimeters; extremely gravelly coarse sandy loam

Minor Components

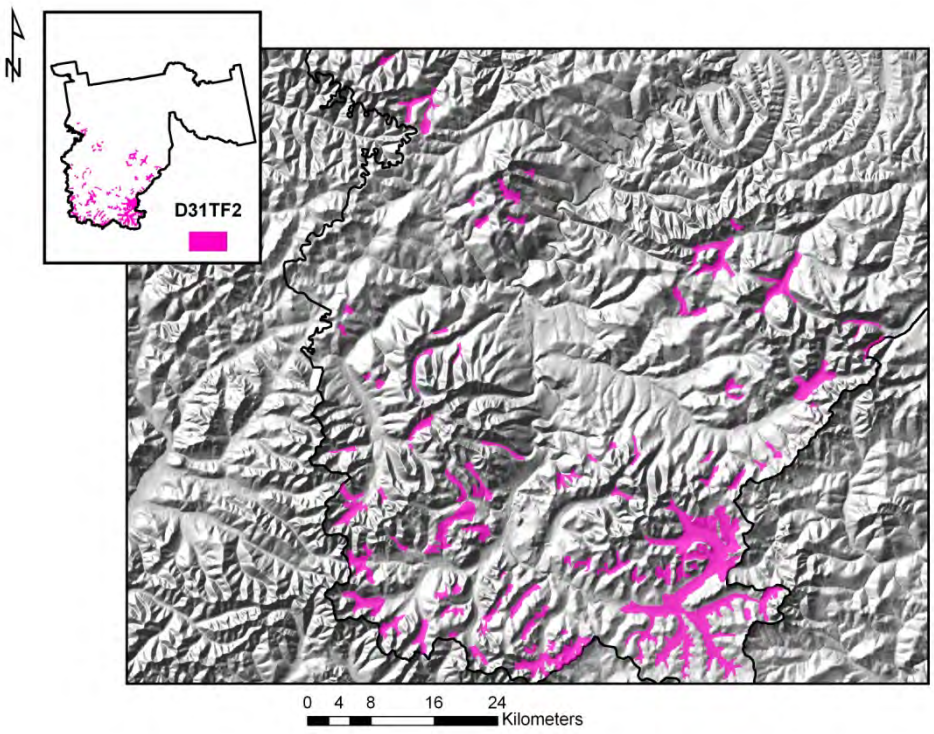
D31—Subalpine Scrub Rocky Drainages

Percentage of map unit: 6 percent
Slope: 1 to 20 percent
Landform: Drainageways
Ecological site: Subalpine Scrub Loamy Drainages (R231XY152AK)
Hydric soil status: Hydric

D31—Subalpine Tussock-Scrub Loamy Colluvial Slopes, Frozen

Percentage of map unit: 5 percent
Slope: 1 to 20 percent
Landform: Mountains
Ecological site: Subalpine Scrub-Tussock Loamy Frozen Hummock (R231XY185AK)
Hydric soil status: Hydric

D31TF2—Subalpine Glaciated Hills



Major land resource area: 231—Interior Alaska Highlands
Elevation: 800 to 1,350 meters
Mean annual precipitation: 288 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 50 to 80 days

Map Unit Composition

D31—Subalpine tussock-scrub loamy colluvial slopes, frozen: 45 percent
D31—Subalpine scrub silty till slopes: 41 percent
Dissimilar minor components: 14 percent

D31—Subalpine Tussock-Scrub Loamy Colluvial Slopes, Frozen

Landform: Mountains
Landform position (two-dimensional): Footslopes, toeslopes
Landform position (three-dimensional): Base slopes
Downslope shape: Convex, linear
Across-slope shape: Linear, convex
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 1 to 20 percent
Parent material: Organic material over loess over loamy cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 10.9 centimeters)
Land capability subclass (nonirrigated): 4c
Ecological site: Subalpine Scrub-Tussock Loamy Frozen Hummock (R231XY185AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Typic Histoturbels
Typical profile:
Oi—0 to 22 centimeters; peat
A—22 to 27 centimeters; silt loam
Cgjj—27 to 60 centimeters; stony loam
Cf—60 to 152 centimeters; permanently frozen stony loam

D31—Subalpine Scrub Silty Till Slopes

Landform: Mountains
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): East to west (clockwise)
Slope range: 5 to 40 percent
Parent material: Organic material over loess over gravelly till

Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 11 centimeters)
Land capability subclass (nonirrigated): 4w
Ecological site: Subalpine Scrub Loamy Hummock (R231XY148AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryorthents
Typical profile:
O—0 to 10 centimeters; slightly decomposed plant material
A—10 to 21 centimeters; silt loam
2BC—21 to 37 centimeters; very stony sandy loam
2C—37 to 152 centimeters; very stony sandy loam

Minor Components

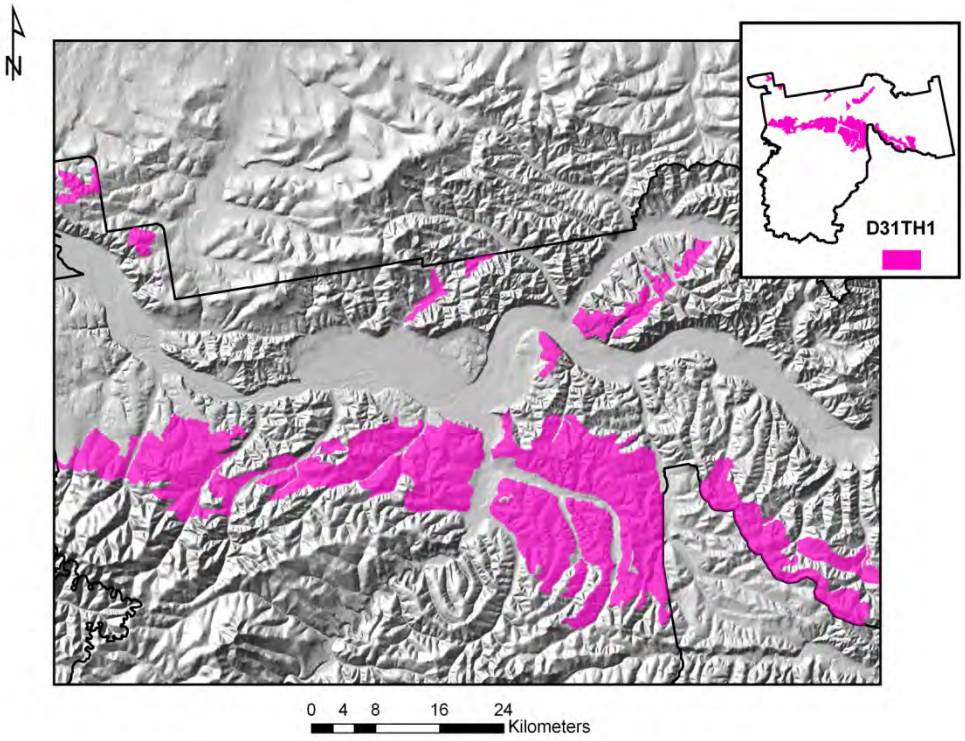
D31—Subalpine Scrub Rocky Drainages

Percentage of map unit: 8 percent
Slope: 1 to 20 percent
Landform: Drainageways
Ecological site: Subalpine Scrub Loamy Drainages (R231XY152AK)
Hydric soil status: Hydric

D31—Subalpine Grass Organic Swales

Percentage of map unit: 6 percent
Slope: 0 to 5 percent
Landform: Hills
Ecological site: Subalpine Graminoid Peat Swale (R231XY149AK)
Hydric soil status: Hydric

D31TH1—Boreal Hills with Extensive Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 200 to 1,000 meters
Mean annual precipitation: 242 to 705 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga silty colluvial slopes, frozen: 28 percent
D31—Boreal taiga organic eolian slopes, frozen: 22 percent
D31—Boreal taiga gravelly colluvial slopes: 19 percent
D31—Boreal woodland silty eolian slopes, frozen: 17 percent
Dissimilar minor components: 14 percent

D31—Boreal Taiga Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 5 to 50 percent
Parent material: Organic material over silty colluvium
Depth to restrictive feature: 50 to 100 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 11.6 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
C—28 to 60 centimeters; silt loam
Cf—60 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over silty cryoturbate

Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Gravelly Colluvial Slopes

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): East
Aspect (range): North to south (clockwise)
Slope range: 10 to 50 percent
Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Moderate (about 17 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: Picea mariana-Betula neoalaskana/Vaccinium uliginosum/Cladonia (F231XY162AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Typical profile:
O—0 to 4 centimeters; slightly decomposed plant material
A—4 to 8 centimeters; silt loam

Bw—8 to 36 centimeters; gravelly sandy loam
C—36 to 152 centimeters; extremely gravelly loamy very fine sand

D31—Boreal Woodland Silty Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): North
Aspect (range): Southwest to east (clockwise)
Slope range: 10 to 75 percent
Parent material: Mossy organic material over gravelly cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 8.2 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, acid, subgelic Typic Histoturbels
Typical profile:
Oi—0 to 25 centimeters; peat
Cjj—25 to 50 centimeters; gravelly silt loam
Cf—50 to 152 centimeters; permanently frozen very gravelly sandy loam

Minor Components

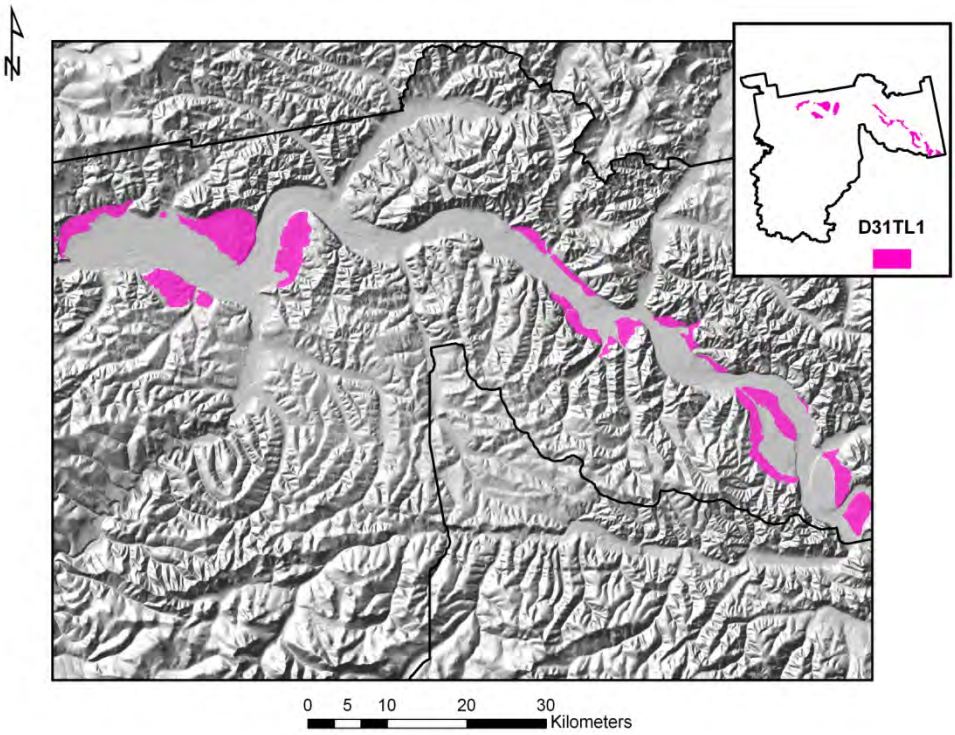
D31—Boreal Forest Loamy Depressions, Frozen

Percentage of map unit: 8 percent
Slope: 20 to 55 percent
Landform: Hills
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric

D31—Boreal Taiga Silty Drainages, Frozen

Percentage of map unit: 6 percent
Slope: 1 to 15 percent
Landform: Drainageways
Ecological site: Picea mariana/Salix-Ledum groenlandicum (F231XY193AK)
Hydric soil status: Hydric

D31TL1—Boreal Eolian Plains with Extensive Permafrost, Moist



Major land resource area: 231—Interior Alaska Highlands
Elevation: 200 to 900 meters
Mean annual precipitation: 242 to 705 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal taiga organic eolian slopes, frozen: 44 percent
D31—Boreal taiga silty eolian slopes, frozen: 39 percent
Dissimilar minor components: 17 percent

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: *Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii* (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Silty Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Shoulders
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over loamy cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates

Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 10.7 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haploturbels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
Cjj—28 to 53 centimeters; silt loam
Cf—53 to 152 centimeters; permanently frozen silt loam

Minor Components

D31—Boreal Forest Loamy Colluvial Slopes

Percentage of map unit: 10 percent
Slope: 5 to 35 percent
Landform: Escarpments
Ecological site: Picea glauca/Alnus-Rosa acicularis (F231XY117AK)
Hydric soil status: Not hydric

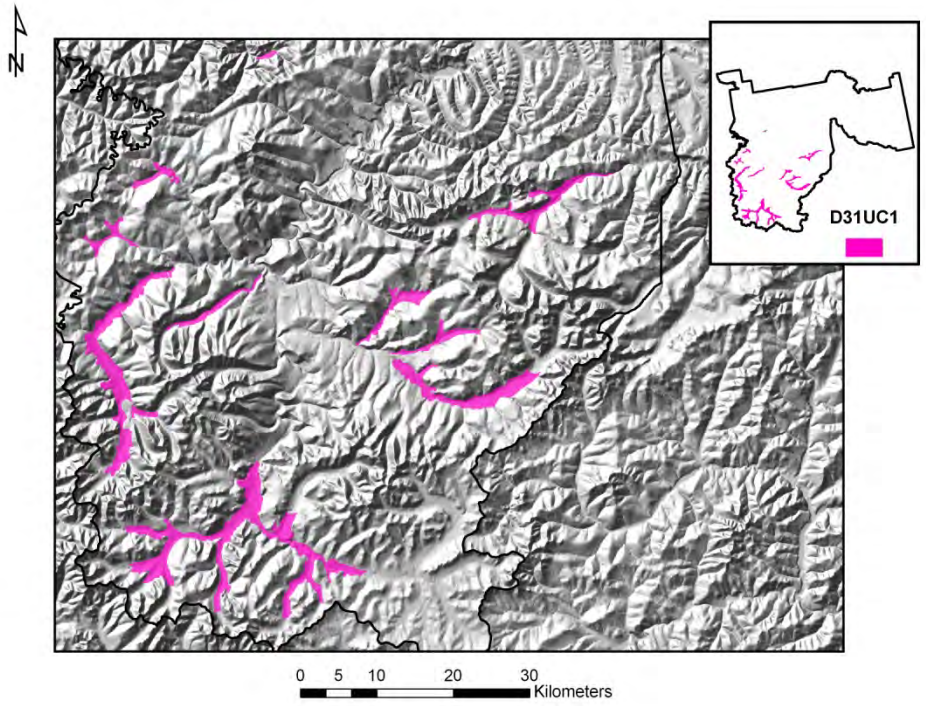
D31—Boreal Taiga Gravelly Drainages

Percentage of map unit: 4 percent
Slope: 5 to 80 percent
Landform: Drainageways
Ecological site: Picea mariana/Alnus viridis ssp. fruticosa/Calamagrostis canadensis (F231XY192AK)
Hydric soil status: Not hydric

D31—Boreal Moss Organic Depressions

Percentage of map unit: 3 percent
Slope: 0 to 1 percent
Landform: Loess plains
Ecological site: Boreal Moss Peat Plain (R231XY150AK)
Hydric soil status: Hydric

D31UC1—Boreal Eolian Hills with Common Permafrost, Wet



Major land resource area: 231—Interior Alaska Highlands
Elevation: 100 to 2,000 meters
Mean annual precipitation: 233 to 783 millimeters
Mean annual air temperature: -6 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal tussock organic plains, frozen: 42 percent
D31—Boreal taiga organic eolian slopes, frozen: 24 percent
D31—Boreal forest loamy high flood plains: 21 percent
Dissimilar minor components: 13 percent

D31—Boreal Tussock Organic Plains, Frozen

Landform: Plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 20 percent
Parent material: Organic material over loess over loamy cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 11.9 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Boreal Tussock Peat Plains (R231XY128AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, dysic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 41 centimeters; peat
A—41 to 49 centimeters; silt loam
Cjj—49 to 56 centimeters; loam
Cf—56 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Organic Eolian Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Footslopes, toeslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): North
Aspect (range): Northwest to south (clockwise)
Slope range: 1 to 40 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 40 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)

Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii (F231XY118AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 48 centimeters; silt loam
Cf—48 to 152 centimeters; permanently frozen silt loam

D31—Boreal Forest Loamy High Flood Plains

Landform: High flood plains
Downslope shape: Convex
Across-slope shape: Convex
Slope range: 1 to 10 percent
Parent material: Organic material over sandy and gravelly alluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 3 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: Rare
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 11.9 centimeters)
Land capability subclass (nonirrigated): 4c
Ecological site: Picea glauca/Rosa acicularis/Lupinus arcticus (F231XY131AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Sandy or sandy-skeletal, mixed Typic Cryorthents
Typical profile:
O—0 to 13 centimeters; slightly decomposed plant material
A—13 to 18 centimeters; sandy loam
C—18 to 152 centimeters; stratified very gravelly loamy coarse sand to gravelly sandy loam

Minor Components

D31—Boreal Woodland Rocky Low Flood Plains

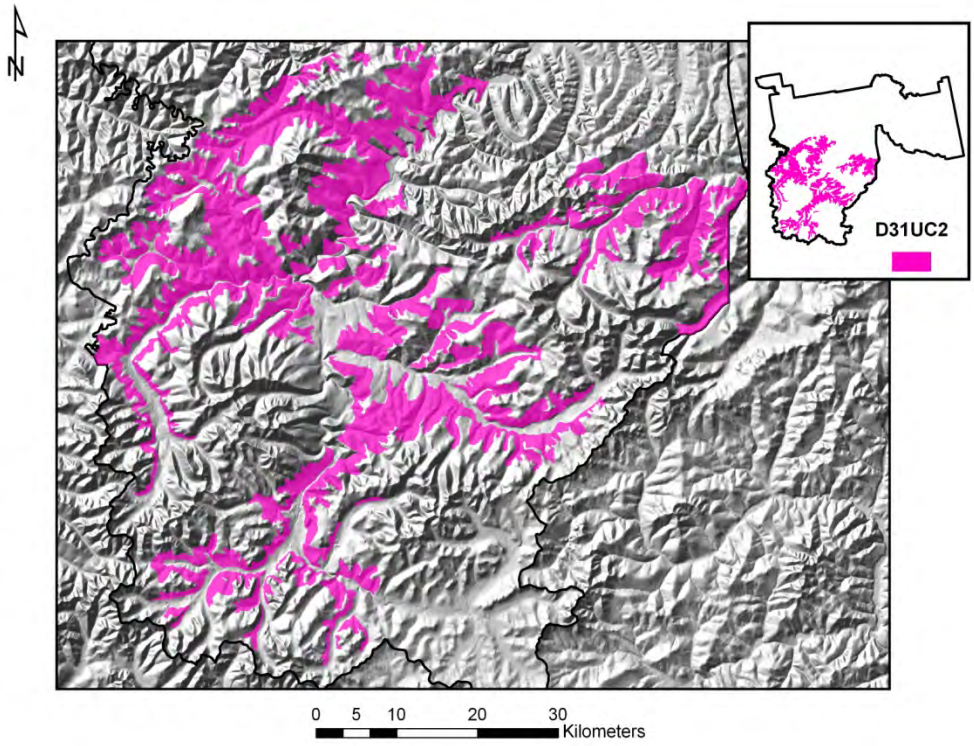
Percentage of map unit: 9 percent
Slope: 1 to 5 percent
Landform: Low flood plains

Ecological site: Populus balsamifera/Salix alaxensis/Calamagrostis canadensis (F231XY130AK)
Hydric soil status: Not hydric

D31—Boreal Water, Flowing

Percentage of map unit: 4 percent
Slope: 0 to 2 percent
Ecological site: Boreal Water, Non-Vegetated (R231XY194AK)
Hydric soil status: Not rated

D31UC2—Subalpine and Boreal Hills



Major land resource area: 231—Interior Alaska Highlands
Elevation: 307 to 1,300 meters
Mean annual precipitation: 244 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Subalpine woodland silty colluvial slopes, frozen: 40 percent
D31—Boreal forest gravelly colluvial slopes, frozen: 31 percent
Dissimilar minor components: 29 percent

D31—Subalpine Woodland Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear, concave
Aspect (representative): West
Aspect (range): South to northeast (clockwise)
Slope range: 15 to 65 percent
Parent material: Organic material over loess over gravelly colluvium
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 13.5 centimeters)
Land capability subclass (nonirrigated): 7e
Ecological site: *Picea glauca/Salix-Vaccinium uliginosum* (F231XY184AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 30 centimeters; silt loam
C—30 to 64 centimeters; gravelly sandy loam
Cf—64 to 152 centimeters; permanently frozen very gravelly sandy loam

D31—Boreal Forest Gravelly Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northeast
Aspect (range): North to south (clockwise)
Slope range: 15 to 65 percent

Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: 50 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1 millimho per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 5 to 25 centimeters (perched)
Available water capacity (entire profile): Low (about 8.9 centimeters)
Land capability subclass (nonirrigated): 6e
Ecological site: *Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum* (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 26 centimeters; silt loam
C—26 to 58 centimeters; very gravelly fine sandy loam
Cf—58 to 152 centimeters; permanently frozen extremely stony sandy loam

Minor Components

D31—Subalpine Woodland Rocky Colluvial Slopes, Cold

Percentage of map unit: 13 percent
Slope: 5 to 70 percent
Landform: Mountains
Ecological site: *Picea mariana/Betula glandulosa* (F231XY124AK)
Hydric soil status: Not hydric

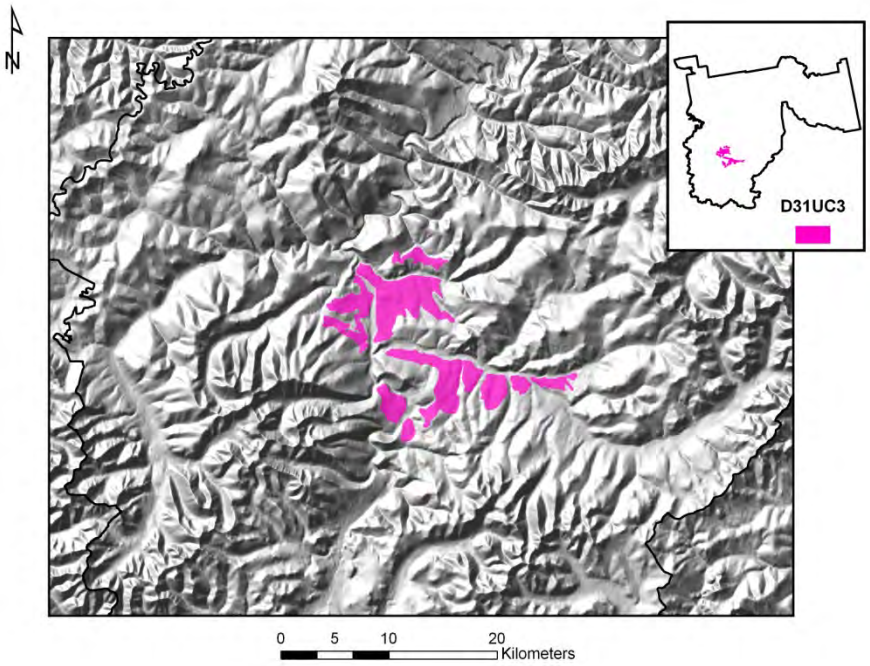
D31—Subalpine Scrub Loamy Colluvial Slopes, Frozen

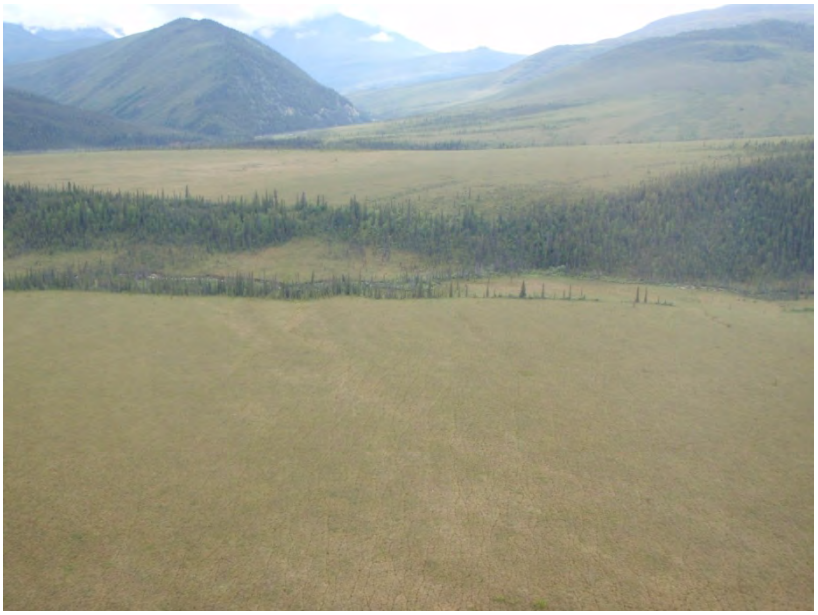
Percentage of map unit: 10 percent
Slope: 5 to 25 percent
Landform: Hills
Ecological site: Subalpine Scrub Loamy Frozen Circles (R231XY129AK)
Hydric soil status: Hydric

D31—Boreal Scrub Rocky Drainages

Percentage of map unit: 6 percent
Slope: 3 to 20 percent
Landform: Drainageways
Ecological site: Boreal Scrub Gravelly Drainages (R231XY195AK)
Hydric soil status: Not hydric

D31UC3—Boreal Plains with Extensive Permafrost





Major land resource area: 231—Interior Alaska Highlands
Elevation: 200 to 1,050 meters
Mean annual precipitation: 245 to 783 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Map Unit Composition

D31—Boreal tussock organic plains, frozen: 65 percent
D31—Boreal taiga silty colluvial slopes, frozen: 18 percent
Dissimilar minor components: 17 percent

D31—Boreal Tussock Organic Plains, Frozen

Landform: Plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 10 percent
Parent material: Organic material over loess over loamy cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 11.9 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Boreal Tussock Peat Plains (R231XY128AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, dysic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 41 centimeters; peat
A—41 to 49 centimeters; silt loam
Cjj—49 to 56 centimeters; loam
Cf—56 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Silty Colluvial Slopes, Frozen

Landform: Hills
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northwest
Aspect (range): Southwest to northeast (clockwise)
Slope range: 5 to 50 percent
Parent material: Organic material over silty colluvium
Depth to restrictive feature: 50 to 100 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic

Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 40 to 60 centimeters (perched)
Available water capacity (entire profile): Low (about 11.6 centimeters)
Land capability subclass (nonirrigated): 6s
Ecological site: Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum (F231XY111AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
A—21 to 28 centimeters; silt loam
C—28 to 60 centimeters; silt loam
Cf—60 to 152 centimeters; permanently frozen silt loam

Minor Components

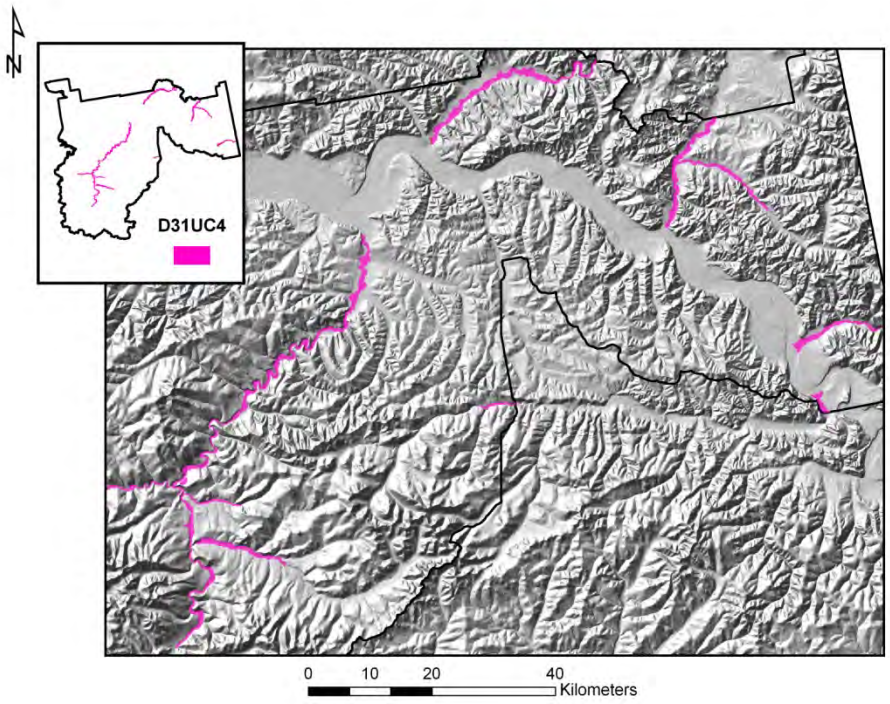
D31—Boreal Taiga Silty Drainages, Frozen

Percentage of map unit: 10 percent
Slope: 1 to 15 percent
Landform: Drainageways
Ecological site: Picea mariana/Salix-Ledum groenlandicum (F231XY193AK)
Hydric soil status: Hydric

D31—Boreal Forest Rocky Colluvial Slopes

Percentage of map unit: 7 percent
Slope: 15 to 70 percent
Landform: Hills
Ecological site: Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis (F231XY182AK)
Hydric soil status: Not hydric

D31UC4—Boreal Flood Plains with Common Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 150 to 810 meters
Mean annual precipitation: 233 to 705 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal woodland rocky low flood plains: 32 percent
D31—Boreal forest loamy high flood plains: 25 percent
Dissimilar minor components: 43 percent

D31—Boreal Woodland Rocky Low Flood Plains

Landform: Low flood plains
Downslope shape: Linear
Across-slope shape: Convex
Slope range: 1 to 5 percent
Parent material: Sandy and gravelly alluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): High
Natural drainage class: Moderately well drained
Flooding frequency: Frequent
Ponding frequency: None
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Very low (about 5.2 centimeters)
Land capability subclass (nonirrigated): 6w
Ecological site: Populus balsamifera/Salix alaxensis/Calamagrostis canadensis (F231XY130AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Sandy or sandy-skeletal, mixed Typic Cryorthents
Typical profile:
C1—0 to 30 centimeters; very cobbly coarse sandy loam
C2—30 to 152 centimeters; extremely gravelly loamy coarse sand

D31—Boreal Forest Loamy High Flood Plains

Landform: High flood plains
Downslope shape: Convex
Across-slope shape: Convex
Slope range: 1 to 12 percent
Parent material: Organic material over sandy and gravelly alluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 3 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: Rare

Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 11.9 centimeters)
Land capability subclass (nonirrigated): 4c
Ecological site: *Picea glauca/Rosa acicularis/Lupinus arcticus* (F231XY131AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Sandy or sandy-skeletal, mixed Typic Cryorthents
Typical profile:
O—0 to 13 centimeters; slightly decomposed plant material
A—13 to 18 centimeters; sandy loam
C—18 to 152 centimeters; stratified very gravelly loamy coarse sand to gravelly sandy loam

Minor Components

D31—Boreal Taiga/Tussock Organic Terraces, Frozen

Percentage of map unit: 13 percent
Slope: 0 to 25 percent
Landform: Terraces
Ecological site: *Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum* (F231XY169AK)
Hydric soil status: Hydric

D31—Boreal Scrub Organic Depressions

Percentage of map unit: 11 percent
Slope: 0 to 5 percent
Landform: Terraces
Ecological site: Boreal Scrub Peat Floodplain (R231XY137AK)
Hydric soil status: Hydric

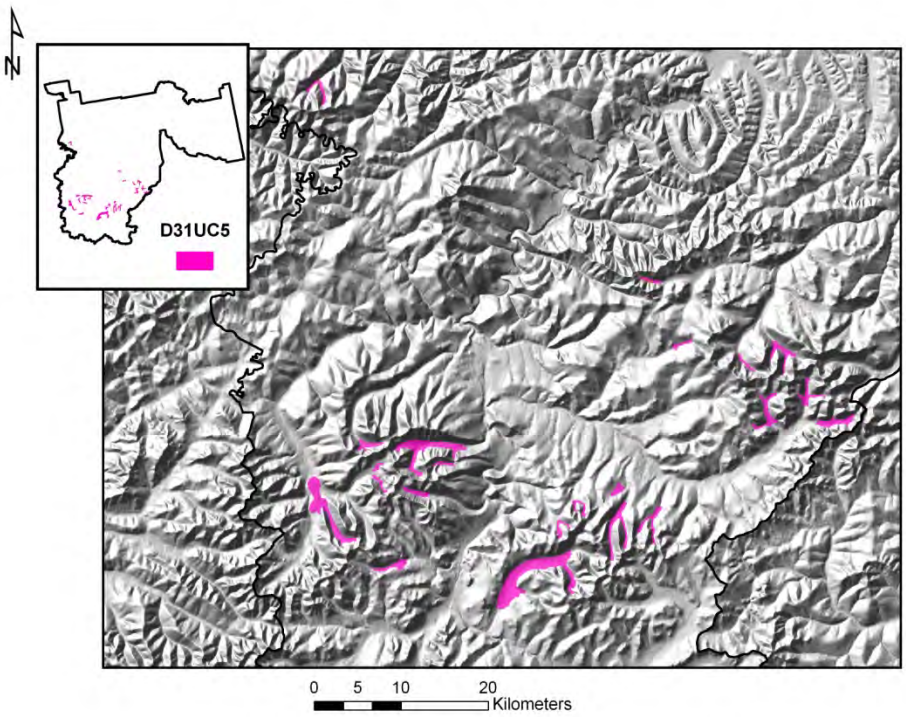
D31—Boreal Riverwash

Percentage of map unit: 10 percent
Slope: 0 to 5 percent
Landform: Very low flood plains
Ecological site: Boreal Gravelly Floodplain, Non-Vegetated (R231XY126AK)
Hydric soil status: Not hydric

D31—Boreal Forest Loamy High Flood Plains, Frozen

Percentage of map unit: 9 percent
Slope: 1 to 3 percent
Landform: High flood plains
Ecological site: *Picea glauca/Alnus viridis ssp. fruticosa* (F231XY151AK)
Hydric soil status: Not hydric

D31UC5—Alpine Glaciated Mountains



Major land resource area: 231—Interior Alaska Highlands
Elevation: 800 to 1,800 meters
Mean annual precipitation: 288 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 50 to 80 days

Map Unit Composition

D31—Subalpine scrub silty till slopes: 35 percent
D31—Alpine scrub gravelly circles, acid: 30 percent
Dissimilar minor components: 35 percent

D31—Subalpine Scrub Silty Till Slopes

Landform: Mountains
Landform position (two-dimensional): Backslopes
Landform position (three-dimensional): Side slopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): South
Aspect (range): East to west (clockwise)
Slope range: 5 to 40 percent
Parent material: Organic material over loess over gravelly till
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 11 centimeters)
Land capability subclass (nonirrigated): 4w
Ecological site: Subalpine Scrub Loamy Hummock (R231XY148AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryorthents
Typical profile:
O—0 to 10 centimeters; slightly decomposed plant material
A—10 to 21 centimeters; silt loam
2BC—21 to 37 centimeters; very stony sandy loam
2C—37 to 152 centimeters; very stony sandy loam

D31—Alpine Scrub Gravelly Circles, Acid

Landform: Mountains
Landform position (two-dimensional): Summits, footslopes
Landform position (three-dimensional): Base slopes, crests
Downslope shape: Convex
Across-slope shape: Convex
Aspect (representative): South
Aspect (range): East to northwest (clockwise)
Slope range: 1 to 15 percent
Parent material: Organic material over gravelly cryoturbate

Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Somewhat excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not present within a depth of 160 centimeters
Available water capacity (entire profile): Low (about 13.3 centimeters)
Land capability subclass (nonirrigated): 4c
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock (R231XY101AK)
Hydric soil status: Not hydric
Hydrologic soil group: A
Soil classification: Loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts
Typical profile:
O—0 to 3 centimeters; slightly decomposed plant material
A—3 to 12 centimeters; silt loam
Bw—12 to 35 centimeters; very gravelly sandy loam
C—35 to 152 centimeters; very cobbly sandy loam

Minor Components

D31—Alpine Scrub Loamy Hummocks, Frozen

Percentage of map unit: 13 percent
Slope: 1 to 20 percent
Landform: Mountains
Ecological site: Alpine Dwarf Scrub-Lichen Mosaic Peat Hummock (R231XY114AK)
Hydric soil status: Not hydric

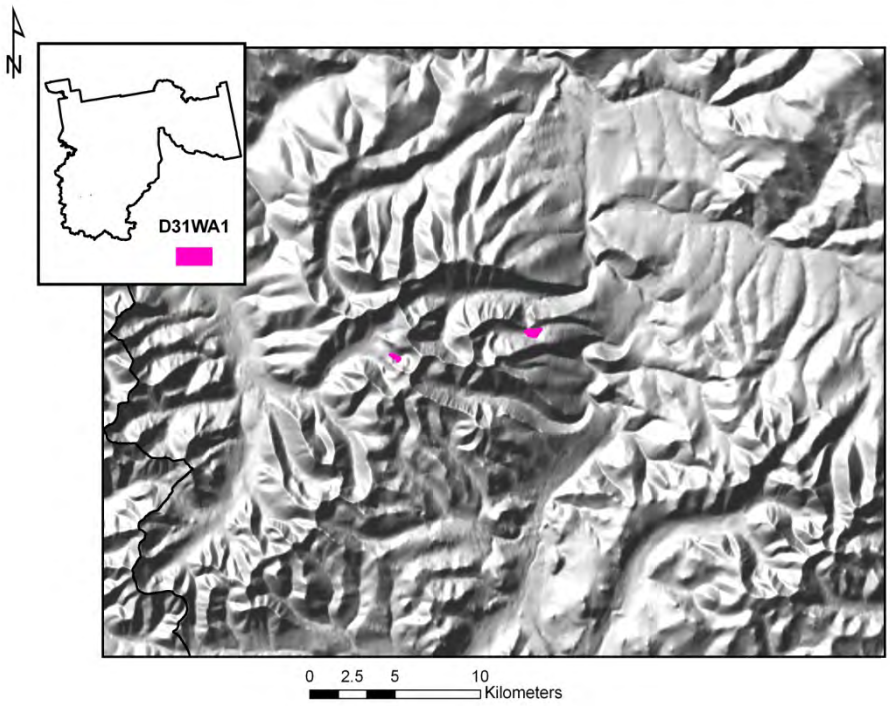
D31—Subalpine Tussock-Scrub Loamy Colluvial Slopes, Frozen

Percentage of map unit: 12 percent
Slope: 1 to 20 percent
Landform: Mountains
Ecological site: Subalpine Scrub-Tussock Loamy Frozen Hummock (R231XY185AK)
Hydric soil status: Hydric

D31—Subalpine Scrub Rocky Drainages

Percentage of map unit: 10 percent
Slope: 1 to 20 percent
Landform: Drainageways
Ecological site: Subalpine Scrub Loamy Drainages (R231XY152AK)
Hydric soil status: Hydric

D31WA1—Alpine and Subalpine Water



Major land resource area: 231—Interior Alaska Highlands
Elevation: 610 to 2,000 meters
Mean annual precipitation: 233 to 824 millimeters
Mean annual air temperature: -7 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Alpine water, ponded: 95 percent
Dissimilar minor component: 5 percent

D31—Alpine Water, Ponded

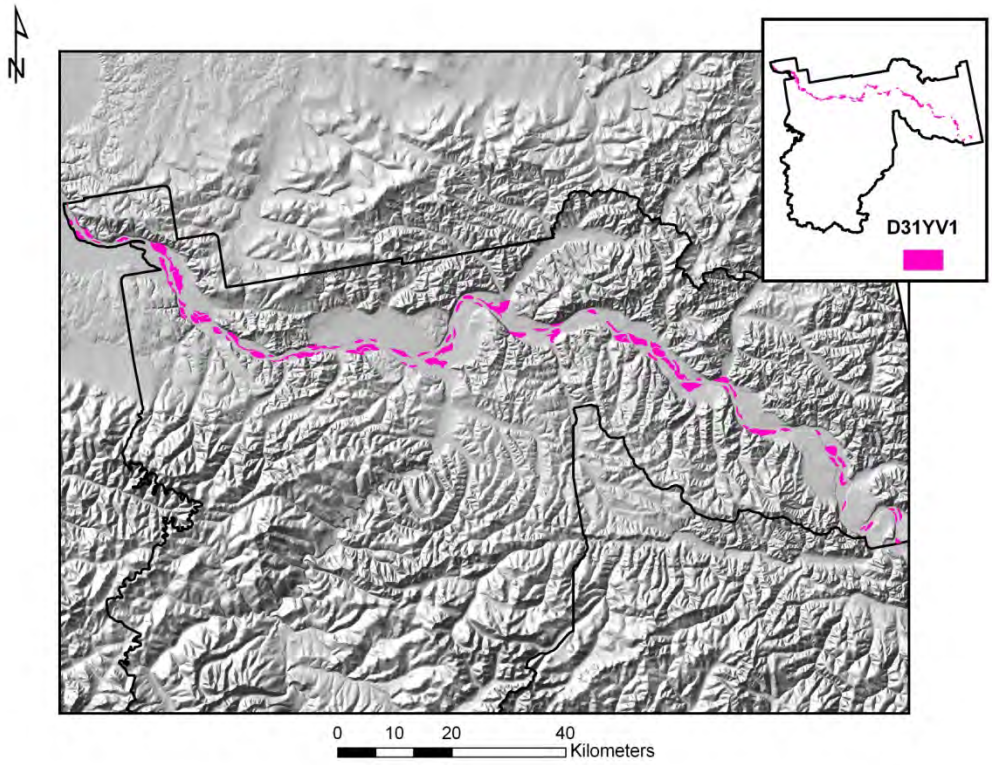
Slope range: 0 to 2 percent
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Unspecified
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not applicable
Land capability subclass (nonirrigated): 8w
Ecological site: Boreal Water, Non-Vegetated (R231XY194AK)
Hydric soil status: Not rated
Hydrologic soil group: D
Typical profile:
W—0 to 152 centimeters; water

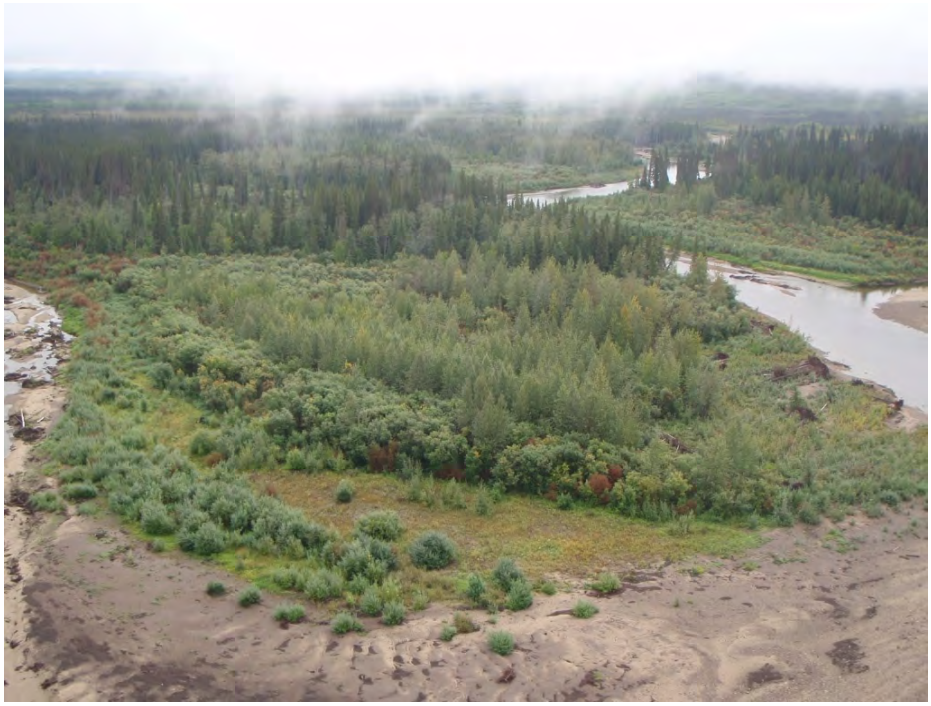
Minor Component

D31—Subalpine Scrub Rocky Drainages

Percentage of map unit: 5 percent
Slope: 1 to 20 percent
Landform: Drainageways
Ecological site: Subalpine Scrub Loamy Drainages (R231XY152AK)
Hydric soil status: Hydric

D31YV1—Boreal Flood Plains, Wet





Major land resource area: 231—Interior Alaska Highlands
Elevation: 150 to 620 meters
Mean annual precipitation: 233 to 539 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal forest loamy mid flood plains: 36 percent
D31—Boreal taiga loamy high flood plains, frozen: 32 percent
D31—Boreal scrub sandy low flood plains: 26 percent
Dissimilar minor component: 6 percent

D31—Boreal Forest Loamy Mid Flood Plains

Landform: Mid flood plains
Landform position (three-dimensional): Treads
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 1 to 15 percent
Parent material: Organic material over loamy alluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 1 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: Occasional
Ponding frequency: None
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Very high (about 37.8 centimeters)
Land capability subclass (nonirrigated): 4w
Ecological site: Populus balsamifera (F231XY189AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents
Typical profile:
O—0 to 5 centimeters; slightly decomposed plant material
C1—5 to 76 centimeters; stratified loamy sand to sandy loam
C2—76 to 152 centimeters; stratified loamy sand to sandy loam

D31—Boreal Taiga Loamy High Flood Plains, Frozen

Landform: High flood plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 20 percent
Parent material: Organic material over loamy alluvium
Depth to restrictive feature: 50 to 120 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low

Natural drainage class: Somewhat poorly drained
Flooding frequency: Rare
Ponding frequency: None
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Moderate (about 18.8 centimeters)
Land capability subclass (nonirrigated): 4s
Ecological site: *Picea glauca* (F231XY196AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels
Typical profile:
Oi—0 to 9 centimeters; slightly decomposed plant material
C—9 to 77 centimeters; stratified sandy loam to silt loam
Cf—77 to 152 centimeters; stratified permanently frozen sandy loam to silt loam

D31—Boreal Scrub Sandy Low Flood Plains

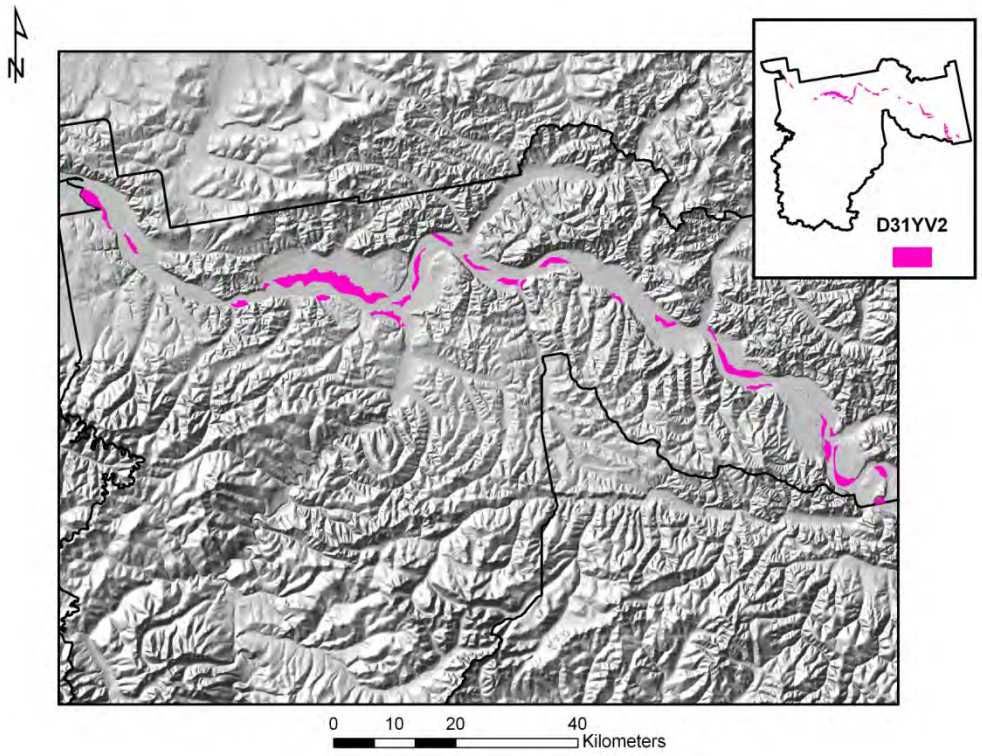
Landform: Low flood plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Loamy alluvium
Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Slightly saline (about 4.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: 1 percent
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Well drained
Flooding frequency: Frequent
Ponding frequency: None
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Very high (about 32.7 centimeters)
Land capability subclass (nonirrigated): 5w
Ecological site: Boreal Scrub Sandy Floodplain, Low (R231XY198AK)
Hydric soil status: Not hydric
Hydrologic soil group: C
Soil classification: Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents
Typical profile:
C1—0 to 78 centimeters; stratified loamy sand to sandy loam
C2—78 to 152 centimeters; stratified gravelly sandy loam to fine sandy loam

Minor Component

D31—Boreal Riverwash

Percentage of map unit: 6 percent
Slope: 0 to 5 percent
Landform: Very low flood plains
Ecological site: Boreal Gravelly Floodplain, Non-Vegetated (R231XY126AK)
Hydric soil status: Not hydric

D31YV2—Boreal Terraces and Flood Plains with Common Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 100 to 2,000 meters
Mean annual precipitation: 233 to 705 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal taiga/tussock organic terraces, frozen: 55 percent
D31—Boreal taiga loamy high flood plains, frozen: 32 percent
Dissimilar minor components: 13 percent

D31—Boreal Taiga/Tussock Organic Terraces, Frozen

Landform: Terraces
Landform position (three-dimensional): Treads
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 10.8 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum (F231XY169AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 54 centimeters; silt loam
Cjjf—54 to 152 centimeters; permanently frozen silt loam

D31—Boreal Taiga Loamy High Flood Plains, Frozen

Landform: High flood plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Organic material over loamy alluvium
Depth to restrictive feature: 50 to 120 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low

Natural drainage class: Somewhat poorly drained
Flooding frequency: Rare
Ponding frequency: None
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Moderate (about 18.8 centimeters)
Land capability subclass (nonirrigated): 4s
Ecological site: *Picea glauca* (F231XY196AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels
Typical profile:
Oi—0 to 9 centimeters; slightly decomposed plant material
C—9 to 77 centimeters; stratified sandy loam to silt loam
Cf—77 to 152 centimeters; stratified permanently frozen sandy loam to silt loam

Minor Components

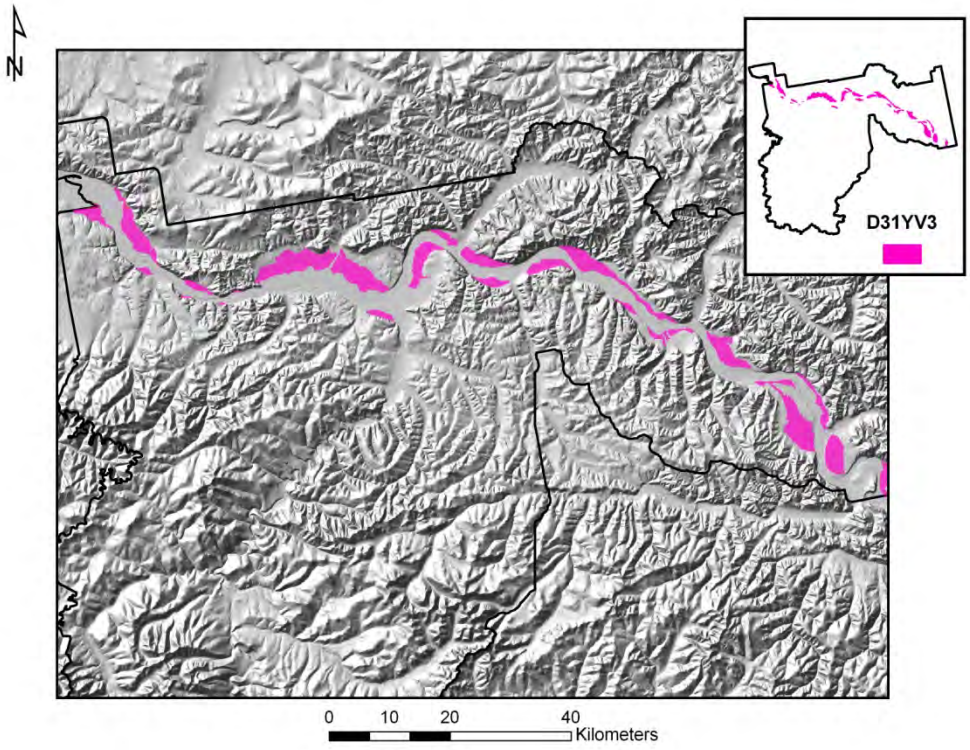
D31—Boreal Water, Ponded

Percentage of map unit: 7 percent
Slope: 0 to 2 percent
Ecological site: Boreal Water, Non-Vegetated (R231XY194AK)
Hydric soil status: Not rated

D31—Boreal Scrub Organic Depressions

Percentage of map unit: 6 percent
Slope: 0 to 5 percent
Landform: Terraces
Ecological site: Boreal Scrub Peat Floodplain (R231XY137AK)
Hydric soil status: Hydric

D31YV3—Boreal Terraces with Extensive Permafrost



Major land resource area: 231—Interior Alaska Highlands
Elevation: 200 to 600 meters
Mean annual precipitation: 234 to 539 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal taiga/tussock organic terraces, frozen: 90 percent
Dissimilar minor component: 10 percent

D31—Boreal Taiga/Tussock Organic Terraces, Frozen

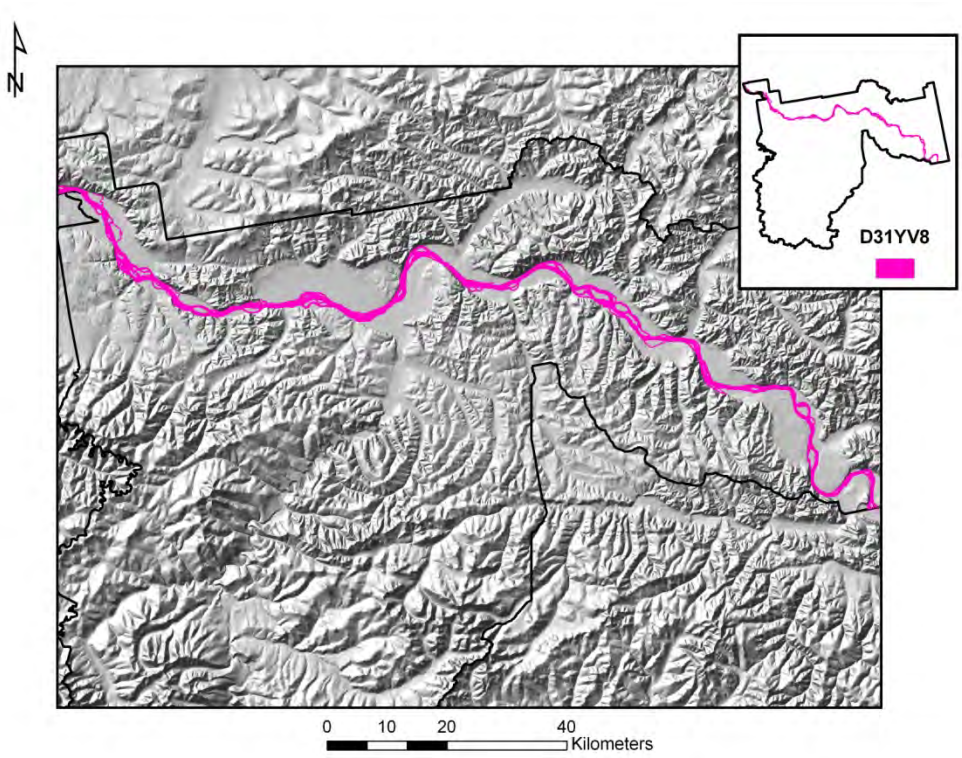
Landform: Terraces
Landform position (three-dimensional): Treads
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 10.8 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum (F231XY169AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 42 centimeters; peat
Cjj—42 to 54 centimeters; silt loam
Cjjf—54 to 152 centimeters; permanently frozen silt loam

Minor Component

D31—Boreal Grass Organic Depressions

Percentage of map unit: 10 percent
Slope: 0 to 1 percent
Landform: Terraces
Ecological site: Boreal Graminoid Peat Terrace, Depression (R231XY199AK)
Hydric soil status: Hydric

D31YV8—Boreal Low Flood Plains



Major land resource area: 231—Interior Alaska Highlands
Elevation: 100 to 2,000 meters
Mean annual precipitation: 233 to 705 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal water, flowing: 70 percent
Dissimilar minor components: 30 percent

D31—Boreal Water, Flowing

Slope range: 0 to 2 percent
Depth to restrictive feature: None within a depth of 150 centimeters
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Unspecified
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: Not applicable
Land capability subclass (nonirrigated): 8w
Ecological site: Boreal Water, Non-Vegetated (R231XY194AK)
Hydric soil status: Not rated
Hydrologic soil group: D
Typical profile:
W—0 to 152 centimeters; water

Minor Components

D31—Boreal Scrub Sandy Low Flood Plains

Percentage of map unit: 14 percent
Slope: 0 to 10 percent
Landform: Low flood plains
Ecological site: Boreal Scrub Sandy Floodplain, Low (R231XY198AK)
Hydric soil status: Not hydric

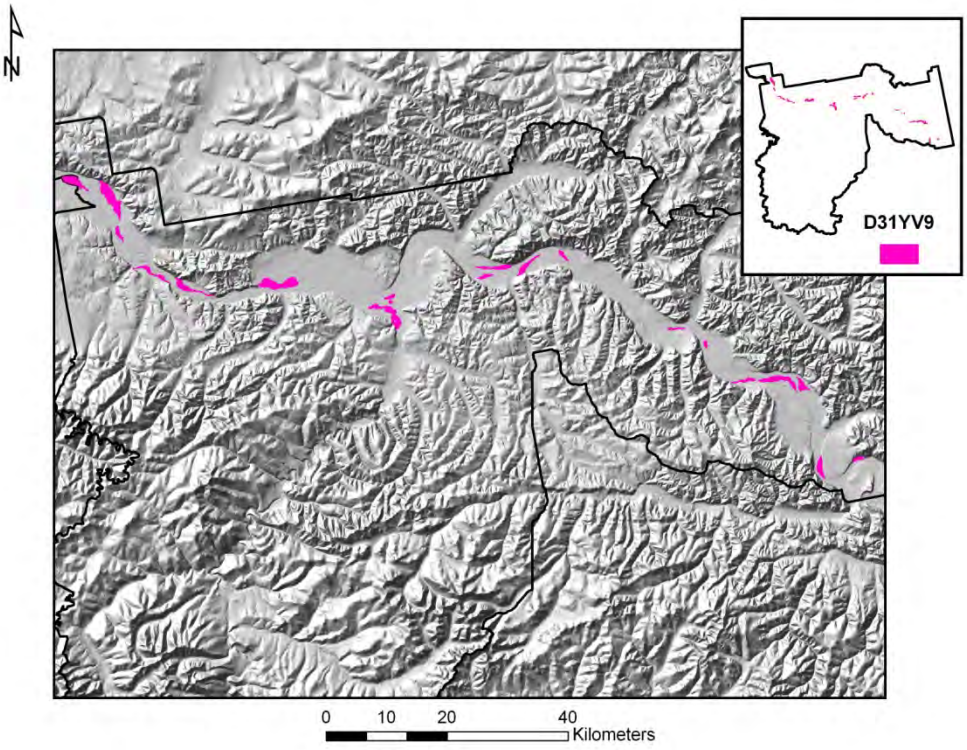
D31—Boreal Riverwash

Percentage of map unit: 10 percent
Slope: 0 to 5 percent
Landform: Very low flood plains
Ecological site: Boreal Gravelly Floodplain, Non-Vegetated (R231XY126AK)
Hydric soil status: Not hydric

D31—Boreal Forest Loamy Mid Flood Plains

Percentage of map unit: 6 percent
Slope: 1 to 5 percent
Landform: Mid flood plains
Ecological site: *Populus balsamifera* (F231XY189AK)
Hydric soil status: Not hydric

D31YV9—Boreal High Flood Plains



Major land resource area: 231—Interior Alaska Highlands
Elevation: 150 to 650 meters
Mean annual precipitation: 233 to 539 millimeters
Mean annual air temperature: -5 to -2 degrees C
Frost-free period: 50 to 110 days

Map Unit Composition

D31—Boreal taiga loamy high flood plains, frozen: 78 percent
Dissimilar minor components: 22 percent

D31—Boreal Taiga Loamy High Flood Plains, Frozen

Landform: High flood plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 10 percent
Parent material: Organic material over loamy alluvium
Depth to restrictive feature: 50 to 120 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Somewhat poorly drained
Flooding frequency: Rare
Ponding frequency: None
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Moderate (about 18.8 centimeters)
Land capability subclass (nonirrigated): 4s
Ecological site: *Picea glauca* (F231XY196AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels
Typical profile:
Oi—0 to 9 centimeters; slightly decomposed plant material
C—9 to 77 centimeters; stratified sandy loam to silt loam
Cf—77 to 152 centimeters; stratified, permanently frozen sandy loam to silt loam

Minor Components

D31—Boreal Scrub Sandy Low Flood Plains

Percentage of map unit: 11 percent
Slope: 0 to 10 percent
Landform: Low flood plains
Ecological site: Boreal Scrub Sandy Floodplain, Low (R231XY198AK)
Hydric soil status: Not hydric

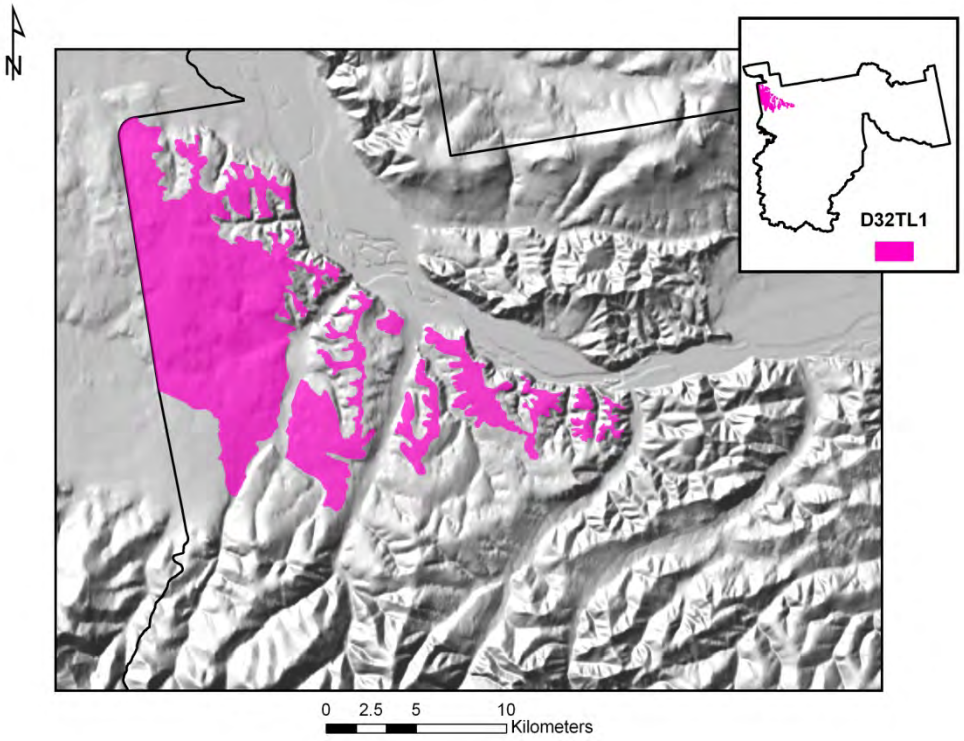
D31—Boreal Scrub Organic Depressions

Percentage of map unit: 7 percent
Slope: 0 to 5 percent
Landform: Terraces
Ecological site: Boreal Scrub Peat Floodplain (R231XY137AK)
Hydric soil status: Hydric

D31—Boreal Scrub Loamy Depressions

Percentage of map unit: 4 percent
Slope: 0 to 3 percent
Landform: Terraces
Ecological site: Boreal Scrub Loamy Depression (R231XY138AK)
Hydric soil status: Hydric

D32TL1—Boreal Eolian Plains with Common Permafrost



Major land resource area: 232—Yukon Flats Lowlands
Elevation: 200 to 515 meters
Mean annual precipitation: 233 to 344 millimeters
Mean annual air temperature: -5 to -3 degrees C
Frost-free period: 75 to 110 days

Map Unit Composition

D32—Boreal taiga organic plains, frozen: 79 percent
Dissimilar minor components: 21 percent

D32—Boreal Taiga Organic Plains, Frozen

Landform: Loess plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 8 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 50 to 100 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 1.5)
Salinity (maximum based on representative value): Nonsaline (about 1 millimho per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 12 centimeters)
Land capability subclass (nonirrigated): 5w
Ecological site: Picea mariana/Vaccinium uliginosum-Ledum groenlandicum (F232XY201AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 41 centimeters; peat
Cgjj—41 to 60 centimeters; silt loam
Cjjf—60 to 152 centimeters; permanently frozen silt loam

Minor Components

D32—Boreal Woodland Loamy Drainages, Frozen

Percentage of map unit: 9 percent
Slope: 1 to 5 percent
Landform: Drainageways
Ecological site: Picea mariana/Salix pulchra-Alnus viridis ssp. fruticosa (F232XY203AK)
Hydric soil status: Hydric

D32—Boreal Forest Gravelly Escarpments, Frozen

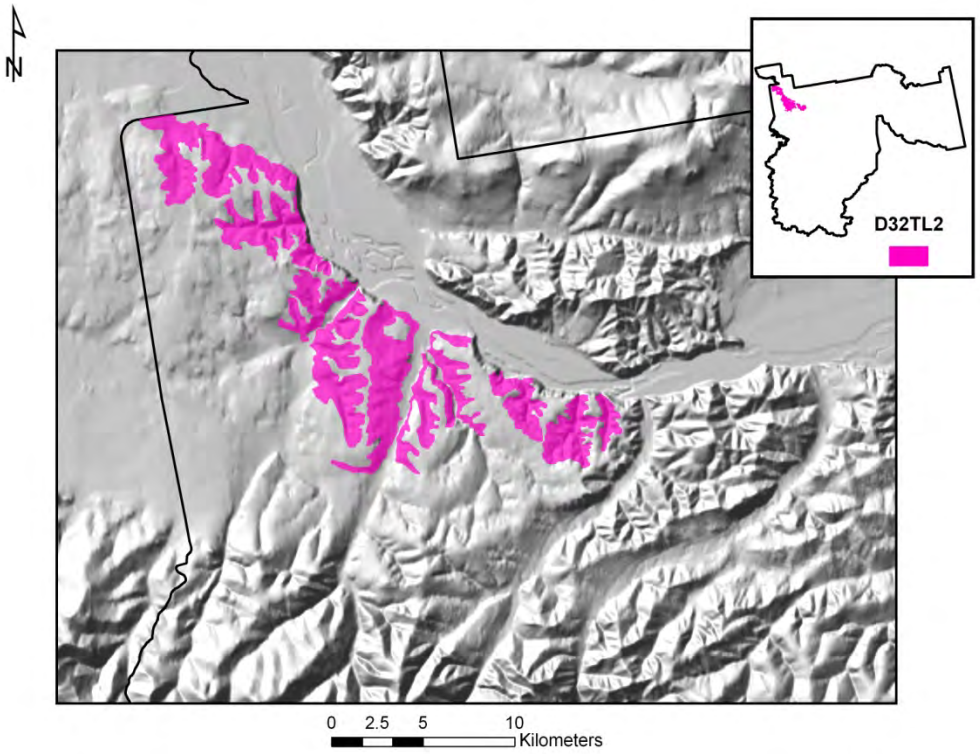
Percentage of map unit: 8 percent
Slope: 10 to 70 percent
Landform: Escarpments

Ecological site: *Picea glauca-Betula papyrifera/Alnus viridis ssp. fruticosa* (F232XY210AK)
Hydric soil status: Not hydric

D32—Boreal Moss Organic Depressions

Percentage of map unit: 4 percent
Slope: 0 percent
Landform: Loess plains
Ecological site: Boreal Moss Peat Depression (R232XY220AK)
Hydric soil status: Hydric

D32TL2—Boreal Escarpments with Common Permafrost



Major land resource area: 232—Yukon Flats Lowlands
Elevation: 200 to 515 meters
Mean annual precipitation: 233 to 344 millimeters
Mean annual air temperature: -5 to -3 degrees C
Frost-free period: 75 to 110 days

Map Unit Composition

D32—Boreal forest gravelly escarpments, frozen: 40 percent
D32—Boreal taiga loamy escarpment slopes: 30 percent
D32—Boreal taiga silty eolian slopes, frozen: 20 percent
Dissimilar minor components: 10 percent

D32—Boreal Forest Gravelly Escarpments, Frozen

Landform: Escarpments
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Northeast
Aspect (range): Southwest to south (clockwise)
Slope range: 10 to 70 percent
Parent material: Organic material over gravelly colluvium
Depth to restrictive feature: 45 to 90 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 2)
Salinity (maximum based on representative value): Very slightly saline (about 2 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Somewhat poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 9.5 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea glauca-Betula papyrifera/Alnus viridis ssp. fruticosa (F232XY210AK)
Hydric soil status: Not hydric
Hydrologic soil group: D
Soil classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Typical profile:
Oi—0 to 21 centimeters; slightly decomposed plant material
C—21 to 56 centimeters; gravelly very fine sandy loam
Cf—56 to 152 centimeters; permanently frozen very gravelly fine sandy loam

D32—Boreal Taiga Loamy Escarpment Slopes

Landform: Escarpments
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Linear
Aspect (representative): Southwest
Aspect (range): East to northwest (clockwise)
Slope range: 50 to 70 percent
Parent material: Sandy and gravelly colluvium

Depth to restrictive feature: None within a depth of 150 centimeters
Shrink-swell potential: Low (linear extensibility percentage about 1)
Salinity (maximum based on representative value): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Moderately high
Natural drainage class: Excessively drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 11.9 centimeters)
Land capability subclass (nonirrigated): 7s
Ecological site: Picea glauca/Shepherdia canadensis-Rosa acicularis (F232XY211AK)
Hydric soil status: Not hydric
Hydrologic soil group: B
Soil classification: Sandy or sandy-skeletal, mixed Typic Haplocryepts
Typical profile:
A—0 to 8 centimeters; loam
Bs—8 to 28 centimeters; loam
C—28 to 152 centimeters; very gravelly loamy coarse sand

D32—Boreal Taiga Silty Eolian Slopes, Frozen

Landform: Escarpments
Landform position (two-dimensional): Backslopes
Downslope shape: Linear
Across-slope shape: Concave
Aspect (representative): Southeast
Aspect (range): Northeast to west (clockwise)
Slope range: 10 to 20 percent
Parent material: Organic material over loamy colluvium
Depth to restrictive feature: 50 to 120 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 1.5)
Salinity (maximum based on representative value): Nonsaline (about 1 millimho per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Somewhat poorly drained
Flooding frequency: None
Ponding frequency: None
Depth to seasonal water table: About 2 to 20 centimeters (perched)
Available water capacity (entire profile): Low (about 12.8 centimeters)
Land capability subclass (nonirrigated): 4s
Ecological site: Picea mariana/Alnus viridis ssp. fruticosa-Ledum groenlandicum (F232XY227AK)
Hydric soil status: Not hydric
Hydrologic soil group: C
Soil classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Typic Haplorthels
Typical profile:
Oi—0 to 11 centimeters; slightly decomposed plant material
C—11 to 70 centimeters; silt loam
Cf—70 to 152 centimeters; permanently frozen silt loam

Minor Components

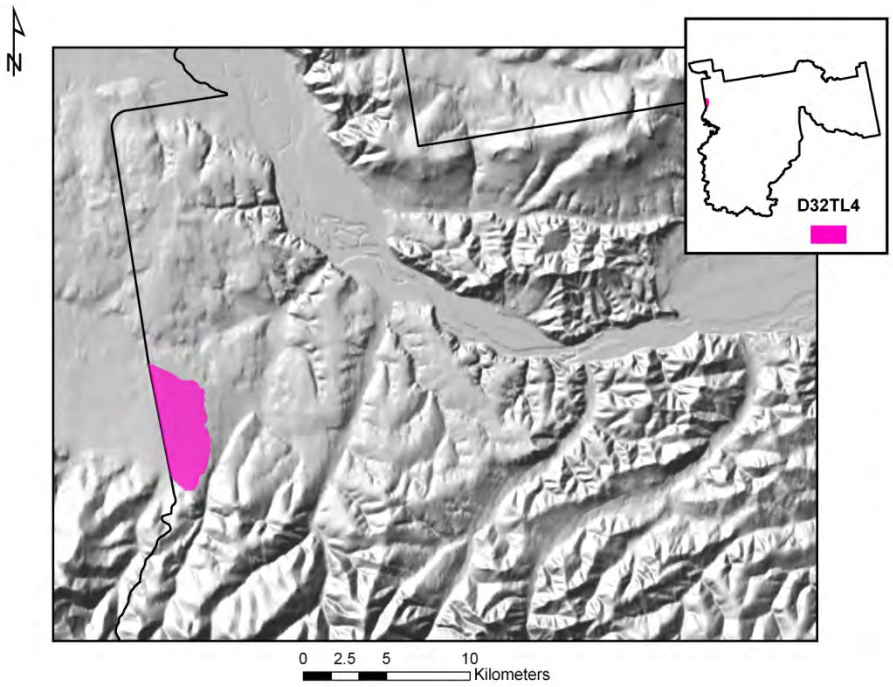
D32—Boreal Taiga Organic Plains, Frozen

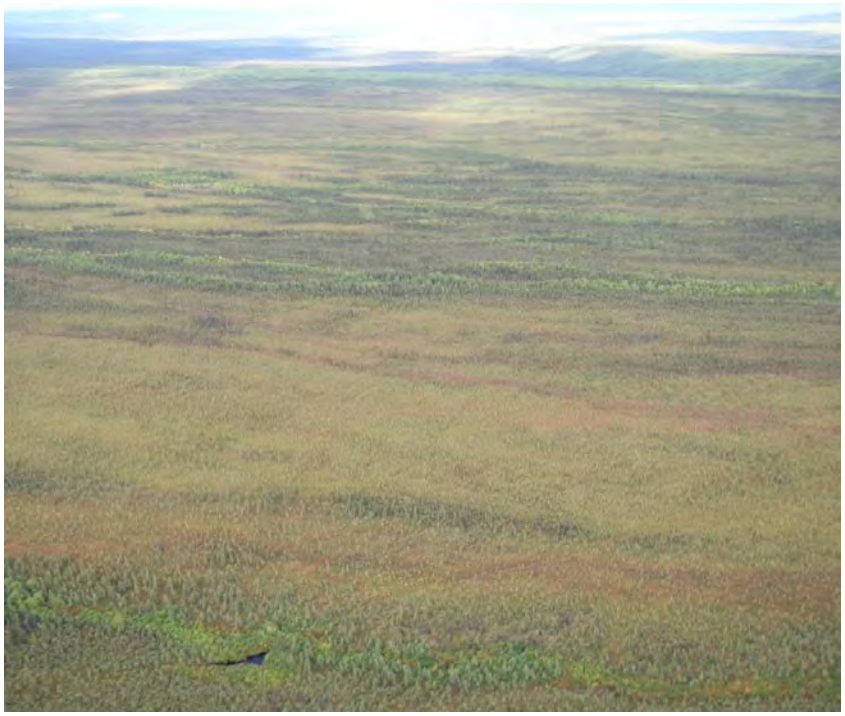
Percentage of map unit: 7 percent
Slope: 0 to 8 percent
Landform: Loess plains
Ecological site: Picea mariana/Vaccinium uliginosum-Ledum groenlandicum (F232XY201AK)
Hydric soil status: Hydric

D32—Boreal Woodland Loamy Drainages, Frozen

Percentage of map unit: 3 percent
Slope: 1 to 5 percent
Landform: Drainageways
Ecological site: Picea mariana/Salix pulchra-Alnus viridis ssp. fruticosa (F232XY203AK)
Hydric soil status: Hydric

D32TL4—Boreal Eolian Plains with Extensive Permafrost





Major land resource area: 232—Yukon Flats Lowlands
Elevation: 315 to 515 meters
Mean annual precipitation: 233 to 344 millimeters
Mean annual air temperature: -5 to -3 degrees C
Frost-free period: 75 to 110 days

Map Unit Composition

D32—Boreal taiga organic plains, frozen: 83 percent
Dissimilar minor components: 17 percent

D32—Boreal Taiga Organic Plains, Frozen

Landform: Loess plains
Downslope shape: Linear
Across-slope shape: Linear
Slope range: 0 to 8 percent
Parent material: Organic material over silty cryoturbate
Depth to restrictive feature: 50 to 100 centimeters to permafrost
Shrink-swell potential: Low (linear extensibility percentage about 1.5)
Salinity (maximum based on representative value): Nonsaline (about 1 millimho per centimeter)
Sodicity (maximum): Not sodic
Calcium carbonate equivalent: No carbonates
Slowest capacity to transmit water (Ksat): Very low
Natural drainage class: Very poorly drained
Flooding frequency: None
Ponding frequency: Frequent
Depth to seasonal water table: At the soil surface (perched)
Available water capacity (entire profile): Low (about 12 centimeters)
Land capability subclass (nonirrigated): 5w
Ecological site: Picea mariana/Vaccinium uliginosum-Ledum groenlandicum (F232XY201AK)
Hydric soil status: Hydric
Hydrologic soil group: D
Soil classification: Loamy, mixed, euic, subgelic Terric Fibristels
Typical profile:
Oi—0 to 41 centimeters; peat
Cgjj—41 to 60 centimeters; silt loam
Cjjf—60 to 152 centimeters; permanently frozen silt loam

Minor Components

D32—Boreal Woodland Loamy Drainages, Frozen

Percentage of map unit: 10 percent
Slope: 1 to 5 percent
Landform: Drainageways
Ecological site: Picea mariana/Salix pulchra-Alnus viridis ssp. fruticosa (F232XY203AK)
Hydric soil status: Hydric

D32—Boreal Moss Organic Depressions

Percentage of map unit: 7 percent
Slope: 0 percent
Landform: Loess plains
Ecological site: Boreal Moss Peat Depression (R232XY220AK)
Hydric soil status: Hydric

Ecological Sites

An ecological site is a basic unit of ecological land classification. It represents a type of land with a distinctive combination of potential natural plant communities, soils, landforms, hydrology, climate, and ecological properties and processes. Examples of ecological properties and processes include vegetation succession, nutrient cycling, and productivity. Ecological site classification is not oriented to any type of land or land use and is applicable to forestland, rangeland, wetland, and upland. The relationship among climate, landforms, soils, and vegetation and the differences in the cumulative effect of these factors from one site to another are the bases for ecological site classification. The ecological sites of the survey area are listed in table 5.

The primary emphasis of ecological site classification generally is the vegetation. The plants observed in the survey area are listed in table 6. Vegetation is considered to be an indicator of the integrated factors of the environment. Productivity, the response of the vegetation to various types of disturbances, and the use and management of the vegetation are principal concerns for landowners and managers.

A secondary, but equally important, emphasis of site classification is the relationship between landforms and soils, which generally is fairly predictable. Natural disturbances, such as wildfire, wind, and flooding, result in considerable variations in the vegetation. Landform-soil relationships provide a stable resource base by which ecological sites can be determined, regardless of the existing vegetative conditions. In addition, inferences can be made regarding site dynamics and stability, soil processes, and appropriate management systems based on landforms and soil types.

Abrupt, or distinct, breaks between landforms, soils, and vegetation occasionally occur, but more commonly the transition is gradual and indistinct. Precipitation, temperature, and other climatic patterns as well as microclimatic variables, such as elevation, change gradually across the landscape. Ecological site classifications, therefore, should be viewed as landscape models. The boundaries between ecological sites commonly are arbitrary and approximate. The characteristics and properties in and between ecological sites are complex and variable, and they commonly overlap to some degree.

Ecological site classification provides a useful framework for correlating and compiling data and interpretations on multiple resources and landscape processes. It is also a valuable framework for organizing, applying, and monitoring resource conservation systems for various land uses.

Potential Natural Community

By definition, an ecological site is characterized by a single potential natural community (PNC). The PNC is the assemblage of plant species that most nearly achieves a long-term steady state of productivity, structure, and composition on a site (Tueller, 1973; National Research Council, 1994). The occurrence of a single potential plant community is based on the premise that over time and in the absence of disturbances to the vegetation and changes in the site, the succession (or the gradual and successive replacement of one plant community by another) eventually results in a single plant community that best reflects the integrated factors of the environment. The theoretic validity and practicality of this theory has been questioned (National Research Council, 1994); however, the PNC provides a benchmark for predicting long-term and short-term responses of the vegetation to disturbances and pathways and to which the processes of succession can be related.

Site Progression

Site progression refers to the gradual and progressive changes over time to the physical and environmental conditions of a site that result in a different PNC. In riparian areas and areas of permafrost, there is a high potential for progressive changes as a result of geomorphic and soil-forming processes and climatic influences and potentials. Vegetation succession on sites undergoing gradual site progression generally does not lead to a true PNC. Changes in the site are occurring as succession is taking place, so a long-term, steady state of productivity, structure, and composition is never achieved.

Along rivers, low flood plains are gradually elevated to the height of stream terraces in response to flooding, channel migration and downcutting, and deposition of alluvium by flood water. As the height of the land surface above the channel increases, the frequency and duration of flooding decrease and the depth to the water table increases. These site changes commonly occur gradually over the lifecycle of the valley formation.

Primary vegetation succession can occur concurrently with the site progression of flood plains and stream terraces. In Alaska, the sequence typically transitions from low-stature herb and shrub communities on recently exposed alluvium to tall forest communities on stream terraces. The latest successional stage attainable on a specific hydrologically influenced surface is referred to as a riparian association (Hansen, 1989; Gebhardt and others, 1990). The PNC of ecological sites in riparian zones commonly is a riparian association.

In areas of permafrost, the post-fire vegetation succession on most boreal forest sites is accompanied by a gradual increase in the abundance and thickness of the organic layer of moss on the soil surface. As the insulating capacity of the organic layer increases, soil warming in summer is reduced and the overall soil temperature decreases. Eventually, the permafrost forms or rises in the soil profile and soil drainage is restricted, commonly to the degree that a shallow water table is perched on the surface of the permafrost. The changes in the soil environment result in a marked decrease in the cycling and availability of nutrients and the productivity of the site. Productive hardwood and spruce forests gradually are replaced by unproductive mixed spruce woodland and scrub bogs.

The time frame and transition dynamics for site progression from a relatively warm, well drained, permafrost-free condition to a cold, poorly drained, shallow to permafrost condition are not well understood. For purposes of site classification, a reasonable hypothesis is that the duration of the well drained, permafrost-free, productive condition persists for at least the lifecycle of the initial stand of spruce. Separate ecological sites are described for the productive, well drained, permafrost-free sites and for the poorly drained, shallow to permafrost sites. The PNC is then defined as the latest successional stage observed on the site. On the permafrost-free sites, the PNC commonly is not a long-term, steady state of productivity, structure, and composition.

Site Retrogression

Wildfire and flooding are common recurring disturbances in interior Alaska. The absence of dwarf spruce forest and limited occurrence of charcoal in the soils, however, suggests that the influence of fire is relatively minor. Flooding, a common recurring disturbance on flood plains, can interrupt or retard site progression. Depending on the velocity and duration of a flood event, vegetation can be destroyed by physical abrasion of sediment, prolonged saturation, or burial. Depending on the intensity and duration, significant site retrogression can occur quickly from a single flood episode. The degree of site alteration is influenced by the height of the site above active channels and its position and orientation to the channel.

The occurrence of site retrogression depends on the site factors and the intensity and duration of the flooding event. Higher flood plains are subject to less frequent flood events and support more mature plant communities, such as forest types, that

are less sensitive to brief periods of flooding. Well established vegetation reduces the velocity of the flood and results in more deposition of sediment. Flooding occurs more frequently on lower flood plains that support young, commonly herbaceous and scrub communities that are relatively rapid growing and can quickly colonize a site following significant flooding. The soils commonly are gravelly because of the deeper, high gradient floodwater and the presence of a regime that includes removal of sandy and silty sediment from the surface.

Flood plains consist of a number of terraces that have a successively lower frequency of flooding as the elevation above active channels increases. The vegetation on each flood plain level reflects the dominant flood regime. Vegetation, site, and soil properties associated with each flooding regime are expressed by a single PNC. In addition to identifying the latest successional stage as the PNC, ecological site classification provides a framework for recognizing and describing progression-retrogression dynamics and relationships.

Soil-Site Correlation

An ecological site consists of one or more soils that have similar vegetative and ecological potentials and processes. A number of different soils might be grouped together in an ecological site, but an individual soil can be included in only one site. To establish soil-site relationships and maintain the one-to-one correlation, vegetative characteristics, ecological patterns and processes, soil characteristics, and other criteria specified in *Soil Taxonomy* (Soil Survey Staff, 1999) and *Keys to Soil Taxonomy* (Soil Survey Staff; 2010) are used to develop the soil classification.

Because of the one-to-one correlation between a soil and an ecological site, the ecological site can be determined by understanding the soil. This is particularly useful in areas where the vegetation is not a definitive indicator of the site. For example, the vegetation has been altered by disturbance or management or the vegetation on two sites is similar in composition and structure. Because of this correlation, an ecological site map can be derived from the soil map. The ecological sites as correlated to the soil components in the survey area are given in table 5.

Ecological Site Characterization Reports

The ecological site characterization reports for the soils in the survey area are provided in this section.

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*

Ecological Classification ID: F231XY110AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways on escarpments, escarpments, hills, mountains

Slope (percent):	Min	Max
	40	85

Elevation (feet):	Min	Max
	850	2,963

Range of Aspect Direction: Northeast to southwest (clockwise), northeast to west (clockwise)

Water Table Depth (cm): None recorded

Flooding:	Frequency	Duration
	None	None

Ponding:	Frequency	Duration
	None	None

Runoff: High

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	25

Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

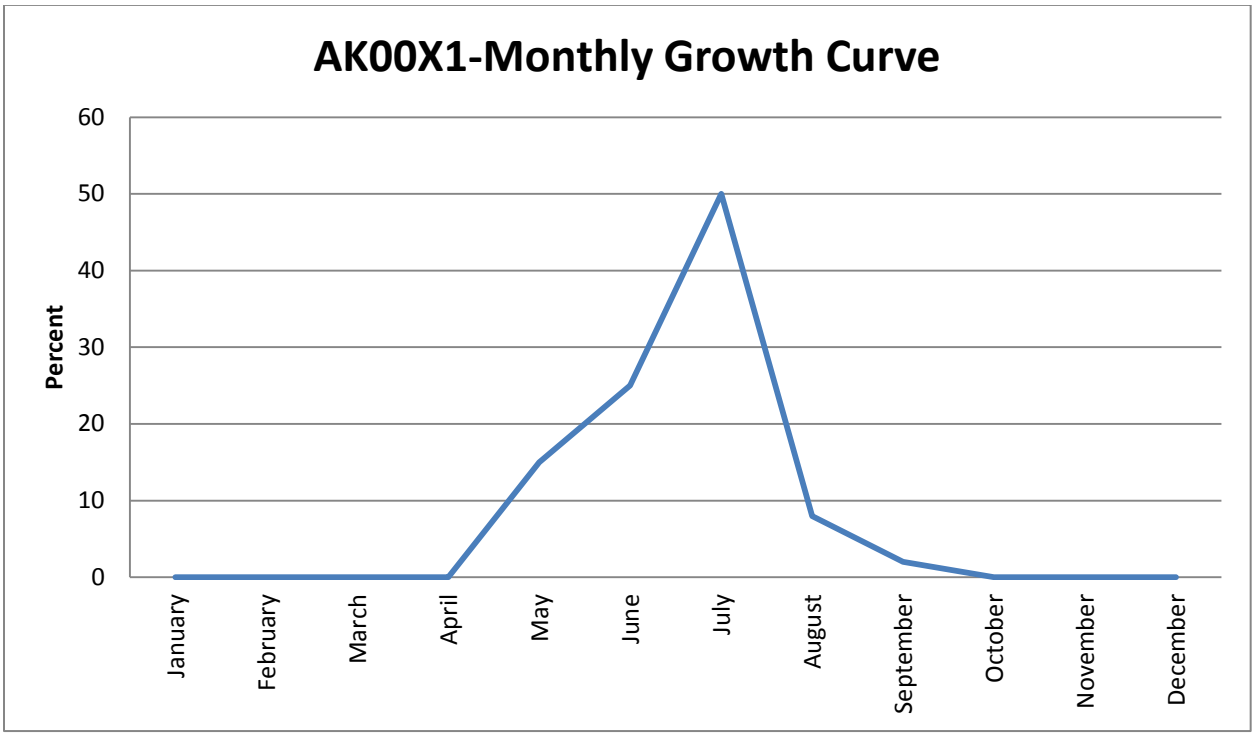
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH1—D31-Boreal forest rocky sedimentary colluvial slopes
D31BH2—D31-Boreal forest rocky colluvial escarpments
D31BH2—D31-Boreal forest rocky sedimentary colluvial slopes
D31BH7—D31-Boreal forest rocky sedimentary colluvial slopes
D31LB1—D31-Boreal forest rocky sedimentary colluvial slopes
D31LB2—D31-Boreal forest rocky sedimentary colluvial slopes
D31OF1—D31-Boreal forest rocky sedimentary colluvial slopes

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts; loamy-skeletal, mixed, superactive Ustic Haplocryepts

Dominant Parent Material: Organic material over gravelly colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	5	10.5	18

pH:	Low	RV	High
	3.4	6.7	9

Effective CEC (me/100g):	Low	High
	14.2	40

CEC (me/100g):	Min	RV	Max
	4	19.3	62

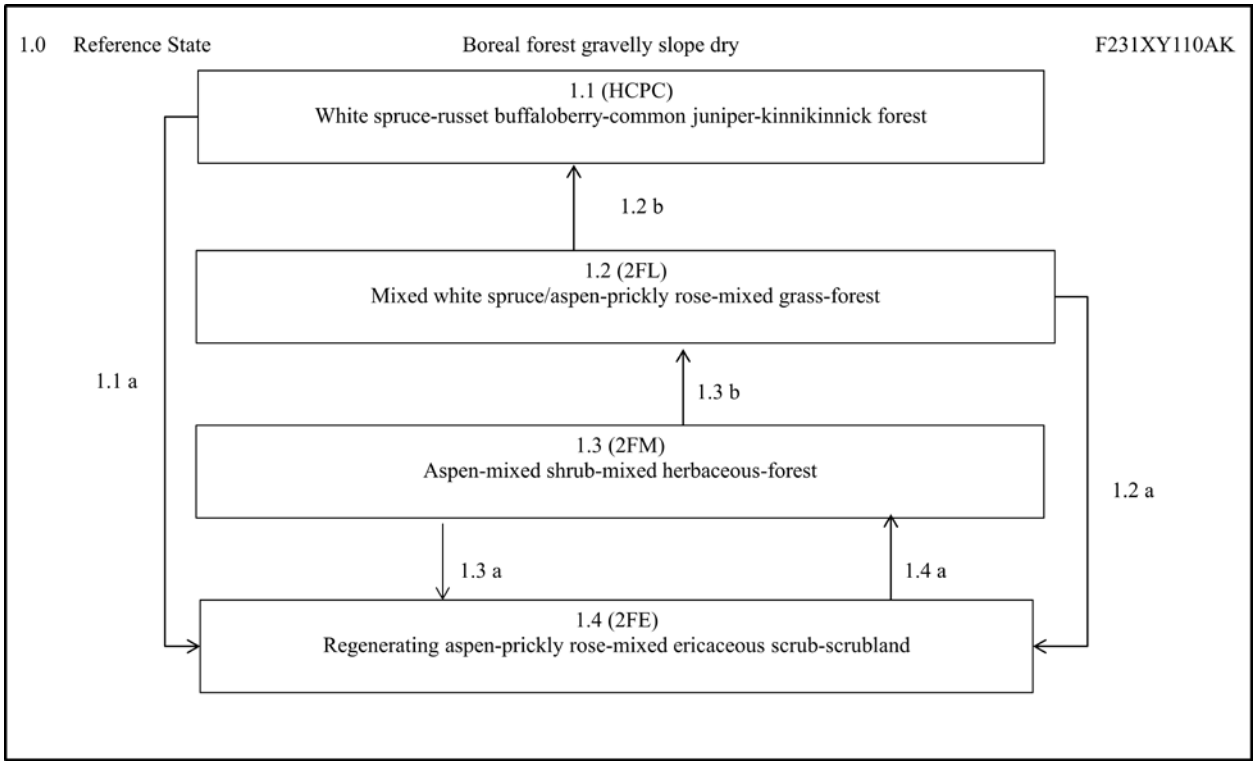
Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.28

Plant Community Phases

Ecological Site Description ID:	F231XY110AK
Ecological Dynamics of the Site:	
This boreal ecological site is on steep, south-facing escarpment slopes (slopes average 65 percent). The soils have mixed lithology, are well drained, and are considered more stable than those of ecological site R231XY109AK. Ecological site F231XY181AK is similar, but site F231XY110AK does not have a thick organic mat or abundant moss ground cover. These differences are attributed to the warmer, drier landscape position. The soils in community phase 1.1 are classified as Haplocryepts and are composed of organic matter over gravelly colluvium. Fire resulted in four documented phases. It is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is about 100 years.	

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event. Because of the steepness of slope and dominance of white spruce forest, a high-severity fire regime is considered to be typical for this ecological site. During a high-severity fire, a large proportion of the organic mat is consumed and mineral soil material typically is exposed. While many pre-fire species likely will regenerate after a fire, conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The fire return interval has a major effect on the structure of the forest. Longer fire return intervals favor development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-russet buffaloberry-common juniper-kinnikinnick forest
Community Phase Narrative:			
The dominant vegetation is a mixture of tall and medium *Picea glauca*, a mixture of shrubs, and a mixture of forbs. *Picea glauca* is the most common tree species (~55% cover) in the stands, and *Populus tremuloides* is a minor component. The shrubs consist of a similar abundance of tall, medium, short, and dwarf strata (combined ~40% cover). The most common tall shrub is *Salix sp.*, the most common medium shrub is *Shepherdia canadensis*, the most common low shrub is *Juniperus communis*, and the most common dwarf shrub is *Arctostaphylos uva-ursi*. Common forbs include *Geocaulon lividum*, *Equisetum scirpoides*, and *Mertensia paniculata*. Graminoids and lichen typically are minor components. Feathermoss is an abundant ground cover in some areas. One observation of this phase was conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. From field observations, the communities resemble those associated with high-intensity fires. White spruce is the dominant tree species. This phase likely has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Mixed white spruce/aspen-prickly rose-mixed grass-forest
Community Phase Narrative:			
The dominant vegetation is a mixture of tall and medium trees. *Populus tremuloides* and *Picea glauca* are the dominant tree species (combined ~35% cover), and *Betula neoalaskana* is a minor component. The shrubs (combined ~40% cover) primarily are in the low shrub stratum, and the most common species is *Rosa acicularis*. Graminoids and forbs are abundant (combined ~30% cover). Common graminoids are *Calamagrostis canadensis* and *Calamagrostis purpurascens*. The diversity of the forbs is high, but none of the species is abundant. Feathermoss is a common ground cover. Seven observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Aspen eventually is replaced by white spruce, resulting in community phase 1.1. Aspen commonly occurs as standing dead trees, which is presumed to indicate that the community is transitioning into a phase that is dominantly white spruce. Phase 1.2 is thought to have a shorter fire return interval than phase 1.1 and a longer fire return interval than phase 1.3.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Aspen-mixed shrub-mixed herbaceous-forest

Community Phase Narrative:	
The dominant vegetation is a mixture of tall, medium, and regenerating *Populus tremuloides* (totaling ~40% cover). *Picea glauca* and *Betula neoalaskana* are also present but are not considered dominant components in the stands. Medium, low, and dwarf shrubs are abundant (totaling ~40% cover). Common medium and low shrubs are *Rosa acicularis* and *Shepherdia canadensis*, and common dwarf shrubs are *Arctostaphylos uva-ursi* and *Vaccinium vitis-idaea*. Graminoids and forbs are evenly distributed (totaling ~35% cover). A common graminoid is *Calamagrostis canadensis*, and a common forb is *Chamerion angustifolium*. Moss and lichen cover is minimal. Ten observations of this phase were conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Fire. Aspen stands are less likely to burn and fire is less likely to spread on these stands than on stands that are dominantly spruce. Burned stands of paper birch and/or aspen are in the study area. If community phase 1.3 is burned, the resulting community resembles community phase 1.4.
1.3b	Normal time and growth without fire. White spruce becomes codominant with aspen, resulting in a community resembling that of phase 1.2. Phase 1.3 is thought to have a shorter fire return interval than phase 1.2 and a longer fire return interval than phase 1.4.

<table>
<tr><td>Phase 1.4</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.4</td><td>Community Phase Name:</td><td>Regenerating aspen-prickly rose-mixed ericaceous scrub-scrubland</td></tr>
<tr><td colspan="4">Community Phase Narrative:</td></tr>
<tr><td colspan="4">The dominant vegetation is regenerating Populus tremuloides (totaling ~35% cover), but Picea glauca and Betula neoalaskana are also present. The majority of the shrub cover is in the low and dwarf strata (totaling ~40% cover). Common species include Rosa acicularis, Arctostaphylos uva-ursi, and Vaccinium vitis-idaea. Graminoids and forbs make up ~30% of the cover. This community phase is highly diverse, but no graminoid or forb species are dominant. Lichen and moss cover is evenly distributed and covers ~30% of the ground surface. Eight observations of this phase were conducted.</td></tr>
</table>

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth without fire. The aspen on the sampled sites is expected to mature, and the community is expected to resemble phase 1.3. If this phase burns, the resulting community would likely resemble that of phase 1.4.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
61 82.8 105

Restrictive Features: None recorded

Drainage Class: Excessively drained, somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 2.5 8

Texture: Channery silt loam, gravelly sandy loam, sandy loam, silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.12 0.21 0.35

pH: Min RV Max
3.7 6.1 8.1

Subsurface Layer

Thickness (cm): Min RV Max
61 80.2 97

Texture: Very gravelly sandy loam, channers, channery silt loam, silt loam, extremely channery silt loam, extremely channery sandy loam, sandy loam

AWC (cm/cm): Min RV Max
0.07 0.16 0.25

pH: Min RV Max
5 6.7 8.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-40	5-30	10-60	2-20	0-10	1-25	0-5

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
GT (>24 inches)	5-5	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
FM (4-24 inches)	---	1-8	---	---
SD (<8 inches)	---	---	10-10	---
SL (8-36 inches)	---	---	1-7	---
TR (<15 feet)	---	---	---	1-65
TM (15-40 feet)	---	---	---	2-3

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAPU	*Calamagrostis purpurascens*	15-15-15	13	13.7
POA	*Poa*	15-15-15	13	13.7
FEAL	*Festuca altaica*	10-10-10	13	11.2
POGL	*Poa glauca*	5-5-5	25	11.2
FESTU	*Festuca*	7-7-7	13	9.4
CALAM	*Calamagrostis*	7-7-7	13	9.4

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAPU	*Calamagrostis purpurascens*	5-18.3-25	38	26.2
AGROP2	*Agropyron*	15-15-15	13	13.7

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SATR5	*Saxifraga tricuspidata*	0.1-4.4-8	38	12.8
CHAN9	*Chamerion angustifolium*	0.1-3-10	50	12.3
GABO2	*Galium boreale*	0.1-2.2-5	63	11.8
ACMI2	*Achillea millefolium*	5-5-5	25	11.2
SOMU	*Solidago multiradiata*	0-1.8-5	63	10.7
ZIEL2	*Zigadenus elegans*	3-4-5	25	10.0
SILEN	*Silene*	3-4-5	25	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARUV	*Arctostaphylos uva-ursi*	5-30-70	38	33.5
VAVI	*Vaccinium vitis-idaea*	5-25-60	38	30.6
EMNI	*Empetrum nigrum*	20-20-20	13	15.8
ARFR4	*Artemisia frigida*	20-20-20	13	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	1-12.2-40	63	27.6
VAUL	*Vaccinium uliginosum*	2-4.5-7	25	10.6
ARUV	*Arctostaphylos uva-ursi*	7-7-7	13	9.4
SHCA	*Shepherdia canadensis*	2-3.5-5	25	9.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	10-38.3-70	88	57.9
PIGL	*Picea glauca*	1-3-9	75	15.0
BENE4	*Betula neoalaskana*	1-5.5-10	25	11.7

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	70-70-70	13	29.6

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	3-4-5	50	14.1
PIGL	*Picea glauca*	2-3.7-5	38	11.7

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	46-58-70	3-5-7	12-18-23	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
2-5-8	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—8; plant species per stop (min-avg-max)—11-18.5-24

Community Phase 2FM

Rooting Depth (cm):	Min	RV	Max
	44	68.4	105

Restrictive Features: None recorded

Drainage Class: Excessively drained, somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 4.2 12

Texture: Silt loam, slightly decomposed plant material, very flaggy slightly decomposed organic matter, very stony slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.18 0.3 0.35

pH: Min RV Max
4.7 6.5 7.6

Subsurface Layer

Thickness (cm): Min RV Max
4 64.2 93

Texture: Gravelly coarse sandy loam, gravelly silt loam, very gravelly coarse sandy loam, very gravelly sandy loam, extremely gravelly coarse sandy loam, channery silt loam, extremely gravelly sandy loam, loam, extremely channery loam, extremely channery silt loam, very flaggy coarse sandy loam, gravel

AWC (cm/cm): Min RV Max
0.05 0.14 0.24

pH: Min RV Max
4.9 6.2 7.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-60	2-45	25-85	1-15	0-5	0-50	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-1	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1- 0.1	---	---
FT (>24 inches)	---	15-15	---	---
SD (<8 inches)	---	---	0.1-0.1	---
SL (8-36 inches)	---	---	1-5	---
SM (3-10 feet)	---	---	0.1-15	---
TS (<15 feet)	---	---	---	2-40
TM (15-40 feet)	---	---	---	4-4
TT (>40 feet)	---	---	---	2-2

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	1-12.4-35	50	24.9
POGL	*Poa glauca*	5-5-5	20	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	6-17-35	30	22.6
CAPU	*Calamagrostis purpurascens*	10-12.5-15	20	15.8
LUARU	*Luzula arcuata ssp. unalaschcensis*	10-10-10	10	10.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	1-4-8	30	11.0
EQSC	*Equisetum scirpoides*	2-6-10	20	11.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GABO2	*Galium boreale*	0.1-5.2-15	70	19.0
SATR5	*Saxifraga tricuspidata*	2-7.2-15	40	17.0
CHAN9	*Chamerion angustifolium*	0.1-4-10	50	14.2
PEDIC	*Pedicularis*	20-20-20	10	14.1
MEPA	*Mertensia paniculata*	0.1-3.8-10	50	13.8

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COSE5	*Corydalis sempervirens*	15-15-15	10	12.2
CHAN9	*Chamerion angustifolium*	5-6-7	20	11.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARUV	*Arctostaphylos uva-ursi*	2-29.2-75	40	34.2
VAVI	*Vaccinium vitis-idaea*	6-10-20	50	22.4
LIBO3	*Linnaea borealis*	0-6.7-10	30	14.1
CHCA2	*Chamaedaphne calyculata*	15-15-15	10	12.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	1-5.4-15	70	19.5
SHCA	*Shepherdia canadensis*	5-10-15	20	14.1
ARUV	*Arctostaphylos uva-ursi*	20-20-20	10	14.1
LEPAD	*Ledum palustre ssp. decumbens*	10-10-10	10	10.0
VIED	*Viburnum edule*	10-10-10	10	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	5-13.3-30	30	20.0
SHCA	*Shepherdia canadensis*	1-8-15	30	15.5

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	2-24.1-60	90	46.6
PIGL	*Picea glauca*	2-5.6-15	90	22.4

Stratum —TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	40-40-40	10	20.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	3-17.9-40	80	37.8
BENE4	*Betula neoalaskana*	1-8.5-20	40	18.4
PIGL	*Picea glauca*	1-4.3-10	70	17.3

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	5-10.7-20	30	17.9
PIGL	*Picea glauca*	2-4.7-8	30	11.8

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	3.1-4-4.5	23-24-25	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
25-78.4-110	5

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use Slight use	Tree regeneration	Moose	Not grazed/browsed Summer

Notable Plants: *Draba densifolia*

Species Richness: Number of stops—10; plant species per stop (min-avg-max): 16-24.1-33

Community Phase 2FL

Rooting Depth (cm): Min RV Max
34 58 84

Restrictive Features: None recorded

Drainage Class: Excessively drained, somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 6 16

Texture: Gravelly very fine sandy loam, peat, silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.2 0.31 0.35

pH: Min RV Max
5.2 6.1 7.2

Subsurface Layer

Thickness (cm): Min RV Max
34 52 68

Texture: Gravelly silt loam, extremely cobbly silt loam, extremely gravelly coarse sandy loam, channery silt loam, very channery fine sandy loam, silt loam, extremely channery coarse sandy loam, gravel, very fine sandy loam

AWC (cm/cm): Min RV Max
0.02 0.14 0.24

pH: Min RV Max
4 6.2 7.7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-7	5-30	40-90	2-20	0-5	0-5	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	15-5	---	---	---
FD (<4 inches)	---	18-18	---	---
FM (4-24 inches)	---	0.1-5	---	---
FT (>24 inches)	---	0.01-0.01	---	---
SL (8-36 inches)	---	---	2-5	---
SM (3-10 feet)	---	---	1-1	---
TR (<15 feet)	---	---	---	1-20
TM (15-40 feet)	---	---	---	1-5
TT (>40 feet)	---	---	---	10-2

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-10-15	29	16.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-21.7-25	43	30.5
CAPU	*Calamagrostis purpurascens*	25-27.5-30	29	28.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
STELL	*Stellaria*	18-18-18	14	16.0
GELI2	*Geocaulon lividum*	10-10-10	14	12.0
LYCO3	*Lycopodium complanatum*	4-4.5-5	29	11.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	1-3.2-7	71	15.1
GELI2	*Geocaulon lividum*	1-4.3-10	43	13.6
GABO2	*Galium boreale*	1-3-5	43	11.3
CHAN9	*Chamerion angustifolium*	0.1-1.8-3	57	10.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	2-3.5-5	29	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARUV	*Arctostaphylos uva-ursi*	3-5.2-10	57	17.3
LIBO3	*Linnaea borealis*	1-2.2-5	57	11.3
VAVI	*Vaccinium vitis-idaea*	2-4.5-7	29	11.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	15-38.8-100	57	47.1
VIED	*Viburnum edule*	2-10.7-25	43	21.4
VAVI	*Vaccinium vitis-idaea*	10-15-20	29	20.7
SHCA	*Shepherdia canadensis*	5-12.5-20	29	18.9
JUCO6	*Juniperus communis*	5-6-7	29	13.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	4-4.7-5	43	14.1
SABE2	*Salix bebbiana*	1-4-7	29	10.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-10-10	14	12.0
ALINT	*Alnus incana ssp. tenuifolia*	10-10-10	14	12.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-6.7-10	100	25.9
POTR5	*Populus tremuloides*	1-9.2-20	71	25.6
BENE4	*Betula neoalaskana*	1-3.3-7	43	12.0

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	10-10-10	14	12.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	5-15-20	86	35.9
PIGL	*Picea glauca*	5-12.5-20	86	32.7
BENE4	*Betula neoalaskana*	5-12.5-25	57	26.7

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-11.4-25	71	28.5
POTR5	*Populus tremuloides*	2-14.7-40	43	25.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	21-49-92	1.4-7-15.5	6-40-73	20	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
20-47.9-115	7

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use		Moose	Unknown
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—7; plant species per stop (min-avg-max)—18-24.4-40

Community Phase HCPC

Rooting Depth (cm): Min RV Max
152 152 152

Restrictive Features: None recorded

Drainage Class: Excessively drained, somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
3 3 3

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

Subsurface Layer

Thickness (cm): Min RV Max
149 149 149

Texture: Gravelly sandy loam, extremely gravelly loamy coarse sand

AWC (cm/cm): Min RV Max
0.02 0.08 0.12

pH: Min RV Max
7.9 8 8.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
4-4	18-18	90-90	20-20	4-4	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	2-6	---	---
FM (4-24 inches)	---	4-9	---	---
FT (>24 inches)	---	3-3	---	---
SD (<8 inches)	---	---	4-5	---
SL (8-36 inches)	---	---	7-7	---
SM (3-10 feet)	---	---	3-7	---
ST (>10 feet)	---	---	5-5	---
TR (<15 feet)	---	---	---	15-15
TM (15-40 feet)	---	---	---	10-25
TT (>40 feet)	---	---	---	30-30

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	6-6-6	100	24.5
ORSE	*Orthilia secunda*	3-3-3	100	17.3
GORE2	*Goodyera repens*	2-2-2	100	14.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	9-9-9	100	30.0
EQSC	*Equisetum scirpoides*	5-5-5	100	22.4
GABO2	*Galium boreale*	4-4-4	100	20.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LUAR2	*Lupinus arcticus*	3-3-3	100	17.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARUV	*Arctostaphylos uva-ursi*	5-5-5	100	22.4
VIED	*Viburnum edule*	4-4-4	100	20.0

Stratum Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	7-7-7	100	26.5
JUCO6	*Juniperus communis*	7-7-7	100	26.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SHCA	*Shepherdia canadensis*	7-7-7	100	26.5
COSES	*Cornus sericea ssp. sericea*	3-3-3	100	17.3

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	5-5-5	100	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	15-15-15	100	38.7

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	25-25-25	100	50.0
POTR5	*Populus tremuloides*	10-10-10	100	31.6

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	30-30-30	100	54.8

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	75-78-80	4.7-6-9.25	34-51-69	4	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
103-103-103	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—22-22-22

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*
Ecological Classification ID: F231XY111AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Alluvial fans, escarpments, high flood plains, hills, mountains, terraces

Slope (percent):	Min	Max
	1	65

Elevation (feet):	Min	Max
	656	3,281

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	5	75

Flooding:	Frequency	Duration
	None	None

Ponding:	Frequency	Duration
	None	None

Runoff: Medium to very high

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	27

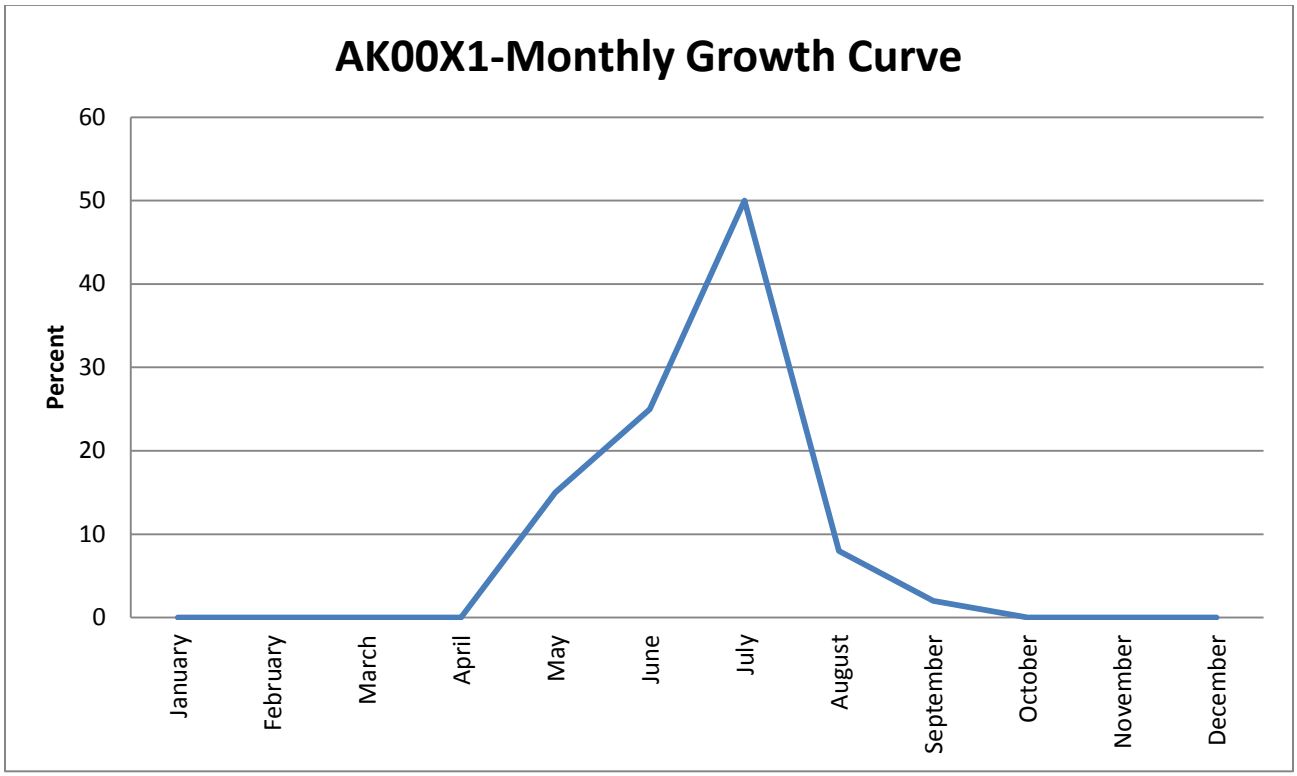
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH1—D31-Boreal taiga silty colluvial slopes, frozen
D31BH1—D31-Boreal taiga silty eolian slopes, frozen
D31BH3—D31-Boreal taiga silty eolian slopes, frozen
D31BH6—D31-Boreal forest loamy depressions
D31BH7—D31-Boreal forest gravelly colluvial slopes, frozen
D31CF1—D31-Boreal forest gravelly colluvial slopes, frozen
D31HL1—D31-Boreal taiga silty colluvial slopes, frozen
D31HL2—D31-Boreal taiga silty colluvial slopes, frozen
D31KT1—D31-Boreal taiga silty eolian slopes, frozen
D31LB1—D31-Boreal taiga silty eolian slopes, frozen
D31LB2—D31-Boreal taiga silty colluvial slopes, frozen
D31OF1—D31-Boreal forest gravelly colluvial slopes, frozen
D31TH1—D31-Boreal forest loamy depressions
D31TH1—D31-Boreal taiga silty colluvial slopes, frozen
D31TL1—D31-Boreal taiga silty eolian slopes, frozen
D31UC2—D31-Boreal forest gravelly colluvial slopes, frozen
D31UC3—D31-Boreal taiga silty colluvial slopes, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels; coarse-loamy, mixed, superactive, acid, subgelic Folistic Haploturbels; coarse-loamy, mixed, superactive, nonacid, subgelic Typic Haplorthels; loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels

Dominant Parent Material: Organic material over gravelly colluviums, organic material over loamy cryoturbate, organic material over loess over gravelly colluviums, organic material over silty colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy, loamy-skeletal

Saturated Hydraulic Conductivity: Moderately low to high

AWC Total (cm):	Low	RV	High
	12	24	53

pH:	Low	RV	High
	3.4	5.7	7.8

Effective CEC (me/100g):	Low	High
	13.2	40

CEC (me/100g):	Min	RV	Max
	4	23.7	62

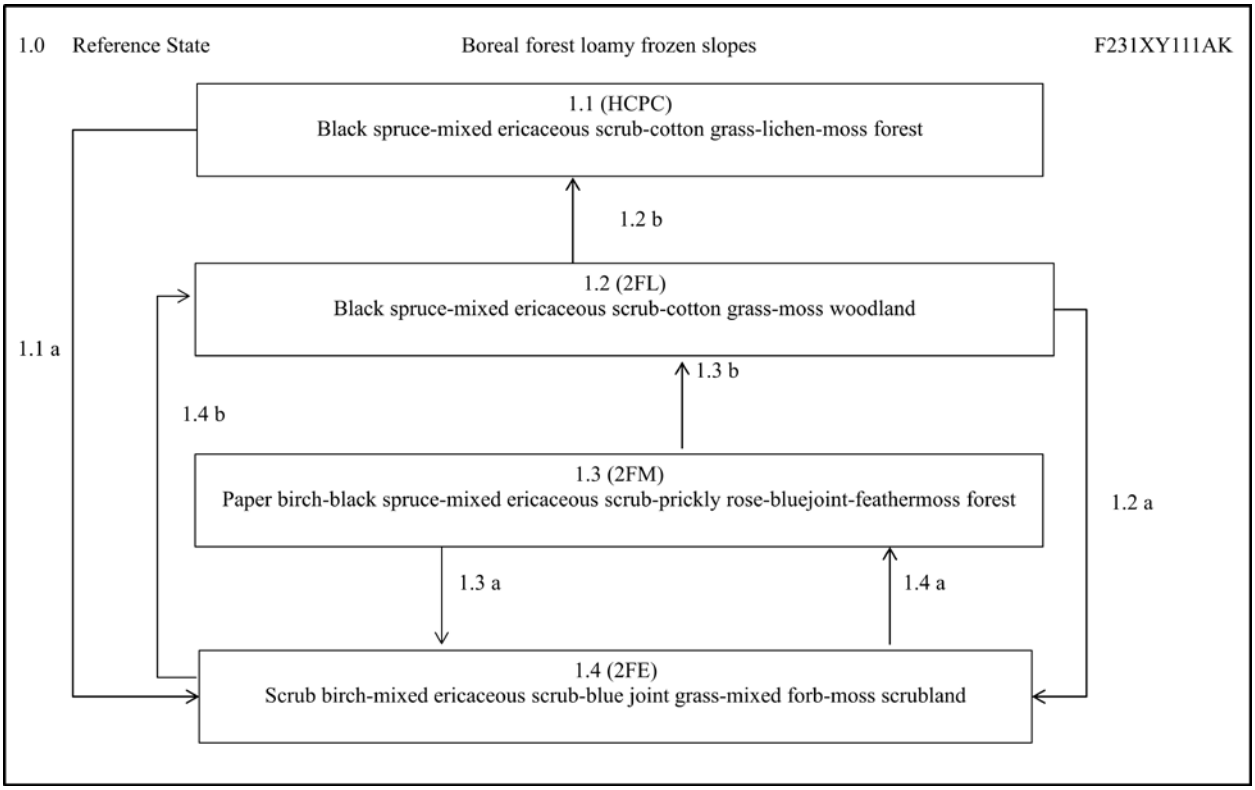
Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.38

Plant Community Phases

Ecological Site Description ID:	F231XY111AK
Ecological Dynamics of the Site:	
This boreal ecological site is on summits, shoulders, and backslopes of hills and mountains. It is on all aspects. Because of the wide variation in landscape position, slope varies substantially (1 to 58%). For the climax phase community, the organic mat is 10 to 40 centimeters thick, and the soils have permafrost. For community phase 1.1, the soils are classified as Haplorthels or Haploturbels and are composed of organic matter over loamy cryoturbate. The soils typically are saturated, mainly because of the thick organic mat. The climax phase is characterized by black spruce forest with an understory of ericaceous shrubs and moss. Fire resulted in four documented phases. It is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. For this ecological site, low-severity fire events are more typical than high-severity fire events. The fire events appear to cause differences in the depth of the organic material on the soil surface, the presence and/or depth to permafrost, and the present and potential vegetation.	

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to directly relate to the time since the last fire event and the severity of the burn. During a low-severity fire, minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Permafrost typically remains in the soil profile, and water commonly perches on it. Graminoids and scrubs quickly recolonize and become dominant on the site from the below-ground root reserves that were not consumed in the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost commonly thaws in the soil profile, and the site becomes drier. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.3.

	The fire return interval likely plays a significant role in the structure of black spruce forests. Longer fire return intervals favor development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Black Spruce-Mixed Ericaceous Scrub-Cotton Grass-Lichen-Moss Forest
Community Phase Narrative:			
The majority of the tree cover is in the medium and stunted tree strata (total mature tree cover ~25%). *Picea mariana* is the dominant tree species, but *Picea glauca* and *Betula neoalaskana* are present as limited cover. The majority of the scrub cover is in the low and dwarf strata (total shrub cover ~65%). Common shrubs include *Betula glandulosa*, *Ledum palustre*, *Vaccinium uliginosum*, *Rubus chamaemorus*, and *Vaccinium vitis-idaea*. Graminoids are less abundant than shrubs (~20% cover), and the most common species are *Carex bigelowii* and *Eriophorum vaginatum*. Forbs are a minor vegetative component. Lichen and moss are extensive as ground cover (combined ~75% cover). The most common lichen is *Cladina sp*., and the most common moss species are *Sphagnum sp*., *Hylocomium splendens,* and *Pleurozium schreberi*. Twenty-one observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. For this ecological site, phase 1.1 has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Black Spruce-Mixed Ericaceous Scrub-Cotton Grass-moss Woodland
Community Phase Narrative:			
The majority of the tree cover is in the medium, stunted, and regenerative tree strata (total mature tree cover ~20%). *Picea mariana* is the dominant tree species, but *Betula neoalaskana* is also present. The majority of the shrub cover is in the low shrub stratum (total shrub cover ~70%). Common shrubs include *Ledum palustre*, *Vaccinium uliginosum*, and *Vaccinium vitis-idaea*. Graminoids are less abundant in this phase as compared to community phase 1.1, but *Eriophorum vaginatum* is present. Forbs are a minor vegetative component. As compared to phase 1.1, lichen makes up less of the overall cover (~20%). Moss is extensive as ground cover, and common species include *Sphagnum sp*., *Hylocomium splendens,* and *Pleurozium schreberi*. Eighteen observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Black spruce woodland matures and eventually becomes an open forest. Fewer paper birch trees are in the stand. The fire return interval is presumed to be shorter than that of phase 1.1 and longer than that of phase 1.4.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Paper Birch-Black Spruce-Mixed Ericaceous Scrub-Prickly Rose-Bluejoint-Feathermoss Forest

Community Phase Narrative:
The tree cover is in the medium and regenerative tree strata (~30% mature tree cover). The stand consists of an even distribution of *Betula neoalaskana* and *Picea mariana*. Shrubs are primarily in the low shrub stratum (total shrub cover ~60%). Common shrubs include *Alnus viridis*, *Ledum palustre*, *Rosa acicularis*, and *Vaccinium vitis-idaea*. As compared to community phases 1.1 and 1.2, this phase has much more forb cover (~10% cover). Common forbs include *Lycopodium annotinum, Cornus canadensis,* and *Equisetum sylvaticum*. *Calamagrostis canadensis* is the most common graminoid species, but graminoids are a minor vegetative component. Moss is abundant as ground cover (~35% cover), and the most common species is *Hylocomium splendens*. Three observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Fire.
1.3b	Normal time and growth without fire event. Permafrost moves upward into the soil profile, and eventually paper birch is replaced by black spruce and an ericaceous scrub community. Areas of phase 1.3 are rare; therefore, the associated transitions for this phase are the least understood. The fire return interval is presumed to be shorter than that of phase 1.1 and longer than that of phase 1.4.

Phase 1.4	

Community Phase Number:	1.4	Community Phase Name:	Scrub Birch-Mixed Ericaceous Scrub-Blue Joint Grass-Mixed Forb-Moss Scrubland

Community Phase Narrative:

Although trees are present, shrubs and graminoids are the dominant forms of vegetation. A limited amount of mature *Picea mariana* is present (~3% cover). Seedlings of *Picea mariana*, *Picea glauca*, *Populus tremuloides*, and *Betula neoalaskana* are present but not abundant (~10% cover). Shrubs primarily are in the low shrub stratum (total shrub cover ~60%). Common shrubs include *Betula glandulosa*, *Ledum palustre*, *Vaccinium uliginosum*, and *Vaccinium vitis-idaea*. Graminoids are abundant (~30% cover), and the most common species is *Calamagrostis canadensis*. Forbs are less abundant than graminoids (~20% cover), and common species include *Equisetum sylvaticum* and *Chamerion angustifolium*. Moss is abundant as ground cover (~30%), but feathermoss is not a dominant species. Thirty-seven observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth without fire. Associated with a high-severity fire event, a less common disturbance event for this ecological site.
1.4b	Normal time and growth without fire. Associated with a low-severity fire event, the most common disturbance event for this ecological site. The average thickness of the organic matter is 13 centimeters after the burn event for the thirty-seven observations made in phase 1.4, indicating that exposure of the mineral soil is rare on this ecological site.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
33 65.4 113

Restrictive Feature: Permafrost

Drainage Class: Poorly drained, well drained

Surface Layer

Thickness (cm): Min RV Max
4 11.6 26

Texture: Mucky peat, peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.1 5.4 6.6

Subsurface Layer

Thickness (cm): Min RV Max
29 53.9 87

Texture: Cobbly silt loam, very cobbly loam, channery clay loam, channery silt loam, channery sandy loam, extremely channery clay loam, silt loam

AWC (cm/cm): Min RV Max
0.13 0.21 0.25

pH: Min RV Max
5 6 7.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-25	0-85	0-90	0-70	0-20	0-5	0-4

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	4-4	---	---
FT (>24 inches)	---	3-5	---	---
SD (<8 inches)	---	---	3-3	---
SL (8-36 inches)	---	---	3-6	---
SM (3-10 feet)	---	---	4-4	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-23.5-50	43	31.9
CABI5	*Carex bigelowii*	1-10.3-30	30	17.5
ERVA4	*Eriophorum vaginatum*	2-12-30	22	16.1
ARLA2	*Arctagrostis latifolia*	35-35-35	3	9.7

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	4-22.6-60	43	31.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	5-18.7-55	43	28.4
CHAN9	*Chamerion angustifolium*	1-4.6-15	57	16.2
EQAR	*Equisetum arvense*	30-30-30	3	9.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	0.1-10.6-35	22	15.2
POAL11	*Polygonum alpinum*	0-3.9-8	35	11.8

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-8.8-65	92	28.4
RUCH	*Rubus chamaemorus*	0-3.7-10	54	14.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	6-21.4-40	51	33.1
LEPAD	*Ledum palustre ssp. decumbens*	10-23.9-85	41	31.1
VAUL	*Vaccinium uliginosum*	0-7.6-35	70	23.1
SPST3	*Spiraea stevenii*	1-6.3-20	54	18.5
BEGL	*Betula glandulosa*	0-6.2-20	24	12.3
ROAC	*Rosa acicularis*	0-3.1-20	43	11.5
SAPU15	*Salix pulchra*	1-5.7-15	19	10.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	5-19.4-45	30	24.0
LEPAD	*Ledum palustre ssp. decumbens*	80-80-80	3	14.7
SABE2	*Salix bebbiana*	0.1-5.6-15	30	12.9
SAPU15	*Salix pulchra*	0-5.3-10	22	10.7
SALIX	*Salix*	4-7-10	14	9.7
ALVIF	*Alnus viridis ssp. fruticosa*	2-5-7	19	9.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-9.5-20	11	10.1
SAGL	*Salix glauca*	30-30-30	3	9.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	0-7-35	84	24.2
BENE4	*Betula neoalaskana*	0-7.9-35	65	22.6

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-8.3-35	19	12.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	2.9-3-3.2	17-18-20	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-4.2-10	5

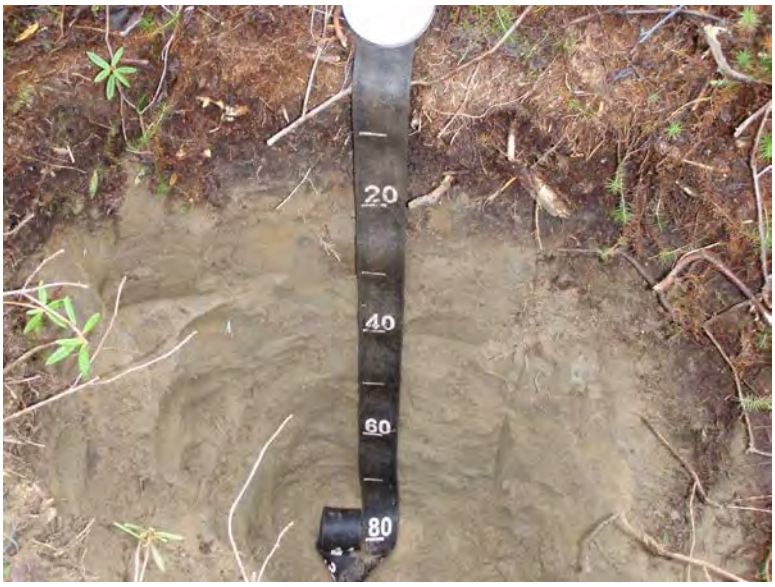
Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
No observed use			Not grazed/browsed
Slight use			Spring
Slight use			Winter
Slight use	Other	Moose	Spring
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows		Spring
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Summer
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: *Salix candida*

Species Richness: Number of stops—37; plant species per stop (min-avg-max)—13-21.6-35

Community Phase 2FM



Rooting Depth (cm):	Min	RV	Max
	49	63	77

Restrictive Feature: Permafrost

Drainage Class: Poorly drained, well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	15	15	15

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.5 4.8 6

Subsurface Layer

Thickness (cm): Min RV Max
34 48 62

Texture: Silt loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
5.5 6.4 7.5

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-5	1-60	25-60	3-10	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	3-3	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	0.1-1	---	---
SD (<8 inches)	---	---	15-15	---
SL (8-36 inches)	---	---	10-5	---
TR (<15 feet)	---	---	---	5-5
TM (15-40 feet)	---	---	---	15-15

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	3-3-3	33	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-20-35	67	36.5

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	25-25-25	33	28.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	15-15-15	33	22.4
LYAN2	*Lycopodium annotinum*	0.1-5.1-10	67	18.3
CHAN9	*Chamerion angustifolium*	1-2-3	67	11.5
EQPR	*Equisetum pratense*	1-2-3	67	11.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	15-15-15	33	22.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	3-5.3-10	100	23.1
VAVI	*Vaccinium vitis-idaea*	15-15-15	33	22.4
VAUL	*Vaccinium uliginosum*	5-5-5	67	18.3
LEPAD	*Ledum palustre ssp. decumbens*	10-10-10	33	18.3

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-12.5-15	67	28.9
SALIX	*Salix*	10-10-10	33	18.3
SABE2	*Salix bebbiana*	8-8-8	33	16.3
SAAR3	*Salix arbusculoides*	5-5-5	33	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-4.7-8	100	21.6
BENE4	*Betula neoalaskana*	5-5-5	33	12.9

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	15-21.7-25	100	46.5
PIMA	*Picea mariana*	15-15-15	67	31.6

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	21-36-96	1.6-3-4.9	15-28-79	6	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
1-19-28	3

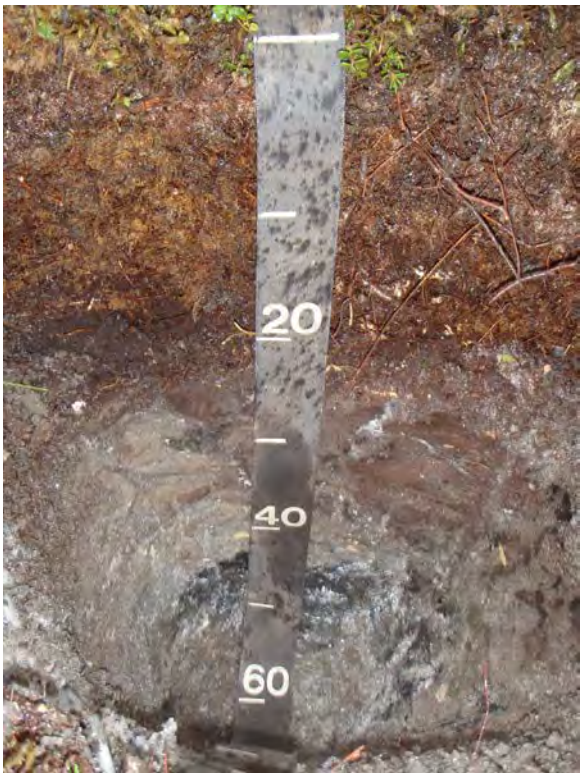
Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use		Moose	Unknown
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—15-18.7-26

Community Phase 2FL



Rooting Depth (cm):	Min	RV	Max
	27	50	63

Restrictive Feature: Permafrost

Drainage Class: Poorly drained, well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	9	25.5	35

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.8 4.4 5.4

Subsurface Layer

Thickness (cm): Min RV Max
18 24.5 28

Texture: Clay loam, loam, silt loam

AWC (cm/cm): Min RV Max
0.22 0.23 0.25

pH: Min RV Max
4.7 5.5 6.4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-40	25-90	5-60	2-10	0-7	0-2	0-2

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
GT (>24 inches)	70-70	---	---	---
FD (<4 inches)	---	5-5	---	---
FM (4-24 inches)	---	7-7	---	---
FT (>24 inches)	---	6-6	---	---
SD (<8 inches)	---	---	35-7	---
SL (8-36 inches)	---	---	10-25	---
TR (<15 feet)	---	---	---	3-3
TS (<15 feet)	---	---	---	30-30

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	5-22.5-40	25	23.7
CAREX	*Carex*	5-12.5-30	17	14.4
CABI5	*Carex bigelowii*	2-9.8-20	17	12.7
CACA12	*Carex capillaris*	35-35-35	4	12.1
ERAN6	*Eriophorum angustifolium*	35-35-35	4	12.1
CACA4	*Calamagrostis canadensis*	1-5.3-20	25	11.5

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	1-35.5-70	8	17.2
CACA4	*Calamagrostis canadensis*	5-9.5-15	17	12.6

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	1-3.1-6	38	10.8

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	0.1-9.1-30	46	20.4
GELI2	*Geocaulon lividum*	2-6.4-15	29	13.7
PEFR5	*Petasites frigidus*	0-3.4-8	25	9.2

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	1-4.5-10	25	10.6

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-11.4-40	100	33.7
EMNI	*Empetrum nigrum*	0.1-10.4-40	42	20.8
RUCH	*Rubus chamaemorus*	0-4.6-25	67	17.5
VAUL	*Vaccinium uliginosum*	5-20-35	8	12.9

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	5-23.1-50	54	35.4
LEGR	*Ledum groenlandicum*	10-33.1-65	33	33.2
VAUL	*Vaccinium uliginosum*	1-9.7-25	75	26.9
BENA	*Betula nana*	3-10-15	25	15.8
BEGL	*Betula glandulosa*	0-9.7-25	25	15.5
SPST3	*Spiraea stevenii*	1-4-10	38	12.2
CHCA2	*Chamaedaphne calyculata*	5-7.3-10	13	9.6

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	0-7.8-15	38	17.1
BENA	*Betula nana*	5-22.5-40	8	13.7
BEGL	*Betula glandulosa*	4-7.8-10	21	12.7
SAPU15	*Salix pulchra*	1-6-15	17	10.0
SALIX	*Salix*	3-4.4-10	21	9.6

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-15.5-55	96	38.6
BENE4	*Betula neoalaskana*	1-4.2-8	54	15.1

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-20.2-50	33	26.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-12.3-30	71	29.5
BENE4	*Betula neoalaskana*	0.1-4.9-15	25	11.0

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-9.3-15	13	10.8

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	2.8-3-3.4	23-25-27	2	G

Tree Basal Area:

Min-Avg-Max	Number of Stands
1-23.8-83	11

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other		Unknown
No observed use			Not grazed/browsed
Slight use			Spring
Slight use	Grasses and sedges	Caribou	Unknown
Slight use	Other woody plants	Moose	Summer
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Summer

Notable Plants: *Stellaria alaskana, Salix candida*

Species Richness: Number of stops—24; plant species per stop (min-avg-max)—19-26.9-38

Community Phase HCPC

Rooting Depth (cm): Min RV Max
23 75 133

Restrictive Feature: Permafrost

Drainage Class: Poorly drained, well drained

Surface Layer

Thickness (cm): Min RV Max
10 31 42

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.9 4.8 5.3

Subsurface Layer

Thickness (cm): Min RV Max
13 44 91

Texture: Gravelly loam, gravelly silt loam, permanently frozen silt loam

AWC (cm/cm): Min RV Max
0.2 0.22 0.25

pH: Min RV Max
4.7 5.4 6.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
9-90	10-90	0-50	1-10	0-3	0-2	0-3

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	2-2	---	---
FM (4-24 inches)	---	1-2	---	---
SD (<8 inches)	---	---	10-15	---
SL (8-36 inches)	---	---	10-5	---
TR (<15 feet)	---	---	---	5-5
TM (15-40 feet)	---	---	---	20-20

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	5-12.7-30	33	20.6
ERBR6	*Eriophorum brachyantherum*	20-40-60	10	19.5
ERVA4	*Eriophorum vaginatum*	0-14-40	24	18.3
CACA4	*Calamagrostis canadensis*	1-7.2-25	38	16.6
CAREX	*Carex*	3-7.7-15	29	14.8

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	55-55-55	5	16.2
CACA4	*Calamagrostis canadensis*	20-20-20	5	9.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	3-6-10	14	9.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	1-6.8-15	43	17.0
PEFR5	*Petasites frigidus*	5-10-15	24	15.4
BORI2	*Boykinia richardsonii*	2-6.3-15	14	9.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	2-9-15	100	30.0
EMNI	*Empetrum nigrum*	3-8.4-15	48	20.0
RUCH	*Rubus chamaemorus*	1-4.5-15	71	18.0
VAOX	*Vaccinium oxycoccos*	0-3-10	67	14.2
ARRU	*Arctostaphylos rubra*	1-5.7-15	29	12.7
CATE11	*Cassiope tetragona*	5-10-15	10	9.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	0-11.4-25	71	28.5
LEGR	*Ledum groenlandicum*	5-15.5-40	52	28.5
LEPAD	*Ledum palustre ssp. decumbens*	5-13.7-25	48	25.5
BEGL	*Betula glandulosa*	5-12.8-25	29	19.1
SALIX	*Salix*	5-10.8-15	19	14.3
SAPU15	*Salix pulchra*	5-8.3-10	14	10.9
BENA	*Betula nana*	2-3.8-10	29	10.5
CHCA2	*Chamaedaphne calyculata*	2-6.7-15	14	9.8
ALVIF	*Alnus viridis ssp. fruticosa*	5-6.7-10	14	9.8
SPST3	*Spiraea stevenii*	0-2.6-5	33	9.3

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	0.1-8.4-15	29	15.4
ALVIF	*Alnus viridis ssp. fruticosa*	5-7.2-10	24	13.1
SABE2	*Salix bebbiana*	2-6-15	24	12.0
SAPU15	*Salix pulchra*	1-3.6-8	33	10.9
ALINT	*Alnus incana ssp. tenuifolia*	25-25-25	5	10.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	2-8.7-15	86	27.3

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-20.9-35	52	33.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	0-17.8-50	81	38.0
PIGL	*Picea glauca*	10-12.5-15	10	10.9

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement
Picea mariana	46-98-176	1.5-4-7.3	6-22-51	38	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
2-32.3-75	17

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—21; plant species per stop (min-avg-max)—13-27.1-41

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca*/*Alnus-Rosa acicularis*

Ecological Classification ID: F231XY117AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Depressions of hills, drainageways of plains, escarpments, hills

Slope (percent):	Min	Max
	5	35

Elevation (feet):	Min	Max
	656	2,953

Range of Aspect Direction: East to west (clockwise)

Water Table Depth (cm):	Min	Max
	40	60

Flooding: None

Ponding: None

Runoff: High

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	20

Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

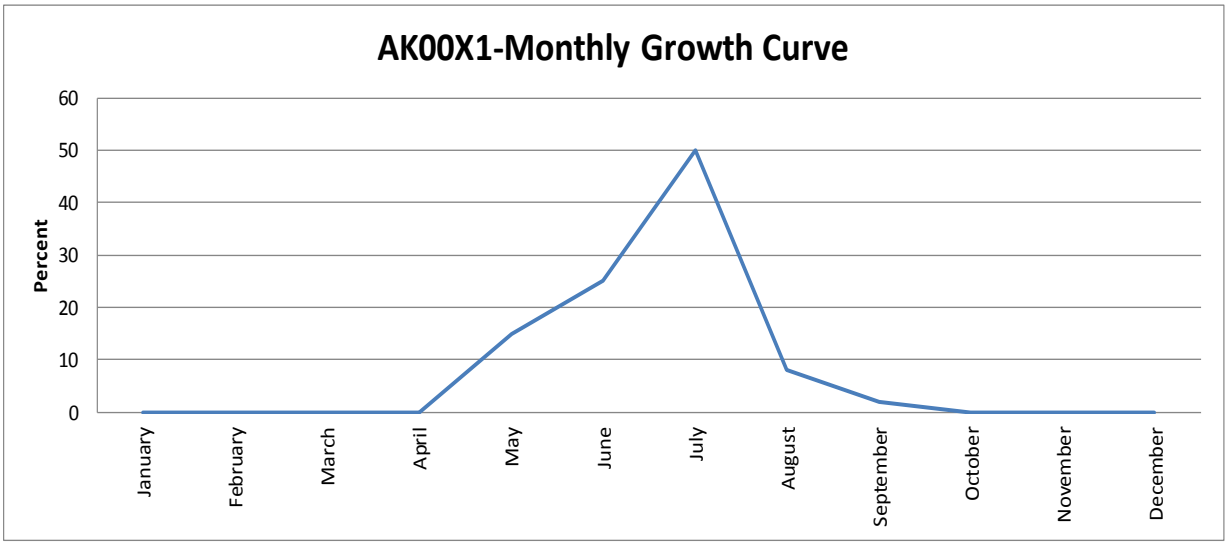
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TL1—D31-Boreal forest loamy colluvial slopes

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haplorthels

Dominant Parent Material: Organic material over loamy colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	29	52

pH:	Low	RV	High
	3.4	6.8	8

Effective CEC (me/100g):	Low	High
	14.2	40

CEC (me/100g):	Min	RV	Max
	4.9	19.2	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.14

Plant Community Phases

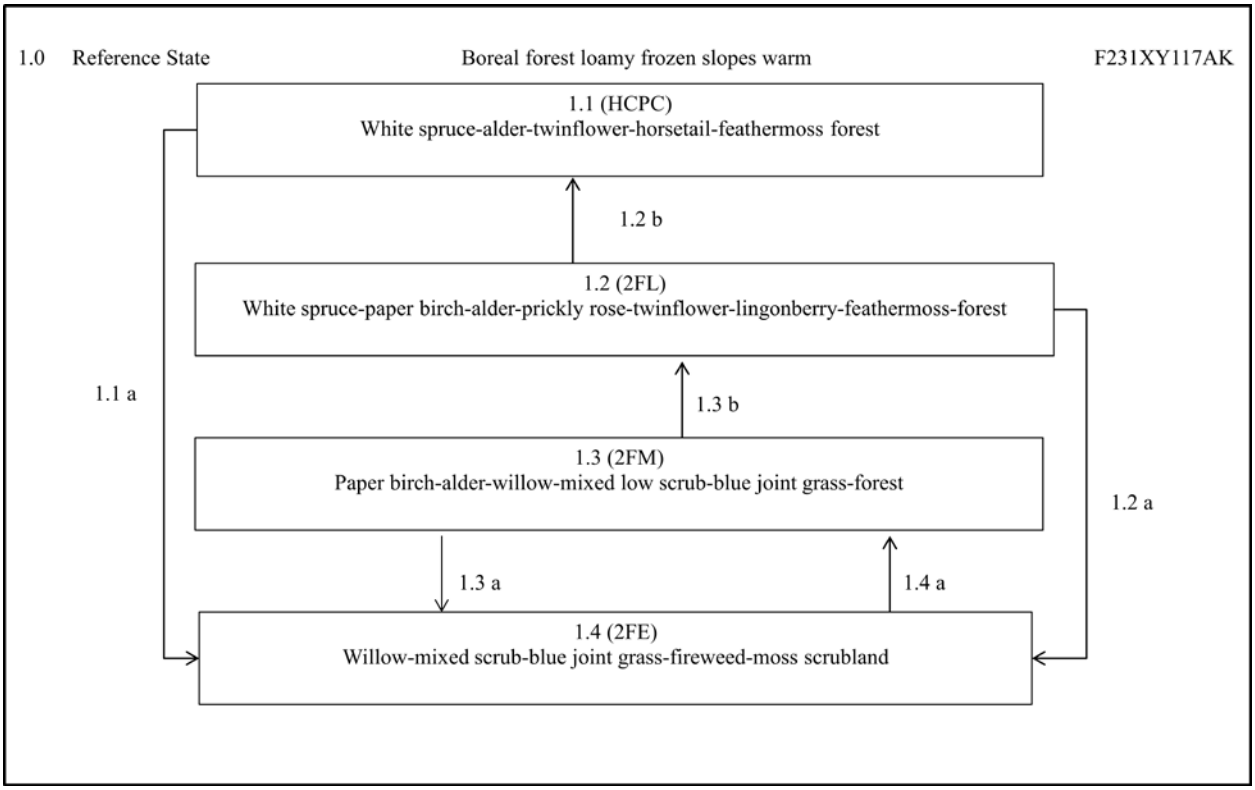
Ecological Site Description ID:	F231XY117AK

Ecological Dynamics of the Site:

This boreal ecological site is on south-facing backslopes of hills and mountains (slopes range from 7 to 32%). The soils are loamy and have permafrost. The climax phase community is characterized by a white spruce forest with a thick feathermoss mat. The surface organic layer of the climax phase community is 14 to 27 centimeters thick. Ecological site F231XY182AK has similar vegetation, but it is on steeper terrain, the soils are rockier, and permafrost is not present in the climax phase. The soils in community phase 1.1 are classified as Haplorthels and are composed of organic matter over loamy colluvium.

Fire resulted in four documented phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. This ecological site typically is subject to high-severity fire events.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn. A high-severity fire regime is the typical fire disturbance for this ecological site. During a high-severity fire, large proportions of the organic mat are consumed and the mineral soils typically are exposed. Permafrost commonly drops out of the soil profile, and the site becomes drier. Many pre-fire species regenerate after fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The fire return interval plays a significant role in the structure of the forest. A longer fire return interval favors the development of community phase 1.1, and a shorter fire return interval favors the development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White Spruce-Alder-Twinflower-Horsetail-Feathermoss Forest

Community Phase Narrative:
The majority of the tree cover is in the tall tree stratum (total mature tree cover ~45%). *Picea glauca* is the dominant tree species, but *Betula neoalaskana* is also present. The majority of the shrub cover is in the tall and dwarf strata (total shrub cover ~60%). Common shrubs include *Alnus viridis*, *Linnaea borealis*, and *Arctostaphylos rubra*. Forbs are a major vegetative component (25% cover). Common species include *Equisetum sp.* and *Geocaulon lividum*. Graminoids and lichen are minor vegetative components. Moss forms an extensive mat (~85% cover), and the primary species is *Hylocomium splendens*. Three observations of this phase were conducted.
Community Pathways

Pathway Number:	Pathway Name & Description:
1. 1 a	Fire. For this ecological site, community phase 1.1 has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	White Spruce-Paper Birch-Alder-Prickly Rose-Twinflower-Lingonberry-Feathermoss-Forest

Community Phase Narrative:
The majority of the tree cover is in the tall and medium tree strata (total mature tree cover ~50%). The dominant tree species are a mixture of *Picea glauca* and *Betula neoalaskana*. *Picea mariana* is common, but is a minor component. Shrub cover is evenly distributed among the tall, low, and dwarf shrub strata (total shrub cover ~50%). Common shrubs include *Alnus viridis*, *Rosa acicularis*, *Ledum palustre*, *Linnaea borealis*, and *Vaccinium vitis-idaea*. Forbs are common (~30% cover). Common species include *Equisetum sp*., *Cornus canadensis*, and *Geocaulon lividum*. Graminoids and lichen are minor vegetative components. Moss forms an extensive mat (~50% cover), and the primary species is *Hylocomium splendens*. Six observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Paper birch is eventually replaced by white spruce and results in a community resembling that of phase 1.1. The fire return interval is presumed to be shorter than that of community phase 1.1 but longer than that of community phase 1.3. Paper birch commonly occurs as standing dead trees, which indicates a transition to a phase that is dominantly white spruce.

Phase 1.3	

Community Phase Number:	1.3	Community Phase Name:	Paper Birch-Alder-Willow-Mixed Low Scrub-Blue Joint Grass-Forest
Community Phase Narrative:			
The majority of the tree cover is in the tall and medium tree strata (total mature tree cover ~50%). The dominant tree species is *Betula neoalaskana,* but *Picea glauca* is also present. Shrubs are least abundant in this phase (~25%). Common species include *Alnus viridis*, *Salix bebbiana*, and *Rosa acicularis*. The forb cover is ~25%, and the graminoid cover is ~35%. Common forbs are *Equisetum sp*., *Mertensia paniculata*, and *Cornus canadensis*, and a common graminoid is *Calamagrostis canadensis*. Lichen and moss are minor vegetative components.			
Community Pathways			

Pathway Number:	Pathway Name & Description:
1.3a	Fire. Stands of paper birch are less likely to burn and fire is less likely to spread on these stands than on stands that are dominantly white spruce; however, burned stands of paper birch are in the study area. If community phase 1.3 is burned, the resulting community would resemble community phase 1.4.
1.3b	Normal time and growth without fire. White spruce becomes codominant with paper birch, resulting in a community resembling that of community phase 1.2. The fire return interval is presumed to be shorter than that of community phase 1.2 but longer than that of community phase 1.4.

Phase 1.4			
Community Phase Number:	1.4	Community Phase Name:	Willow-mixed scrub-blue joint grass-fireweed-moss scrubland
Community Phase Narrative:			
This phase was observed in the field but was not sampled.			

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FM

Rooting Depth (cm): Min RV Max
64 64 64

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
11 11 11

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
5.3 5.3 5.3

Subsurface Layer

Thickness (cm): Min RV Max
53 53 53

Texture: Silt loam

AWC (cm/cm): Min RV Max
0.24 0.24 0.24

pH: Min RV Max
6.2 6.5 6.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-5	2-15	25-80	10-20	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):Min-Max

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	25-25	---	---	---
FD (<4 inches)	---	0.1-1	---	---
FM (4-24 inches)	---	0.1-5	---	---
SL (8-36 inches)	---	---	0.1-0.1	---
ST (>10 feet)	---	---	10-10	---
TR (<15 feet)	---	---	---	5-7
TM (15-40 feet)	---	---	---	2-2
TT (>40 feet)	---	---	---	35-7

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	25-35-45	100	59.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	20-20-20	50	31.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	20-20-20	50	31.6
EQPR	*Equisetum pratense*	10-10-10	50	22.4
MEPA	*Mertensia paniculata*	3-4-5	100	20.0
EQAR	*Equisetum arvense*	3-3-3	50	12.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-5-5	50	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	10-10-10	50	22.4
LEGR	*Ledum groenlandicum*	10-10-10	50	22.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	15-15-15	50	27.4

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SABE2	*Salix bebbiana*	10-10-10	50	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	5-7.5-10	100	27.4
PIGL	*Picea glauca*	2-4.5-7	100	21.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	55-55-55	50	52.4
PIGL	*Picea glauca*	2-2-2	50	10.0

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	35-35-35	50	41.8
PIGL	*Picea glauca*	7-7-7	50	18.7

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	7.2-8-8.5	54-55-57	3	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
9-59.5-110	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Other	Winter

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—14-16-18

Community Phase 2FL

Rooting Depth (cm):	Min	RV	Max
	54	65	76

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	20	21	22

Texture: Slightly decomposed plant material

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4.3	6.3	7.2

Subsurface Layer

Thickness (cm):	Min	RV	Max
	34	44	54

Texture: Gravelly silt loam, permanently frozen silt loam, silt loam

AWC (cm/cm):	Min	RV	Max
	0.21	0.24	0.25

pH:	Min	RV	Max
	5.8	6.6	7.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-20	30-80	5-70	5-18	0-2	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	15-15	---	---	---
FD (<4 inches)	---	1-3	---	---
FM (4-24 inches)	---	0.01-3	---	---
FT (>24 inches)	---	0.01-1	---	---
SD (<8 inches)	---	---	0.01-5	---
SL (8-36 inches)	---	---	0.01-8	---
ST (>10 feet)	---	---	10-15	---
TR (<15 feet)	---	---	---	2-5
TM (15-40 feet)	---	---	---	10-2
TT (>40 feet)	---	---	---	15-3

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-4-5	50	14.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-8.5-15	33	16.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	1-7.5-15	67	22.4
GELI2	*Geocaulon lividum*	5-6-7	33	14.1
ORSE	*Orthilia secunda*	3-3.3-4	50	12.9
GORE2	*Goodyera repens*	3-4.5-6	33	12.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	10-15-20	33	22.4
GELI2	*Geocaulon lividum*	2-6.8-15	67	21.2
EQPR	*Equisetum pratense*	5-10-15	33	18.3
EQAR	*Equisetum arvense*	3-6-10	50	17.3
MEPA	*Mertensia paniculata*	1-2.8-5	67	13.5
EQUIS	*Equisetum*	7-7-7	17	10.8
DEGL3	*Delphinium glaucum*	0.1-1.7-3	50	9.2

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	4-4.5-5	33	12.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-9.8-15	83	28.6
LIBO3	*Linnaea borealis*	0.1-7.6-15	83	25.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	0.1-8-15	100	28.3
LEGR	*Ledum groenlandicum*	3-11-20	50	23.5
VIED	*Viburnum edule*	1-4.2-7	67	16.8
SHCA	*Shepherdia canadensis*	0.1-2.6-5	33	9.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	5-7.5-10	33	15.8
SHCA	*Shepherdia canadensis*	2-3.5-5	33	10.8
VIED	*Viburnum edule*	7-7-7	17	10.8

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-15-25	50	27.4
SABE2	*Salix bebbiana*	10-10-10	33	18.3
SALIX	*Salix*	10-10-10	17	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-6-10	100	24.5
BENE4	*Betula neoalaskana*	2-5.7-10	50	16.8
PIMA	*Picea mariana*	5-5-5	17	9.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	7-16.8-40	67	33.4
BENE4	*Betula neoalaskana*	10-16.7-20	50	28.9
PIMA	*Picea mariana*	2-11-20	33	19.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-18.8-35	100	43.4
BENE4	*Betula neoalaskana*	7-13.8-25	67	30.3

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	8.6-9-10.7	42-46-50	3	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
47-63-125	6

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants		Unknown
Slight use	Other woody plants	Other	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—24-30.5-42

Community Phase HCPC

Rooting Depth (cm): Min RV Max
14 43.5 73

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
14 17.5 21

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
5.1 6.3 7.4

Subsurface Layer

Thickness (cm): Min RV Max
0 26 52

Texture: Gravelly sandy loam

AWC (cm/cm): Min Avg Max
0.12 0.13 0.14

pH: Min RV Max
6.8 7.1 7.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-5	75-90	5-25	3-15	0-2	0-0	0-1

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	1-3	---	---
FM (4-24 inches)	---	0.1-10	---	---
SD (<8 inches)	---	---	2-3	---
SL (8-36 inches)	---	---	0.1-1	---
SM (3-10 feet)	---	---	15-15	---
ST (>10 feet)	---	---	15-15	---
TM (15-40 feet)	---	---	---	15-15
TT (>40 feet)	---	---	---	40-40

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CASC10	*Carex scirpoidea*	7-7-7	33	15.3

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-5-5	67	18.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQVA	*Equisetum variegatum*	10-10-10	33	18.3
GELI2	*Geocaulon lividum*	6-6-6	33	14.1
PYGR	*Pyrola grandiflora*	2-2.5-3	67	12.9
ORSE	*Orthilia secunda*	2-2.5-3	67	12.9
GORE2	*Goodyera repens*	4-4-4	33	11.5
STLO2	*Stellaria longipes*	3-3-3	33	10.0
PYAS	*Pyrola asarifolia*	3-3-3	33	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	3-9-15	67	24.5
GELI2	*Geocaulon lividum*	1-5.5-10	67	19.1
MEPA	*Mertensia paniculata*	10-10-10	33	18.3
COCA13	*Cornus canadensis*	6-6-6	33	14.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	4-4-4	33	11.5
DEGL3	*Delphinium glaucum*	3-3-3	33	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	3-9.3-20	100	30.6
ARRU	*Arctostaphylos rubra*	2-4-7	100	20.0
VAVI	*Vaccinium vitis-idaea*	8-8-8	33	16.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RITR	*Ribes triste*	10-10-10	33	18.3
LEGR	*Ledum groenlandicum*	7-7-7	33	15.3
VAUL	*Vaccinium uliginosum*	5-5-5	33	12.9
VIED	*Viburnum edule*	1-2-3	67	11.5
ROAC	*Rosa acicularis*	1-2-3	67	11.5
RIBES	*Ribes*	3-3-3	33	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SHCA	*Shepherdia canadensis*	15-15-15	33	22.4
ROAC	*Rosa acicularis*	5-5-5	33	12.9
SAAR3	*Salix arbusculoides*	5-5-5	33	12.9

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	15-17.5-20	67	34.2
ALNUS	*Alnus*	18-18-18	33	24.5
SAALA	*Salix alaxensis var. alaxensis*	15-15-15	33	22.4
SABE2	*Salix bebbiana*	15-15-15	33	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-3.5-5	67	15.3
BENE4	*Betula neoalaskana*	4-4-4	33	11.5

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-9-15	100	30.0
BENE4	*Betula neoalaskana*	5-5-5	33	12.9

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	25-31.7-40	100	56.3
BENE4	*Betula neoalaskana*	6-6-6	33	14.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	89-143-271	7.2-10-12.5	46-63-78	8	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
73-99.5-142	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Other woody plants	Other	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—22-28.7-35

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea mariana*/*Betula glandulosa*

Ecological Classification ID: F231XY124AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills, mountains, nonsorted circles on hills, turf hummocks on hills

Slope (percent):	Min	Max
	5	70

Elevation (feet):	Min	Max
	2,461	4,265

Range of Aspect Direction: South to northeast (clockwise)

Water Table Depth (cm): None recorded

Flooding:	Frequency	Duration
	None	None

Ponding:	Frequency	Duration
	None	None

Runoff: Medium

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	11	32

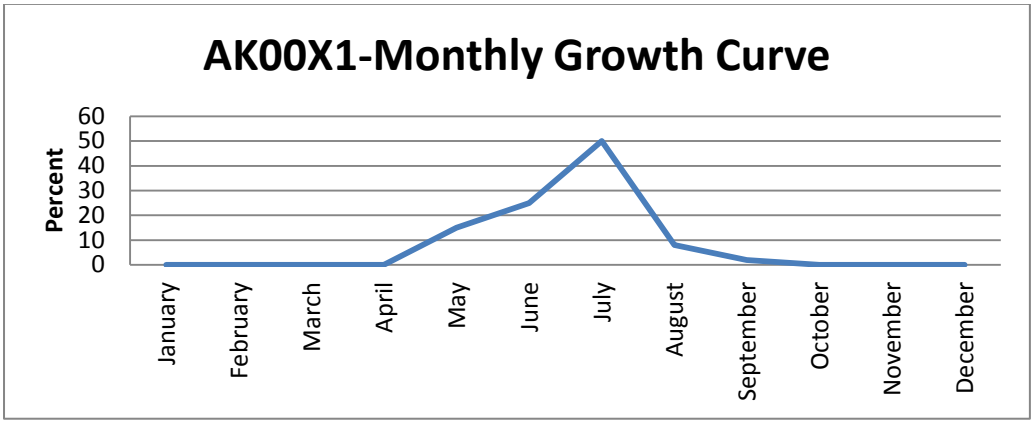
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31UC2—D31-Subalpine woodland rocky colluvial slopes, cold

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Dominant Parent Material: Organic material over gravelly colluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Loamy-skeletal
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	7	11	14

pH:	Low	RV	High
	3.4	5.5	6.9

Effective CEC (me/100g):	Low	High
	11.1	33.9

CEC (me/100g):	Min	RV	Max
	4.9	24.4	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.39

Plant Community Phases

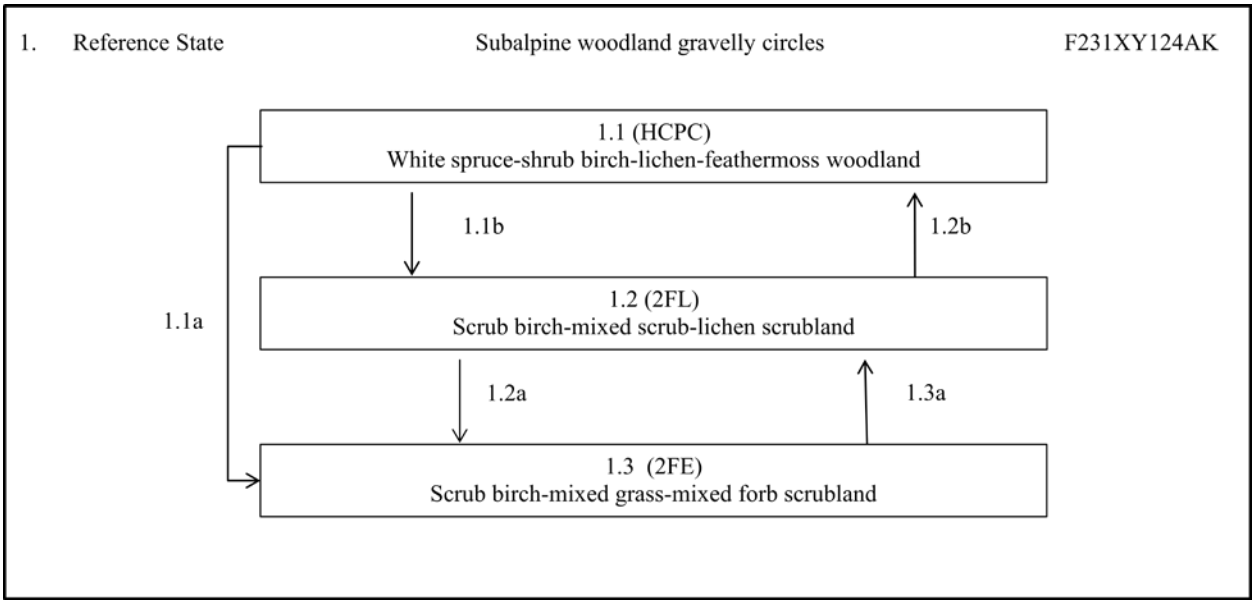
Ecological Site Description ID:	F231XY124AK

Ecological Dynamics of the Site:

This subalpine ecological site is at high elevations, generally on convex backslopes of mountains (>5% slopes; 850 to 1,150 meters elevation). Cryoturbation resulted in patterned ground features known as circles. The soils in community phase 1.1 are classified as Haplocryepts and are composed of organic matter over gravelly cryoturbate. There is no obvious rock sorting. Rocks typically are on the soil surface, but they are not abundant. White spruce is present, but the cover in the climax phase generally is sparse due mainly to the cold microclimate. This site is on landscape positions similar to those of site R231XY129AK, but the soils associated with this site have a higher content of rock fragments and do not have permafrost.

Fire is a documented disturbance regime that resulted in three observed phases. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. For this ecological site, high-severity fire events are believed to be more typical than low-severity fire events. Low-severity and high-severity fire events appear to cause differences in the thickness of the organic material on the soil surface and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	For the climax phase, the dominant vegetation is a mixture of shrubs in the medium, low, and dwarf strata. The tree cover is sporadic, and it is evenly distributed among the tall, medium, stunted, and regenerative tree strata. The sites are considered woodland (10-25% tree cover). The phases were grouped primarily on the basis of the general height and age of the trees, which are believed to indicate the time since the last fire event. Fire has completely removed the tree canopy. Because the early-phase vegetation is a mixture of broadleaf tree regeneration and herbaceous plants, the disturbance was likely a high-severity fire event. This high-severity fire likely consumed much of the organic mat, exposing the mineral soil. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). In interior Alaska, the dominant subalpine tree species is *Picea glauca*. *Picea glauca* establishes after fire from offsite seed sources; therefore, the fire return interval likely greatly affects the abundance of white spruce cover at any given location. Shorter fire return intervals likely result in less long-term coniferous tree cover than do longer fire return intervals. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-shrub birch-lichen-feathermoss woodland

Community Phase Narrative:
The tree canopy is evenly distributed among stunted, regenerative, medium, and tall trees. The site is considered woodland. *Picea glauca* is the most common tree species, but *Picea mariana* is also present. For this phase, *Picea glauca* averages 70 years of age (28 to 123 years). This phase has abundant shrub cover, most of which is in the low and dwarf strata. The most common medium shrub is *Betula glandulosa*, the most common low shrubs are *Betula glandulosa* and *Vaccinium uliginosum*, and the most common dwarf shrub is *Empetrum nigrum*. Graminoids and forbs are minor vegetative components. Lichen and moss are evenly distributed across the site (combined >50% ground cover). The diversity of the lichen is high, but no individual species is dominant. The most common moss species are *Hylocomium splendens* and *Pleurozium schreberi*.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	High-severity fire.
1.1b	Low-severity or spot fires. Fire removes the majority of the spruce cover, but shrubs quickly regenerate post-fire.

Phase 1.2	

Community Phase Number:	1.2	Community Phase Name:	Scrub birch-mixed scrub-lichen scrubland

Community Phase Narrative:

Because most of the other vegetative components in the late and climax phases are similar, the tree canopy is the major distinguishing factor. The tree canopy consists dominantly of stunted and regenerative trees, and the site typically does not have enough cover to be considered woodland (<10% tree cover). *Picea glauca* is the most common tree species, but *Picea mariana* and *Betula neoalaskana* are also present. For this phase, *Picea glauca* averages 54 years of age (19 to 117 years), and the diameter at breast height averages 3.8 inches. The most common medium and low shrub is *Betula glandulosa*, and the most common dwarf shrubs are *Empetrum nigrum*, *Vaccinium vitis-idaea*, and *Ledum palustre*. Graminoids and forbs are minor vegetative components. The diversity of the lichen is high. Common lichen include various *Cladina sp*. and *Masonhalea richardsonii.*

Community Pathways

Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire disturbance. White spruce matures into woodland. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3	

Community Phase Number:	1.3	Community Phase Name:	Scrub birch-mixed grass-mixed forb scrubland
Community Phase Narrative:			
All of the tree canopy is in the regenerative tree stratum, and it consists primarily of *Populus tremuloides*. As compared to the climax and late phase vegetation, the abundance of shrubs and lichen is substantially lower. The most common shrub is *Betula glandulosa*. Unlike in the late and climax phases, graminoids and forbs are major vegetative components. The most common graminoids are *Festuca altaica* and *Calamagrostis canadensis*, and the most common forb is *Chamerion angustifolium*. Two observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	Normal time and growth without disturbance.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm):

Min	Avg	Max
60	68	76

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm):

Min	Avg	Max
0	0	0

Texture: Silt loam

AWC (cm/cm): Min Avg Max
0.24 0.24 0.25

pH: Min Avg Max
6.4 6.8 7.11

Subsurface Layer

Thickness (cm): Min Avg Max
60 68 76

Texture: Gravelly silt loam, very cobbly silt loam, extremely cobbly silt loam, very gravelly very fine sandy loam

AWC (cm/cm): Min Avg Max
0.12 0.2 0.24

pH: Min Avg Max
6.5 7.1 7.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-2	10-55	10-90	4-15	1-5	1-15	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	40-40	---	---	---
FD (<4 inches)	---	0.01-2	---	---
FM (4-24 inches)	---	0.01-5	---	---
SD (<8 inches)	---	---	1-5	---
SL (8-36 inches)	---	---	0.01-5	---
SM (3-10 feet)	---	---	1-3	---
TR (<15 feet)	---	---	---	2-25

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	40-40-40	50	44.7
CAPU	*Calamagrostis purpurascens*	3-3-3	50	12.2

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
FEAL	*Festuca altaica*	40-40-40	50	44.7

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	2-2-2	50	10.0
SATR5	*Saxifraga tricuspidata*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	2-11-20	100	33.2
GEPR3	*Gentiana prostrata*	5-5-5	50	15.8
EQAR	*Equisetum arvense*	5-5-5	50	15.8
ACMI2	*Achillea millefolium*	3-3-3	50	12.2
ACDE2	*Aconitum delphiniifolium*	0-1-2	100	10.0
GABO2	*Galium boreale*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARUV	*Arctostaphylos uva-ursi*	5-5-5	50	15.8
LIBO3	*Linnaea borealis*	2-2-2	50	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	5-5-5	50	15.8
BEOC2	*Betula occidentalis*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	25-25-25	50	35.4
ALINT	*Alnus incana ssp. tenuifolia*	1-2.5-4	100	15.8
LEPAD	*Ledum palustre ssp. decumbens*	3-3-3	50	12.2
SAGL	*Salix glauca*	3-3-3	50	12.2
ROAC	*Rosa acicularis*	2-2-2	50	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	2-13.5-25	100	36.7
POBA2	*Populus balsamifera*	2-2-2	50	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—19-24-29

Community Phase 2FL

Rooting Depth (cm): Min RV Max
19 54.2 81

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 3.2 8

Texture: Channery silt loam, highly decomposed plant material, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.21 0.32 0.4

pH: Min RV Max
3.2 4.2 4.9

Subsurface Layer

Thickness (cm): Min RV Max
19 51 73

Texture: Extremely bouldery very fine sandy loam, cobbly loam, very cobbly coarse sandy loam, very cobbly sandy loam, very channery sandy loam, extremely channery coarse sand, extremely channery very fine sandy loam, very stony coarse sandy loam, very flaggy fine sandy loam, extremely flaggy fine sandy loam, extremely stony sandy loam

AWC (cm/cm): Min RV Max
0.03 0.12 0.24

pH: Min RV Max
5 5.6 6.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
12-90	5-40	3-40	0-10	0-5	0-25	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-3	---	---	---
FD (<4 inches)	---	0.1-2	---	---
FM (4-24 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	10-5	---
SL (8-36 inches)	---	---	0.1-25	---
TR (<15 feet)	---	---	---	1-1
TS (<15 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
FEAL	*Festuca altaica*	1-10.3-15	38	19.7
CAREX	*Carex*	5-7.5-10	25	13.7
CABI5	*Carex bigelowii*	1-3.5-7	50	13.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	7-7-7	13	9.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-10.9-50	100	33.0
EMNI	*Empetrum nigrum*	5-10.1-15	100	31.8
LEGR	*Ledum groenlandicum*	80-80-80	13	31.6
ARAL2	*Arctostaphylos alpina*	1-10.8-30	75	28.5
LOPR	*Loiseleuria procumbens*	2-6.7-12	75	22.4
DROC	*Dryas octopetala*	0-6.2-15	75	21.5
LEPAD	*Ledum palustre ssp. decumbens*	3-9-15	25	15.0
ARRU	*Arctostaphylos rubra*	10-10-10	13	11.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	5-23.8-40	50	34.5
VAUL	*Vaccinium uliginosum*	2-5.1-10	88	21.2
LEPAD	*Ledum palustre ssp. decumbens*	0.1-4.7-12	38	13.3
BEOC2	*Betula occidentalis*	2-4.5-7	25	10.6

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	5-30-50	38	33.5
SARI4	*Salix richardsonii*	10-10-10	13	11.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEOC2	*Betula occidentalis*	10-10-10	13	11.2
ALVIF	*Alnus viridis ssp. fruticosa*	7-7-7	13	9.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-3.2-5	63	14.1
BENE4	*Betula neoalaskana*	10-10-10	13	11.2

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	4-6.2-10	75	21.5

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-6.5-8	25	12.7

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	19-58-117	1.1-4-9	6-17-37	13	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
4-47-90	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Caribou	Spring
Slight use	Grasses and sedges	Dall sheep	Unknown
Slight use	Other woody plants	Caribou	Unknown
Slight use	Willows	Moose	Spring

Notable Plants: None observed

Species Richness: Number of stops—8; plant species per stop (min-avg-max)—22-27.5-35

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	46	76.5	93

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	8.8	14

Texture: Highly decomposed plant material, silt loam, slightly decomposed plant material

AWC (cm/cm):	Min	RV	Max
	0.25	0.34	0.4

pH: Min RV Max
3.7 4.6 5.7

Subsurface Layer

Thickness (cm): Min RV Max
46 67.8 79

Texture: Extremely cobbly coarse sandy loam, very gravelly sandy loam, extremely gravelly coarse sand, silt loam

AWC (cm/cm): Min RV Max
0.02 0.11 0.24

pH: Min RV Max
4.4 5.9 6.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
25-45	3-50	5-37	0-10	0-5	0-20	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
GT (>24 inches)	7-7	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	1-7	---	---
SD (<8 inches)	---	---	10-3	---
SL (8-36 inches)	---	---	10-15	---
SM (3-10 feet)	---	---	10-20	---
ST (>10 feet)	---	---	15-15	---
TR (<15 feet)	---	---	---	2-2
TM (15-40 feet)	---	---	---	10-10
TT (>40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	2-3.5-5	33	10.8
CACA11	*Carex canescens*	5-5-5	17	9.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
FEAL	*Festuca altaica*	7-7-7	17	10.8
CACA4	*Calamagrostis canadensis*	7-7-7	17	10.8

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	7-7-7	17	10.8
POBO2	*Polemonium boreale*	5-5-5	17	9.1
SOMU	*Solidago multiradiata*	5-5-5	17	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	5-20-35	83	40.8
VAVI	*Vaccinium vitis-idaea*	2-6.2-10	67	20.4
ARAL2	*Arctostaphylos alpina*	2-7.3-15	50	19.1
DROC	*Dryas octopetala*	2-7.3-15	50	19.1
ARRU	*Arctostaphylos rubra*	10-10-10	17	12.9
VAUL	*Vaccinium uliginosum*	5-5-5	17	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	15-23.8-35	67	39.8
VAUL	*Vaccinium uliginosum*	5-11-20	83	30.3
ROAC	*Rosa acicularis*	0-5.7-10	50	16.8
LEGR	*Ledum groenlandicum*	15-15-15	17	15.8
SAPU15	*Salix pulchra*	15-15-15	17	15.8
VAVI	*Vaccinium vitis-idaea*	5-7.5-10	33	15.8
EMNI	*Empetrum nigrum*	10-10-10	17	12.9
SALIX	*Salix*	1-3-5	33	10.0
LEPAD	*Ledum palustre ssp. decumbens*	1-3-5	33	10.0
SAGL	*Salix glauca*	0-2.5-5	33	9.1
ALINT	*Alnus incana ssp. tenuifolia*	5-5-5	17	9.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	15-17.5-20	33	24.2
SAPU15	*Salix pulchra*	5-7.5-10	33	15.8
SARI4	*Salix richardsonii*	10-10-10	17	12.9
SAGL	*Salix glauca*	5-5-5	17	9.1

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEOC2	*Betula occidentalis*	15-15-15	17	15.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-1.7-2	50	9.1
PIMA	*Picea mariana*	5-5-5	17	9.1

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-4.3-5	50	14.7
PIMA	*Picea mariana*	10-10-10	17	12.9

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-10-15	67	25.8

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	10-10-10	33	18.3

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	28-70-123	2.4-6-12.1	12-30-65	10	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
1-10-23	4

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Caribou	Spring
No observed use			Not grazed/browsed
Slight use	Willows	Caribou	Unknown
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Summer
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—25-30-35

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Populus balsamifera*/*Salix alaxensis*/*Calamagrostis canadensis*
Ecological Classification ID: F231XY130AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways on hills, low flood plains

Slope (percent):	Min	Max
	1	5

Elevation (feet):	Min	Max
	656	2,657

Range of Aspect Direction: All aspects
Water Table Depth (cm): None recorded

Flooding:	Frequency	Duration
	Frequent	Brief

Ponding:	Frequency	Duration
	None	None

Runoff: Low

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	10	28

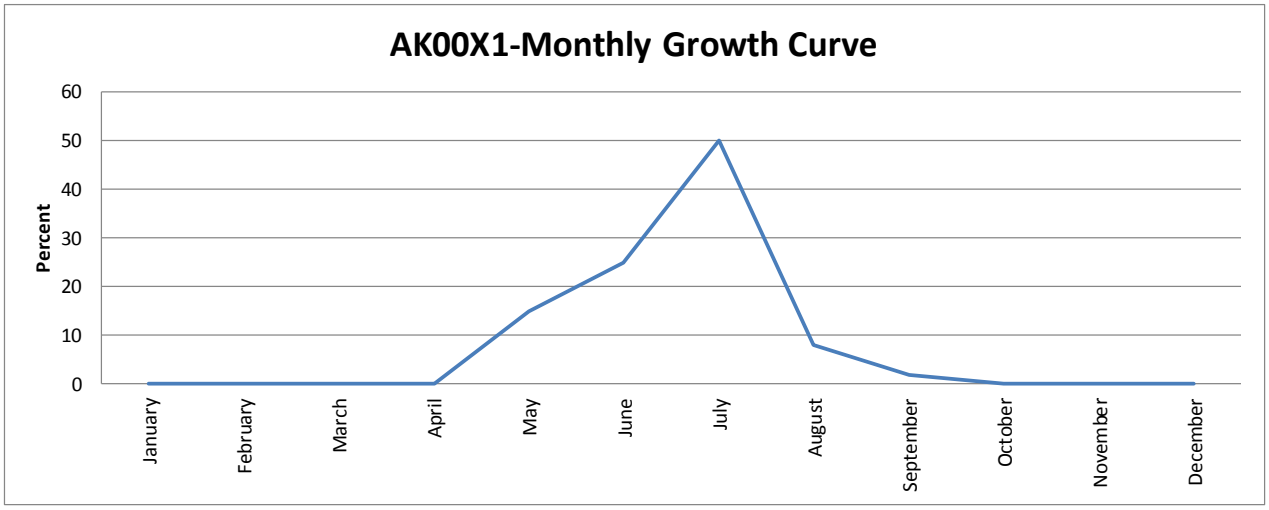
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH5—D31-Boreal woodland rocky low flood plains
D31HL1—D31-Boreal woodland rocky low flood plains
D31UC1—D31-Boreal woodland rocky low flood plains
D31UC4—D31-Boreal woodland rocky low flood plains

Characteristics of Representative Soil Components

Soil Classification: Sandy or sandy-skeletal, mixed Typic Cryorthents
Dominant Parent Material: Sandy and gravelly alluvium
Representative Surface Texture: Very cobbly coarse sandy loam
Subsurface Texture Group: Sandy or sandy-skeletal
Saturated Hydraulic Conductivity: High

AWC Total (cm):	Low	RV	High
	3	5	6

pH:	Low	RV	High
	5.9	7.2	8

Effective CEC (me/100g):	Low	High
	4	4

CEC (me/100g):	Min	RV	Max
	1.9	2.3	2.7

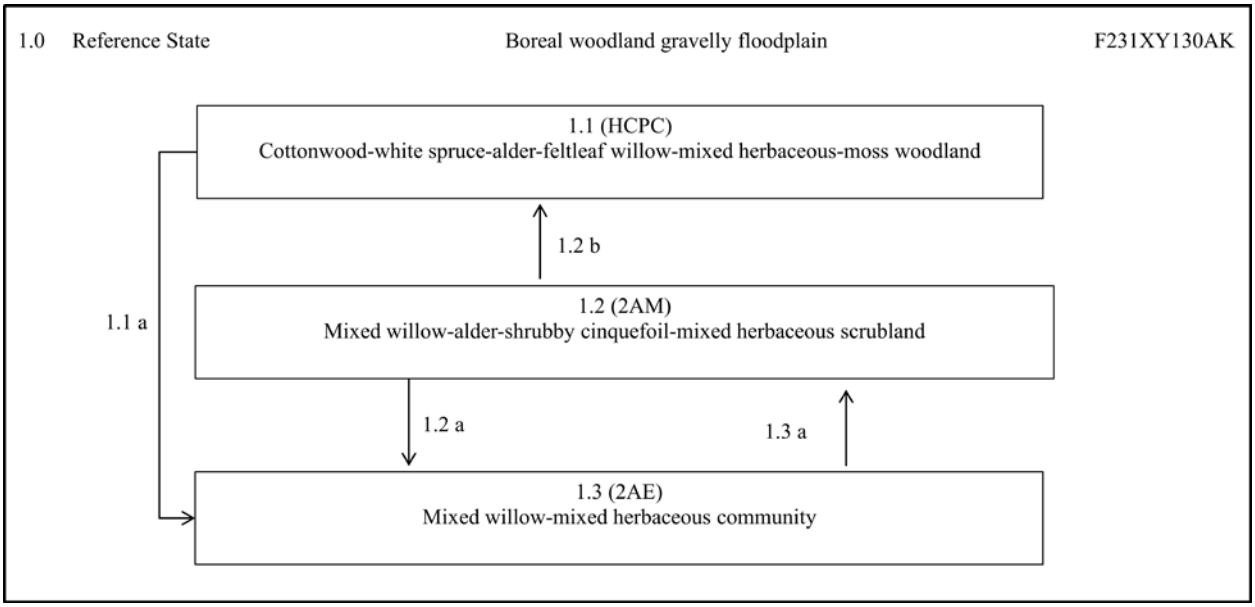
Organic Matter (percent):	Low	RV	High
	0.9	0.9	0.9

Bulk Density (1/3-Bar):	Min	RV	Max

1.38 1.5 1.59

Plant Community Phases

Ecological Site Description ID:	F231XY130AK
Ecological Dynamics of the Site:	
This boreal ecological site is associated with all river systems that are subject to frequent flood events, with the exception of the Yukon River. Soils are classified as Cryorthents and are composed of sandy and/or loamy alluvium over gravelly alluvium. The duration of the periods of flooding is short enough to allow vegetation to grow on bars, but the intensity of the flooding hinders growth of trees. This site commonly supports woodland with stands of alder and willow. As the site progresses from phase 1.3 to 1.1, less soil is exposed and surface plant litter increases. These changes likely coincide with increases in vegetative cover. Ice damning disturbance was not observed on this ecological site that results in three unique phases. If the flood regime shifts to favor the growth of white spruce, the area transitions to ecological site F231XY131AK.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Phases in the reference state were grouped based on the structure and dominance of tree and shrub species, which are believed to be directly related to the duration and intensity of flooding of the river systems. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to		

	3 feet, and dwarf shrubs as less than 8 inches.		
Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Cottonwood-white spruce-alder-feltleaf willow-mixed herbaceous-moss woodland
Community Phase Narrative:			
Community phase 1.1 has a taller and denser tree and shrub cover than does community phase 1.2. The tree cover is evenly distributed between the medium and regenerative strata (total mature tree cover ~15%). *Populus balsamifera* is dominant in the medium tree stratum, and *Picea glauca* is dominant in the regenerative tree stratum. The majority of the shrub cover is in the tall and medium strata (total shrub cover ~50%). Common shrub species include *Salix alaxensis*, *Alnus incana* spp. *tenuifolia*, and *Rosa acicularis*. Common graminoids and forbs include *Hedysarum alpinum, Artemisia tilesii*, and *Calamagrostis canadensis.* Moss makes up a significant ground cover (~25%), and the most common species is *Hylocomium splendens*. Six observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Increased flood frequency, duration, and/or flood intensity shift the community from dominantly tall shrubs with a closed canopy to a sparsely vegetated herbaceous community.		

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Alder-mixed willow-shrubby cinquefoil-mixed herbaceous scrubland
Community Phase Narrative:			
Community phase 1.2 has a taller and denser shrub cover than does community phase 1.3. Seedlings of *Picea glauca* and *Populus balsamifera* are a minor vegetative component. Medium and low shrubs are the dominant cover (total shrub cover ~50%). Common species include *Alnus incana ssp. tenuifolia* and *Salix alaxensis*. Graminoids and forbs are common, but they occur at low densities (~20% cover). Common species are *Hedysarum alpinum, Artemisia tilesii*, *Carex lasiocarpa*, *Calamagrostis canadensis*, and *Chamerion latifolium.* Five observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Increased flood frequency, duration, and intensity shift the community from dominantly medium and tall shrubs with an open canopy to a sparsely vegetated herbaceous community.
1.2b	Normal time and growth. Flood disturbance is less frequent, and the community shifts from an open shrub community to a closed shrub community.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Mixed willow-mixed herbaceous community
Community Phase Narrative:			
This phase is characterized by sparse trees, shrubs, graminoids, and forbs. Seedlings of *Picea glauca*, *Betula neoalaskana,* and *Populus balsamifera* are a minor vegetative component. Low shrubs are dominant (total shrub cover ~10%). Common species include *Salix pseudomonticola* and *Salix alaxensis*. Graminoids and forbs are common, but they occur at low densities (~15% cover). Common species are *Hedysarum alpinum, Eurybia sibirica, Wilhelmsia physodes,* and *Artemisia tilesii*. Three observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth. Flood disturbance is less frequent, and the community shifts from a sparse forb community to an open shrub community.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2AE

Rooting Depth (cm):	Min	RV	Max
	44	50.7	56

Restrictive Features: None recorded

Drainage Class: Moderately well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	0	0

Texture: Gravelly loamy coarse sand, very cobbly sandy loam, very gravelly loamy coarse sand

AWC (cm/cm):	Min	RV	Max
	0.02	0.05	0.07

pH:	Min	RV	Max
	6.3	7.1	7.7

Subsurface Layer

Thickness (cm):	Min	RV	Max
	44	50.7	56

Texture: Extremely cobbly coarse sand, extremely channery loamy coarse sand

AWC (cm/cm):	Min	RV	Max
	0.03	0.04	0.06

pH:	Min	RV	Max
	7.8	7.9	8

Influencing Water Features

NWI Code: R2UB1, R2US1

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Cobble Gravel; Riverine, Lower Perennial, Unconsolidated Shore, Cobble Gravel

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars; steep, entrenched, cascading step-pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	0-8	3-10	1-15	3-40	45-93	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	0.01-3	---	---
FM (4-24 inches)	---	0.01-1	---	---
SL (8-36 inches)	---	---	0.01-5	---
TR (<15 feet)	---	---	---	0.01-0.01

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POA	*Poa*	15-15-15	33	22.4
DECA18	*Deschampsia caespitosa*	5-5-5	33	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ELMA7	*Elymus macrourus*	10-10-10	33	18.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	3-3-3	33	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
HEAL	*Hedysarum alpinum*	2-2-2	67	11.5
ARTI	*Artemisia tilesii*	1-1.5-2	67	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPS	*Salix pseudomonticola*	20-20-20	33	25.8
SAAL	*Salix alaxensis*	5-5-5	67	18.3

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	5-7.5-10	67	22.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
Slight use		Moose	Winter
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—10-12.7-16

Community Phase 2AM

Rooting Depth (cm):	Min	RV	Max
	4	42.6	71

Restrictive Feature: Permafrost

Drainage Class: Moderately well drained

Surface Layer

Thickness (cm): Min RV Max
0 4 17

Texture: Gravelly fine sand, peat

AWC (cm/cm): Min RV Max
0.03 0.18 0.35

pH: Min RV Max
3.7 6.6 7.7

Subsurface Layer

Thickness (cm): Min RV Max
4 38.6 54

Texture: Very cobbly coarse sand, very gravelly loamy sand, extremely cobbly coarse sand, extremely gravelly loamy coarse sand, highly organic silt loam, silt loam, peat

AWC (cm/cm): Min RV Max
0.03 0.09 0.35

pH: Min RV Max
4.2 6.2 7.7

Influencing Water Features

NWI Code: R2UB1, R3US1

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Upper Perennial, Unconsolidated Shore, Cobble-Gravel.

Rosgen Classification: Moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools; low-gradient, meandering, alluvial riffle/pool channels with point bars; multiple channels, narrow and deep with expansive, vegetated floodplain and wetlands; low-gradient, meandering, riffle/pool stream with low W/D ratio and little deposition

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-1	2-35	10-35	2-10	5-80	10-65	0-10

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-8	---	---	---
GT (>24 inches)	10-10	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1-8	---	---
SM (3-10 feet)	---	---	10-25	---
TR (<15 feet)	---	---	---	1-1

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CALA11	*Carex lasiocarpa*	1-8-15	40	17.9
ERVA4	*Eriophorum vaginatum*	10-10-10	20	14.1
JUTE	*Juncus tenuis*	10-10-10	20	14.1
DECA18	*Deschampsia caespitosa*	8-8-8	20	12.6
CAAQ	*Carex aquatilis*	5-5-5	20	10.0
CACA4	*Calamagrostis canadensis*	1-2.5-4	40	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ELMA7	*Elymus macrourus*	10-10-10	20	14.1
AGROS2	*Agrostis*	5-5-5	20	10.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	10-10-10	20	14.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
HEAL	*Hedysarum alpinum*	0-3.3-8	60	14.1
EQAR	*Equisetum arvense*	10-10-10	20	14.1
ARTI	*Artemisia tilesii*	0.1-2.6-5	40	10.1
EUSI13	*Eurybia sibirica*	2-2.5-3	40	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	20-20-20	20	20.0
VAUL	*Vaccinium uliginosum*	15-15-15	20	17.3
BEGL	*Betula glandulosa*	5-5-5	20	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAALL	*Salix alaxensis var. longistylis*	15-20-25	40	28.3
SAAL	*Salix alaxensis*	3-14-25	40	23.7
SAALA	*Salix alaxensis var. alaxensis*	10-12.5-15	40	22.4
ALINT	*Alnus incana ssp. tenuifolia*	5-10-15	40	20.0
SAPU15	*Salix pulchra*	15-15-15	20	17.3
ALVIF	*Alnus viridis ssp. fruticosa*	15-15-15	20	17.3
SABE2	*Salix bebbiana*	12-12-12	20	15.5
SAAR3	*Salix arbusculoides*	10-10-10	20	14.1
SAPS	*Salix pseudomonticola*	5-5-5	20	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	1-12-30	60	26.8

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Summer
Slight use	Willows	Moose	Unknown

Notable Plants: *Juncus tenuis*

Species Richness: Number of stops—5; plant species per stop (min-avg-max)—12-15-18

Community Phase HCPC

Rooting Depth (cm) :	Min	RV	Max
	39	56.3	74

Restrictive Features: None recorded

Drainage Class: Moderately well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	0.7	4

Texture: Fine sandy loam, loamy sand, sandy loam, silt loam

AWC (cm/cm):	Min	RV	Max
	0.08	0.2	0.35

pH: Min RV Max
5.7 6.8 7.7

Subsurface Layer

Thickness (cm): Min RV Max
39 55.7 70

Texture: Very gravelly coarse sand, very gravelly loamy sand, extremely cobbly coarse sand, loamy sand, extremely stony loamy sand, very fine sandy loam

AWC (cm/cm): Min RV Max
0.02 0.06 0.25

pH: Min RV Max
6.1 7 7.6

Influencing Water Features

NWI Code: PSS1, R2UB1

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Riverine, Lower Perennial, Unconsolidated Bottom, Cobble-Gravel

Rosgen Classification: Moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools; low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-4	3-75	15-50	1-15	0-65	0-30	0-5

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-1	---	---	---
GT (>24 inches)	70-70	---	---	---
FD (<4 inches)	---	0.1-1	---	---
FM (4-24 inches)	---	0.1-15	---	---
SL (8-36 inches)	---	---	0.1-5	---
SM (3-10 feet)	---	---	5-5	---
ST (>10 feet)	---	---	45-45	---
TR (<15 feet)	---	---	---	2-2
TM (15-40 feet)	---	---	---	2-5
TT (>40 feet)	---	---	---	15-15

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POA	*Poa*	1-8-15	33	16.3
CACA4	*Calamagrostis canadensis*	1-2.7-4	50	11.5
POPA2	*Poa palustris*	5-5-5	17	9.1
BRINP5	*Bromus inermis ssp. pumpellianus var. pumpellianus*	5-5-5	17	9.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-42.5-70	33	37.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	15-15-15	17	15.8
COPA28	*Comarum palustre*	1-5.5-10	33	13.5
HEAL	*Hedysarum alpinum*	0-2.5-7	67	12.9
ARTI	*Artemisia tilesii*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUARA2	*Rubus arcticus ssp. acaulis*	15-15-15	17	15.8
ARRU	*Arctostaphylos rubra*	5-5-5	17	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	2-3-5	67	14.1
VAUL	*Vaccinium uliginosum*	5-5-5	17	9.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAL	*Salix alaxensis*	20-35-50	33	34.2
ALINT	*Alnus incana ssp. tenuifolia*	5-6.2-10	67	20.4
ALVIF	*Alnus viridis ssp. fruticosa*	2-8.5-15	33	16.8

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAL	*Salix alaxensis*	45-45-45	17	27.4
SAALL	*Salix alaxensis var. longistylis*	40-40-40	17	25.8
SAPS	*Salix pseudomonticola*	35-35-35	17	24.2
SAALA	*Salix alaxensis var. alaxensis*	35-35-35	17	24.2
ALINT	*Alnus incana ssp. tenuifolia*	10-10-10	17	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-8.8-25	100	29.7
POBA2	*Populus balsamifera*	3-5.8-10	67	19.6
BENE4	*Betula neoalaskana*	0.1-1.5-2	67	10.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	1-15.8-50	67	32.4
PIGL	*Picea glauca*	10-10-10	17	12.9
BENE4	*Betula neoalaskana*	5-5-5	17	9.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	1-8-15	33	16.3

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	40-51-57	1.1-1-1.4	9-10-12	3	B

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Winter
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—17-20.5-24

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca*/*Rosa acicularis*/*Lupinus arcticus*

Ecological Classification ID: F231XY131AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways on hills, high flood plains, low flood plains

Slope (percent):	Min	Max
	1	12

Elevation (feet):	Min	Max
	656	2,625

Range of Aspect Direction: All aspects

Water Table Depth (cm): None recorded

Flooding:	Frequency	Duration
	None	None

Ponding:	Frequency	Duration
	Rare	Very brief

Runoff: Low

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	10	28

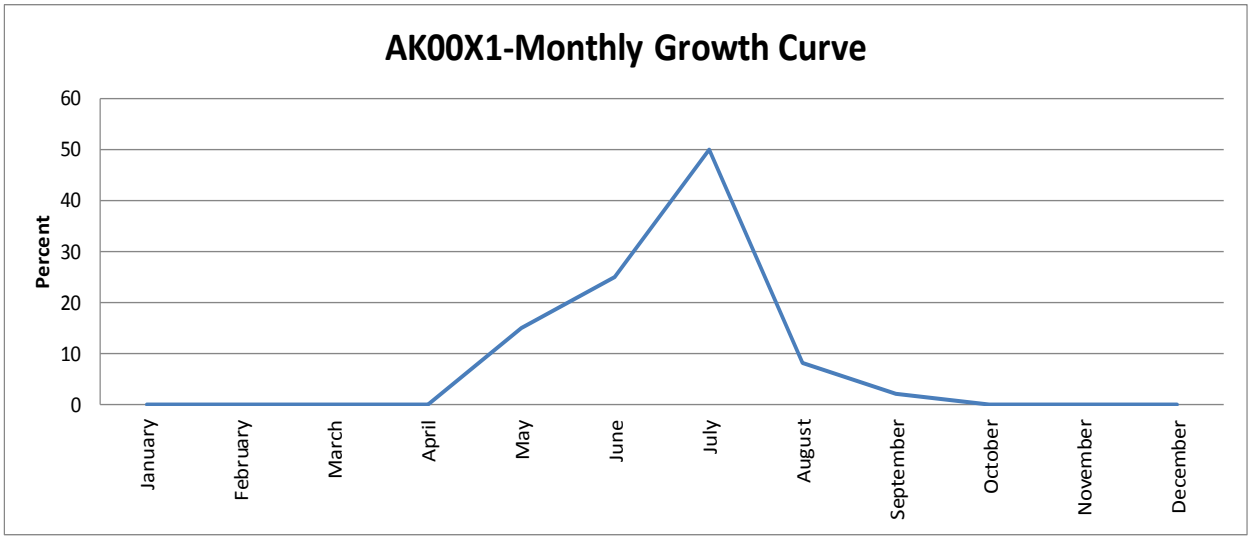
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH5—D31-Boreal forest loamy high flood plains
D31UC1—D31-Boreal forest loamy high flood plains
D31UC4—D31-Boreal forest loamy high flood plains

Characteristics of Representative Soil Components

Soil Classification: Sandy or sandy-skeletal, mixed Typic Cryorthents
Dominant Parent Material: Organic material over sandy and gravelly alluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Sandy or sandy-skeletal
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	6	12	17

pH:	Low	RV	High
	3.4	6.3	7.5

Effective CEC (me/100g):	Low	High
	17.7	40

CEC (me/100g):	Min	RV	Max
	2.7	22.9	62

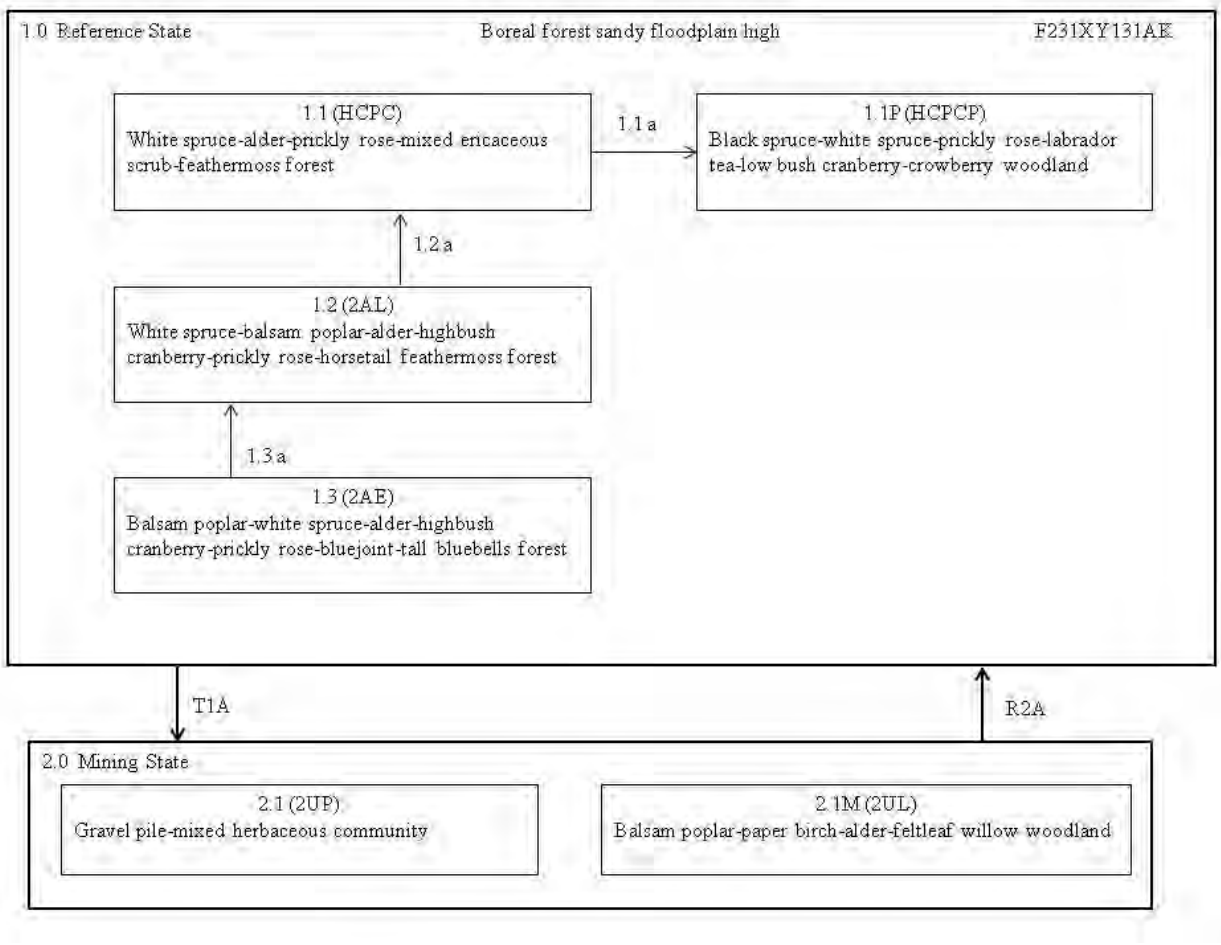
Organic Matter (percent):	Low	RV	High
	0.9	29	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.9	1.1	1.36

Plant Community Phases

Ecological Site Description ID:	F231XY131AK
Ecological Dynamics of the Site:	
This boreal ecological site is associated with all river systems that are subject to occasional to very rare flood events, with the exception of the Yukon River. Decreased intensity and frequency of flooding favors the replacement of tall scrubs with tree species, marking a successional progression from ecological site F231XY130AK (starting with community phase 1.3). As the site progresses from community phase 1.3 to 1.1, the surface organic matter content increases and tree composition shifts from dominantly deciduous to dominantly coniferous. In community phase 1.1, the soils are classified as Cryorthents and are composed of organic matter over sandy and gravelly alluvium. As flooding becomes very rare, this ecological site begins to shift toward that of a flood plain terrace site (e.g., F231XY169AK). Indicators of this shift are a decrease in the density and size of white spruce trees, an increase in abundance and density of ericaceous vegetation and black spruce trees, and a likely increase in fire disturbance. These sites are described as post-climax (i.e., community phase 1.1P). Mining occurs on this ecological site. It is believed that the degree of disturbance transitioned the reference state into two separate and unique community phases.	

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	If the intensity of flooding increases and the tree canopy is removed, this site transitions to ecological site F231XY130. Fire is a disturbance regime believed to occur on the post-climax community phase. While unique community phases occur with a fire regime, limited sampling of post-climax plant communities was conducted. As a result, no fire-related plant community phases are recognized. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-alder-prickly rose-mixed ericaceous scrub-feathermoss forest
Community Phase Narrative:			
The tree cover is mainly from the tall tree stratum (total mature tree cover ~50% and averages 152 years of age). *Picea glauca* is dominant, but a small number of *Betula neoalaskana* and *Populus balsamifera* are also present. Shrubs are evenly distributed among the tall, medium, low, and dwarf strata (~50% cover). Common species include *Alnus viridis ssp. fruticosa*, *Rosa acicularis*, *Vaccinium vitis-idaea*, and *Linnaea borealis*. The diversity of forbs and graminoids is high, with the ground cover totaling ~25%. Common species include *Geocaulon lividum*, *Calamagrostis canadensis*, *Lupinus arcticus*, and *Cornus canadensis*. Moss is an abundant ground cover (~80%), and the most common species are *Hylocomium splendens* and *Pleurozium schreberi*. Four observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Normal time and growth without flooding. White spruce forest declines in productivity, and the abundance and density of ericaceous plants and black spruce increase. The site begins the transition to a flood plain terrace site.		

Phase 1.1P			
Community Phase Number:	1.1P	Community Phase Name:	Black spruce-white spruce-prickly rose-Labrador tea-low bush cranberry-crowberry woodland
Community Phase Narrative:			
Community phase 1.1P has a less dense white spruce canopy and lower basal area than does community phase 1.1. The tree canopy is evenly distributed between *Picea glauca* and *Picea mariana,* and *Betula neoalaskana* is codominant (~30% total mature tree cover). The tree cover is from the tall, medium, and stunted tree strata, and the average basal area is 43 (average basal area of community phase 1.1 is 142). Shrub cover totals ~50%, and common species are *Rosa acicularis*, *Ledum sp.*, *Vaccinium uliginosum*, *Empetrum nigrum*, and *Vaccinium vitis-idaea*. Forbs and graminoids are diverse but not abundant (~10% cover). *Hylocomium splendens* is the most abundant moss species (~20% cover), but *Sphagnum sp*. is also present. Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
	No observed pathways.		

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	White spruce-balsam poplar-alder-highbush cranberry-prickly rose-horsetail feathermoss forest
Community Phase Narrative:			
Picea glauca is the dominant species in the tree canopy, but *Populus balsamifera* and *Betula neoalaskana* are also abundant. Deciduous trees commonly occur as standing dead trees or as a component of litter on the forest floor. The tree cover is mainly from the tall tree stratum (total mature tree cover ~60%, *Picea glauca* averages 59 years of age). Total shrub cover is approximately 20%, and common species are *Alnus viridis ssp. fruticosa*, *Viburnum edule*, *Rosa acicularis*, and *Linnaea borealis*. Total forb cover is ~50%, and common species are *Equisetum arvense*, *Mertensia paniculata*, and *Geocaulon lividum*. Graminoids, lichen, and moss are minor vegetative components. One observation of this phase was conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Normal time and growth. White spruce forest matures, and white spruce becomes dominant in the tree canopy.		

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Balsam poplar-white spruce-alder-highbush cranberry-prickly rose-bluejoint-tall bluebells forest
Community Phase Narrative:			
Picea glauca, *Populus balsamifera*, and *Betula neoalaskana* are the dominant species in the tree canopy. The tree cover is primarily from the medium tree stratum (total mature tree cover ~65% and *Picea glauca* averages 42 years of age). Shrub cover is ~60%, and the most abundant species are *Alnus viridis ssp. fruticosa*, *Salix bebbiana*, *Rosa acicularis*, and *Viburnum edule*. Graminoids and forbs make up ~40% cover, and the most abundant species are *Calamagrostis canadensis*, *Artemisia tilesii*, *Mertensia paniculata*, and *Pyrola grandiflora*. One observation of this phase was conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	Normal time and growth. White spruce begins to replace deciduous trees in the tree canopy.		

Phase 2.1			
Community Phase Number:	2.1	Community Phase Name:	Gravel pile-mixed herbaceous community
Community Phase Narrative:			
This community is sparsely vegetated (<15% combined vegetative cover) and is comprised mostly of surface rock fragments. The most abundant species are *Populus balsamifera*, *Populus tremuloides*, *Betula neoalaskana*, *Salix alaxensis*, *Chamerion angustifolium*, and *Calamagrostis canadensis*. One observation of this phase was conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
	No observed pathways.		

Phase 2.1M			
Community Phase Number:	2.1M	Community Phase Name:	Balsam poplar-paper birch-alder-feltleaf willow woodland
Community Phase Narrative:			
Picea glauca, *Betula neoalaskana*, and *Populus balsamifera* are primarily in the medium and regenerative tree strata (total mature tree cover ~25%). Shrubs are dominantly in the tall shrub stratum, and the most common species are *Alnus viridis ssp. fruticosa*, *Alnus incana ssp. tenuifolia*, and *Salix alaxensis* (total shrub cover ~50%). Graminoids, forbs, lichen, and moss are minor vegetative components. One observation of this phase was conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
	No observed pathways.		

Transition

Transition Number:	T1A
To State/Community Phase:	2.1 and/or 2.1M
Transition Narrative:	
Community phases 2.1 and 2.1M are associated with mining activities. It appears that gravel was deposited in separate piles during mining and then loamy alluvium was deposited. Gravel piles are considered a unique plant community that might not ever support a typical flood plain community. As compared to gravel piles (community phase 2.1), loamy piles (community phase 2.1M) support a higher abundance of vegetation.	

Restoration Pathway

Restoration Pathway Number:	R2A
To State/Community Phase:	1.3
Restoration Pathway Narrative:	
Community phase 2.1 likely is altered beyond restoration back to the reference state due to the xeric conditions. Community phase 2.1M resembles areas in many low flood plain positions (e.g., ecological site F231XY130AK). With normal time and growth, community phase 2.1M might support a white spruce-mixed deciduous forest.	

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2AE

Rooting Depth (cm): Min RV Max
62 62 62

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
4 4 4

Texture: Silt loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
7.1 7.1 7.1

Subsurface Layer

Thickness (cm): Min RV Max
58 58 58

Texture: Extremely cobbly coarse sand, extremely gravelly coarse sand

AWC (cm/cm): Min RV Max
0.02 0.08 0.25

pH: Min RV Max
7.2 7.5 7.8

Influencing Water Features

NWI Code None recorded

NWI Description: None recorded

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-1	5-5	95-95	20-20	2-2	1-1	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-10	---	---	---
FD (<4 inches)	---	0.1-3	---	---
FM (4-24 inches)	---	0.1-8	---	---
SD (<8 inches)	---	---	0.1-10	---
SL (8-36 inches)	---	---	0.1-0.1	---
SM (3-10 feet)	---	---	10-30	---
ST (>10 feet)	---	---	10-5	---
TR (<15 feet)	---	---	---	2-5
TM (15-40 feet)	---	---	---	15-50
TT (>40 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-10-10	100	31.6

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ORSE	*Orthilia secunda*	3-3-3	100	17.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	8-8-8	100	28.3
ARTI	*Artemisia tilesii*	5-5-5	100	22.4
PYGR	*Pyrola grandiflora*	5-5-5	100	22.4
POLEM	*Polemonium*	2-2-2	100	14.1
EQAR	*Equisetum arvense*	2-2-2	100	14.1
HEAL	*Hedysarum alpinum*	1-1-1	100	10.0
GELI2	*Geocaulon lividum*	1-1-1	100	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	10-10-10	100	31.6

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	30-30-30	100	54.8
VIED	*Viburnum edule*	10-10-10	100	31.6

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	10-10-10	100	31.6
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	100	22.4
SABE2	*Salix bebbiana*	2-2-2	100	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-5-5	100	22.4
POBA2	*Populus balsamifera*	2-2-2	100	14.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	50-50-50	100	70.7
PIGL	*Picea glauca*	15-15-15	100	38.7
BENE4	*Betula neoalaskana*	2-2-2	100	14.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-5-5	100	22.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	38-42-47	4.2-6-9.5	35-40-47	3	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
100-100-100	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Other woody plants	Other	Winter

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—33-33-33

Community Phase 2AL

Rooting Depth (cm):

Min	RV	Max
87	87	87

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm):

Min	RV	Max
0	0	0

Texture: Silt loam

AWC (cm/cm):

Min	RV	Max
0.25	0.25	0.25

pH:

Min	RV	Max
5.8	5.8	5.8

Subsurface Layer

Thickness (cm):

Min	RV	Max
87	87	87

Texture: Very gravelly coarse sand, extremely gravelly loamy coarse sand

AWC (cm/cm):

Min	RV	Max
0.03	0.08	0.25

pH: Min	RV	Max
6.9	7.1	7.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	15-15	85-85	7-7	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	3-3	---	---	---
FD (<4 inches)	---	0.1-1	---	---
FM (4-24 inches)	---	0.1-45	---	---
SD (<8 inches)	---	---	0.1-3	---
SL (8-36 inches)	---	---	5-5	---
SM (3-10 feet)	---	---	5-7	---
TR (<15 feet)	---	---	---	1-1
TM (15-40 feet)	---	---	---	2-4
TT (>40 feet)	---	---	---	4-50

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	3-3-3	100	17.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	45-45-45	100	67.1
MEPA	*Mertensia paniculata*	4-4-4	100	20.0
PYGR	*Pyrola grandiflora*	3-3-3	100	17.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	3-3-3	100	17.3
GELI2	*Geocaulon lividum*	2-2-2	100	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	5-5-5	100	22.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VIED	*Viburnum edule*	7-7-7	100	26.5
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	100	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-1-1	100	10.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	4-4-4	100	20.0
PIGL	*Picea glauca*	2-2-2	100	14.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	50-50-50	100	70.7
POBA2	*Populus balsamifera*	5-5-5	100	22.4
BENE4	*Betula neoalaskana*	4-4-4	100	20.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	43-59-75	7.2-10-13.8	63-80-96	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
112-112-112	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other woody plants	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—21-21-21

Community Phase 2UP

Rooting Depth (cm): None recorded
Restrictive Features: None recorded
Drainage Class: Excessively well drained
Surface Layer
Thickness (cm): None
Texture: Extremely gravelly loamy coarse sand

AWC (cm/cm):	Min	RV	Max
	0.01	0.01	0.01

pH:	Min	RV	Max
	7.2	7.2	7.2

Subsurface Layer
Thickness (cm): None
Texture: Extremely gravelly loamy coarse sand

AWC (cm/cm):	Min	RV	Max
	0.01	0.01	0.01

pH:	Min	RV	Max
	7.2	7.2	7.2

Influencing Water Features

NWI Code: None recorded
NWI Description: None recorded
Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	1-1	5-5	1-1	1-1	100-100	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-1	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	2-2	---	---
SL (8-36 inches)	---	---	0.1-2	---
TR (<15 feet)	---	---	---	0.1-4

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	2-2-2	100	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAL	*Salix alaxensis*	2-2-2	100	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	4-4-4	100	20.0
BENE4	*Betula neoalaskana*	1-1-1	100	10.0
POTR5	*Populus tremuloides*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—10-10-10

Community Phase 2UL

Rooting Depth (cm): Min RV Max
17 17 17
Restrictive Features: None recorded
Drainage Class: Well drained
Surface Layer
Thickness (cm): Min RV Max
1 1 1
Texture: Slightly decomposed plant material
AWC (cm/cm): Min RV Max
0.35 0.35 0.35
pH: Min RV Max
4.6 4.6 4.6
Subsurface Layer
Thickness (cm): Min RV Max
16 16 16
Texture: Very gravelly loamy coarse sand
AWC (cm/cm): Min RV Max
0.04 0.04 0.04
pH: Min RV Max
6.3 6.3 6.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-3	5-5	90-90	10-10	0-0	45-45	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-0.1	---	---	---
GT (>24 inches)	0.1-0.1	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1-3	---	---
FT (>24 inches)	---	0.1-0.1	---	---
SL (8-36 inches)	---	---	0.1-3	---
SM (3-10 feet)	---	---	3-3	---
ST (>10 feet)	---	---	15-8	---
TR (<15 feet)	---	---	---	10-5
TM (15-40 feet)	---	---	---	10-5

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ACMI2	*Achillea millefolium*	3-3-3	100	17.3
CHAN9	*Chamerion angustifolium*	3-3-3	100	17.3
ARTI	*Artemisia tilesii*	2-2-2	100	14.1
EQAR	*Equisetum arvense*	1-1-1	100	10.0
GABO2	*Galium boreale*	1-1-1	100	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUID	*Rubus idaeus*	3-3-3	100	17.3
ROAC	*Rosa acicularis*	2-2-2	100	14.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAR27	*Salix arctica*	3-3-3	100	17.3

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	20-20-20	100	44.7
ALINT	*Alnus incana ssp. tenuifolia*	15-15-15	100	38.7
SAAL	*Salix alaxensis*	8-8-8	100	28.3

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-10-10	100	31.6
POBA2	*Populus balsamifera*	5-5-5	100	22.4
PIGL	*Picea glauca*	3-3-3	100	17.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-10-10	100	31.6
POBA2	*Populus balsamifera*	10-10-10	100	31.6
PIGL	*Picea glauca*	5-5-5	100	22.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—29-29-29

Community Phase HCPC

Rooting Depth (cm): Min RV Max
32 62.4 89

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
4 16.6 23

Texture: Moderately decomposed plant material, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.3 5.8 6.5

Subsurface Layer

Thickness (cm): Min RV Max
28 45.8 66

Texture: Extremely cobbly coarse sand, extremely gravelly coarse sand, sand, coarse sand

AWC (cm/cm): Min RV Max
0.01 0.11 0.4

pH: Min RV Max
5.2 6.5 7.4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	60-90	10-20	7-10	0-15	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
FD (<4 inches)	---	10-10	---	---
FM (4-24 inches)	---	0.1-5	---	---
SD (<8 inches)	---	---	1-15	---
SL (8-36 inches)	---	---	2-5	---
ST (>10 feet)	---	---	3-3	---
TR (<15 feet)	---	---	---	2-2
TT (>40 feet)	---	---	---	40-40

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-8.5-15	50	20.6

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-15-15	25	19.4

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PYGR	*Pyrola grandiflora*	6-8-10	50	20.0
COCA13	*Cornus canadensis*	1-5.5-10	50	16.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LUAR2	*Lupinus arcticus*	7-8.5-10	50	20.6
GABO2	*Galium boreale*	15-15-15	25	19.4
EQAR	*Equisetum arvense*	12-12-12	25	17.3
GELI2	*Geocaulon lividum*	0.1-2-5	75	12.3
HEAL	*Hedysarum alpinum*	0.1-2.6-5	50	11.3
MEPA	*Mertensia paniculata*	0.1-2.6-5	50	11.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	0.1-4.8-10	100	21.9
EMNI	*Empetrum nigrum*	3-9-15	50	21.2
LIBO3	*Linnaea borealis*	1-4-10	75	17.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	5-12.5-20	50	25.0
ROAC	*Rosa acicularis*	2-11-20	50	23.5
RIHU	*Ribes hudsonianum*	15-15-15	25	19.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	25-25-25	50	35.4
VIED	*Viburnum edule*	10-10-10	25	15.8

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	3-9.3-15	75	26.5

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-2-3	75	12.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-8.5-12	50	20.6
BENE4	*Betula neoalaskana*	2-5-8	50	15.8

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	20-42.5-60	100	65.2
BENE4	*Betula neoalaskana*	5-5-5	25	11.2

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	93-152-225	9-13-18.8	68-82-111	11	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
118-142-185	4

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown
Slight use	Other woody plants	Other	Unknown

Notable Plants: None observed

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—19-24.5-30

Community Phase HCPCP

Rooting Depth (cm):	Min	RV	Max
	35	60.5	86

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	10.5	21

Texture: Loamy sand, peat

AWC (cm/cm): Min RV Max
0.08 0.22 0.35

pH: Min RV Max
3.3 4.9 6.5

Subsurface Layer

Thickness (cm): Min RV Max
35 50 65

Texture: Extremely cobbly coarse sand, highly decomposed plant material, coarse sand, mucky peat

AWC (cm/cm): Min RV Max
0.02 0.16 0.4

pH: Min RV Max
5.4 6.1 7.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: Moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools; low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-5	15-40	10-70	3-25	0-50	0-1	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FM (4-24 inches)	---	1-5	---	---
SD (<8 inches)	---	---	1-2	---
SL (8-36 inches)	---	---	15-2	---
SM (3-10 feet)	---	---	40-40	---
TR (<15 feet)	---	---	---	2-5
TM (15-40 feet)	---	---	---	20-5
TT (>40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-5-5	33	12.9
CAREX	*Carex*	1-2-3	67	11.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	15-15-15	33	22.4
EQPA	*Equisetum palustre*	5-5-5	33	12.9

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-5-7	100	22.4
EMNI	*Empetrum nigrum*	2-3.3-5	100	18.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	2-8.5-15	67	23.8
LEGR	*Ledum groenlandicum*	15-15-15	33	22.4
VAUL	*Vaccinium uliginosum*	3-4-5	67	16.3
ROAC	*Rosa acicularis*	1-1.7-2	100	12.9

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	40-40-40	33	36.5
SAPU15	*Salix pulchra*	20-20-20	33	25.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-5-5	67	18.3
BENE4	*Betula neoalaskana*	2-3.5-5	67	15.3
PIMA	*Picea mariana*	5-5-5	33	12.9

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-7.5-10	67	22.4
BENE4	*Betula neoalaskana*	2-3.5-5	67	15.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	10-12.5-15	67	28.9
PIMA	*Picea mariana*	20-20-20	33	25.8
BENE4	*Betula neoalaskana*	5-5-5	33	12.9

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-10-10	33	18.3
PIGL	*Picea glauca*	1-3-5	67	14.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	81-97-121	4.5-7-12.7	29-43-64	7	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
35-43.3-50	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use			Unknown
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—14-20.7-24

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca*/*Salix pulchra*/*Carex*

Ecological Classification ID: F231XY140AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills

Slope (percent):	Min	Max
	5	45

Elevation (feet):	Min	Max
	2,625	4,183

Range of Aspect Direction: South to northeast (clockwise)

Water Table Depth (cm):	Min	Max
	2	50

Flooding: None

Ponding: None

Runoff: Medium

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	11	32

Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

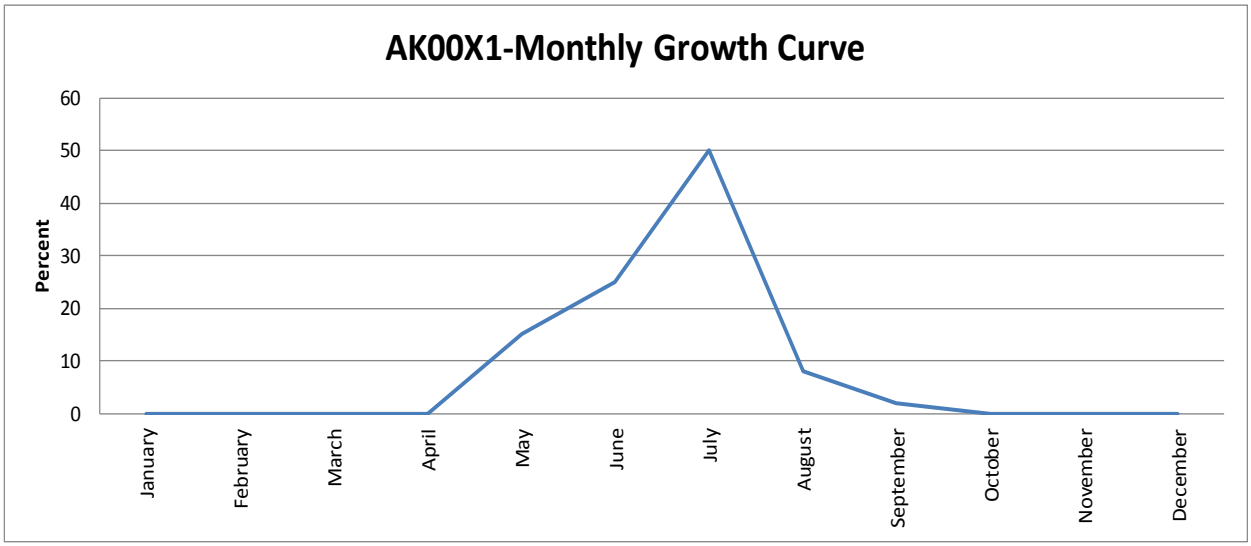
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31OM2—D31-Subalpine woodland silty colluvial slopes
D31SD1—D31-Subalpine woodland silty colluvial slopes
D31TF1—D31-Subalpine woodland silty colluvial slopes

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryorthents

Dominant Parent Material: Organic material over gravelly colluvium

Representative Surface Texture: Peat

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	5	10	19

pH:	Low	RV	High
	3.8	6.1	7.4

Effective CEC (me/100g):	Low	High
	12.7	33.9

CEC (me/100g):	Min	RV	Max
	5.1	20.7	62

Organic Matter (percent):	Low	RV	High
	1.5	22.4	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.47

Plant Community Phases

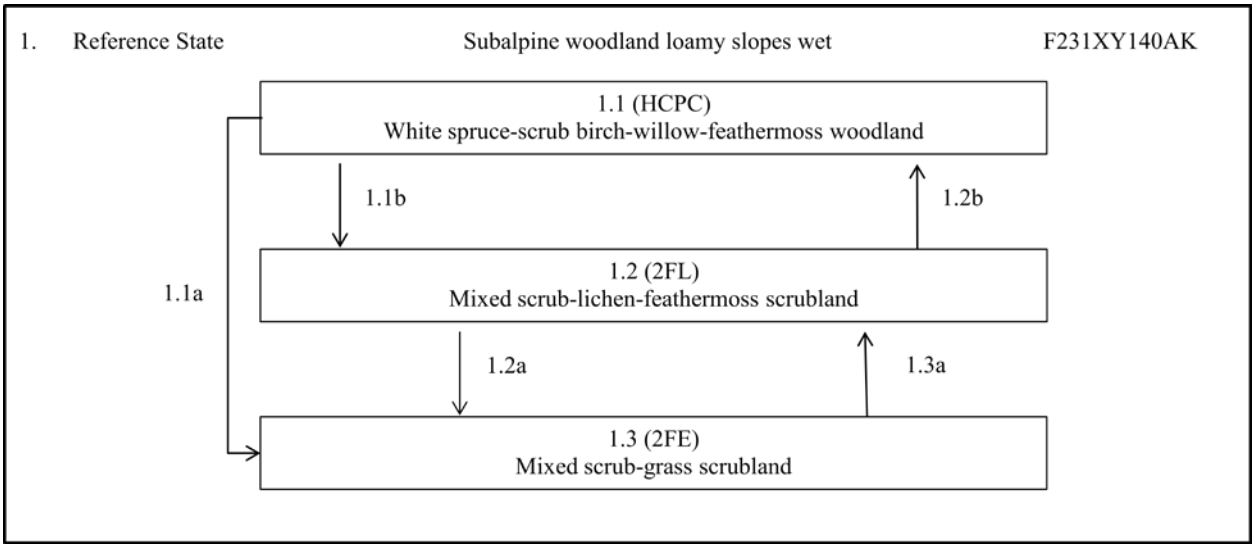
Ecological Site Description ID:	F231XY140AK

Ecological Dynamics of the Site:

This subalpine ecological site generally is on nearly level to moderately steep slopes of hills on summits, shoulders, and backslopes at high elevations (<20% slopes; 1,050 to 2,000 meters elevation). The slopes generally are concave; therefore, the soils are wetter than those in more convex positions (e.g., ecological site F231XY164AK). The soils in community phase 1.1 are classified as Cryorthents and are composed of organic matter over loamy and/or gravelly cryoturbate. Some tree cover is on this subalpine ecological site, but the cover in the climax phase generally is <25% and is limited due to the cold microclimate. Ecological site F231XY184AK is similar to this site, but site F231XY184AK has a slightly higher percentage of tree cover and has permafrost.

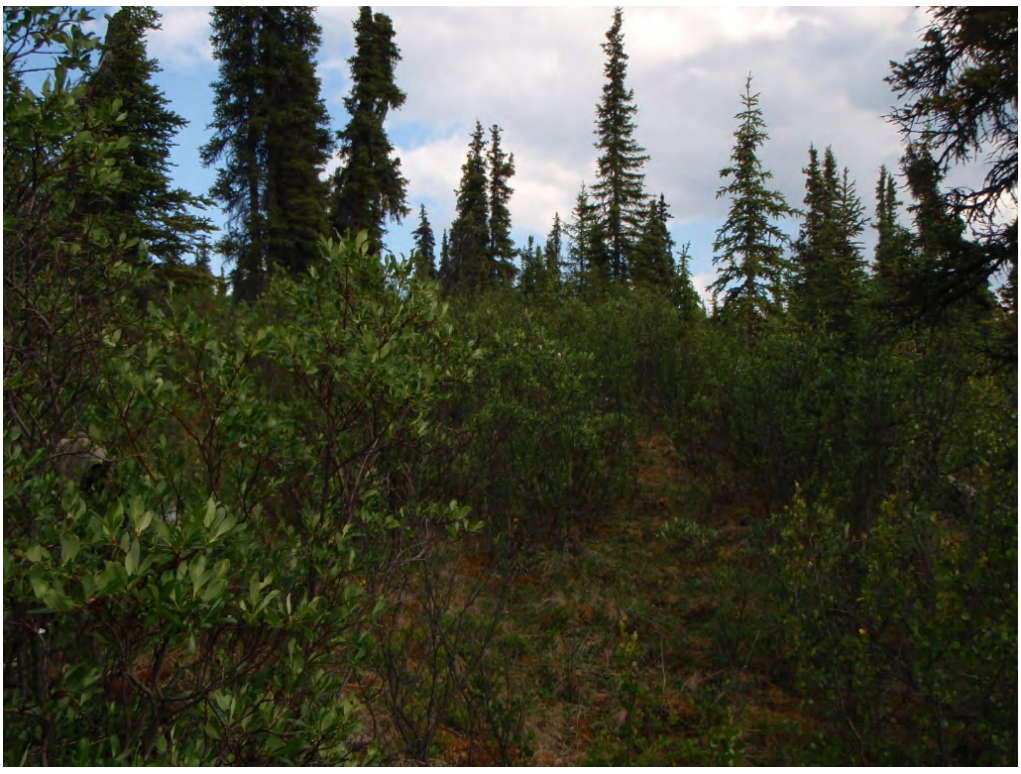
Fire resulted in three observed phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. High-severity fire events are more typical on this ecological site than low-severity fire events. Low-severity and high-severity fire events appear to cause differences in the depth of organic material on the soil surface, the presence and/or depth to permafrost, and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	The dominant vegetation on the climax phase is a mixture of trees and shrubs. The tree cover is in the tall, medium, regenerative, and stunted strata and is considered woodland (10 to 25% cover). The climax phase has a high diversity of shrubs, forbs, and lichen. In three observation areas, the tree cover is a mixture of black and white spruce. This cover could be a post-climax or unique fire phase within the reference state, but these areas were included in the climax phase because of the limited number of observations and the similar understory species present (phase 1.1). During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Many pre-fire species likely will regenerate after the fire event, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. In interior Alaska, the dominant subalpine tree species is *Picea glauca*. As *Picea glauca* establishes after fire from offsite seed sources, the fire return interval likely plays a significant role in controlling the abundance of white spruce. Areas with a shorter fire return interval likely will have less long-term coniferous tree cover than areas with a longer fire return interval. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1	

Community Phase Number:	1.1	Community Phase Name:	White spruce-scrub birch-willow-feathermoss woodland

Community Phase Narrative:
The tree canopy is composed primarily of medium-sized trees. *Picea glauca* is the most common tree species, but *Picea mariana* is also present (total mature tree cover ~15%). *Picea glauca* averages 111 years in age. Shrubs are abundant, typically totaling more than 50% cover, and are primarily in the medium, low, and dwarf strata. The most common medium shrubs are *Betula glandulosa* and a variety of *Salix sp*. The most common low shrubs are *Vaccinium sp*. and *Ledum palustre*. Numerous dwarf shrub species are present (9 species). Species unique to this ecological site are *Dryas octopetala*, *Arctostaphylos rubra*, *Cassiope tetragona,* and *Salix reticulata.* Graminoids and forbs are minor components in the plant community. Graminoid cover consists primarily of *Carex sp.* The diversity of forbs is high (commonly more than 25 species per plot), but all of the species have minor distribution. Forb species unique to this ecological site are *Saussurea angustifolia, Valeriana capitata*, and *Papavar sp*. Moss cover typically is more abundant than the lichen cover. The moss is primarily feathermoss species, including *Hylocomium splendens and Pleurozium schreberi.*

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	High-intensity fire. Fire completely removed the tree canopy and reduced the surface organic matter content.
1.1b	Low-intensity fire or spot fire. A low-intensity or spot fire likely would result in a community that resembles a late fire phase community. Some shrubs and graminoids can quickly recolonize from below-ground root reserves that are not consumed during the fire event and become dominant.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Mixed scrub-lichen-feathermoss scrubland
Community Phase Narrative:			
The majority of the tree canopy consists of stunted or regenerating *Picea glauca*. The age of trees was not assessed. As in community phase 1.1, the shrubs are abundant, typically totally more than 50% cover, and are primarily in the medium, low, and dwarf shrub strata. The most common medium shrub is *Alnus viridis,* the most common low shrub is *Ledum palustre,* and the most common dwarf shrub is *Cassiope tetragona.* The diversity of graminoids and forbs is lower than that of phase 1.1. Common species are *Calamagrostis canadensis, Carex bigelowii*, *Chamerion angustifolium*, and *Petasites frigidus*. Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	High-intensity fire.		

1.2b	Normal time and growth without fire disturbance. The major difference between the late and climax phase community is the size and quantity of trees. The fire return interval is presumed to be shorter than that of phase 1.1 and longer than that of phase 1.3.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Mixed scrub-grass scrubland
Community Phase Narrative:			
The tree canopy is in the stunted stratum and is dominantly *Picea mariana*. The dominant vegetation is a mixture of shrubs and graminoids. The shrub cover is >50% and is primarily medium and low species. The most common medium shrub is *Salix sp*., and the most common low shrub is *Betula glandulosa*. The most abundant graminoid is *Poa sp*., and most abundant forb is *Chamerion angustifolium*. One observation of this phase was conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth without fire.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min Avg Max
86 86 86
Restrictive Features: None recorded
Drainage Class: Very poorly drained
Surface Layer
Thickness (cm): Min Avg Max
2 2 2
Texture: Slightly decomposed plant material
AWC (cm/cm): Min RV Max
0.35 0.35 0.35
pH: None recorded

Subsurface Layer

Thickness (cm): Min 84 Avg 84 Max 84

Texture: Gravelly fine sandy loam, very gravelly sandy loam

AWC (cm/cm): Min 0.07 Avg 0.1 Max 0.12

pH: Min 5.1 Avg 5.4 Max 5.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-5	10-10	15-15	10-10	10-10	15-15	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-7	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	0.1-10	---	---
SD (<8 inches)	---	---	0.1-2	---
SL (8-36 inches)	---	---	10-20	---
SM (3-10 feet)	---	---	10-5	---
TS (<15 feet)	---	---	---	3-3

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POA	*Poa*	15-15-15	100	38.7
HIAL3	*Hierochloe alpina*	7-7-7	100	26.5
FEAL	*Festuca altaica*	7-7-7	100	26.5
CABI5	*Carex bigelowii*	6-6-6	100	24.5

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RANUN	*Ranunculus*	1-1-1	100	10.0
PEFR5	*Petasites frigidus*	1-1-1	100	10.0
CALA7	*Campanula lasiocarpa*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	10-10-10	100	31.6

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	2-2-2	100	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	20-20-20	100	44.7
LEPAD	*Ledum palustre ssp. decumbens*	10-10-10	100	31.6
VAUL	*Vaccinium uliginosum*	2-2-2	100	14.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	10-10-10	100	31.6
SAGL	*Salix glauca*	5-5-5	100	22.4

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-3-3	100	17.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—18-18-18

Community Phase 2FL

Rooting Depth (cm): Min RV Max
54 71 88

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
8 10 12

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.4 4.2 4.9

Subsurface Layer

Thickness (cm): Min RV Max
46 61 76

Texture: Extremely cobbly silt loam, very gravelly sandy loam, gravel

AWC (cm/cm): Min RV Max
0.1 0.14 0.18

pH: Min RV Max
6 6.3 6.6

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
35-80	20-45	5-25	1-5	0-0	0-1	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GD (<4 inches)	1-2	---	---	---
FD (<4 inches)	---	0.01-1	---	---
FM (4-24 inches)	---	0.01-0.01	---	---
SD (<8 inches)	---	---	1-30	---
SM (3-10 feet)	---	---	1-4	---
TS (<15 feet)	---	---	---	8-8

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	10-10-10	33	18.3
POARA2	*Poa* arctica ssp. arctica	10-10-10	33	18.3
LUPA4	*Luzula parviflora*	7-7-7	33	15.3

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	8-8-8	33	16.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYAN2	*Lycopodium annotinum*	1-3-5	67	14.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	15-15-15	33	22.4
CHAN9	*Chamerion angustifolium*	10-10-10	33	18.3
MEPA	*Mertensia paniculata*	3-3-3	33	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CATE11	*Cassiope tetragona*	5-17.5-30	67	34.2
DROC	*Dryas octopetala*	20-20-20	33	25.8
VAUL	*Vaccinium uliginosum*	5-10-15	67	25.8
VAVI	*Vaccinium vitis-idaea*	1-6-15	100	24.5
EMNI	*Empetrum nigrum*	5-7.5-10	67	22.4
LOPR	*Loiseleuria procumbens*	3-3-3	33	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	20-20-20	33	25.8
LEPAD	*Ledum palustre ssp. decumbens*	5-10-15	67	25.8
BEGL	*Betula glandulosa*	5-10-15	67	25.8
BENA	*Betula nana*	10-10-10	33	18.3
SAPU15	*Salix pulchra*	8-8-8	33	16.3
SABE2	*Salix bebbiana*	7-7-7	33	15.3
SPST3	*Spiraea stevenii*	3-3-3	33	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	15-25-35	67	40.8
SAGL	*Salix glauca*	25-25-25	33	28.9
ALINT	*Alnus incana ssp. tenuifolia*	15-15-15	33	22.4
SPST3	*Spiraea stevenii*	5-5-5	33	12.9
BEGL	*Betula glandulosa*	4-4-4	33	11.5

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-6.7-10	100	25.8
PIMA	*Picea mariana*	5-5-5	33	12.9

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—26-31-39

Community Phase HCPC

Rooting Depth (cm): Min RV Max
15 65 154

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
10 18.9 34

Texture: Moderately decomposed plant material, mucky peat, peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.8 5.8 7.4

Subsurface Layer

Thickness (cm): Min RV Max
13 46.2 120

Texture: Gravelly coarse sandy loam, cobbly coarse sandy loam, gravelly loam, gravelly loamy coarse sand, gravelly silt loam, gravelly sandy loam, very gravelly coarse sandy loam, very gravelly silt loam, very gravelly sandy loam, extremely gravelly loamy coarse sand, channery silt loam, very channery sandy loam, loam, silt loam, sandy loam

AWC (cm/cm): Min RV Max
0.04 0.15 0.25

pH: Min RV Max
4.9 6.2 7.4

Influencing Water Features

NWI Code: PFO4

NWI Description: Palustrine, Forested, Needle-Leaved Evergreen

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-40	15-90	4-60	0-12	0-5	0-5	0-10

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	30-30	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
FM (4-24 inches)	---	1-5	---	---
SD (<8 inches)	---	---	0.01-5	---
SL (8-36 inches)	---	---	15-7	---
SM (3-10 feet)	---	---	10-5	---
TR (<15 feet)	---	---	---	1-10
TM (15-40 feet)	---	---	---	1-7

Plant Species Canopy Cover (%), Constancy (%), and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	1-13-40	74	30.9
CACA4	*Calamagrostis canadensis*	1-4.7-15	53	15.7
CAPO	*Carex podocarpa*	0.1-5.2-10	42	14.7
FEAL	*Festuca altaica*	1-5.4-15	26	11.9

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	0-1.8-8	53	9.8

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAN3	*Saussurea angustifolia*	0.1-2.9-10	58	13.0
MEPA	*Mertensia paniculata*	0.1-3.5-7	32	10.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	3-10.3-25	95	31.3
SARE2	*Salix* reticulata	3-11.6-30	74	29.2
VAVI	*Vaccinium vitis-idaea*	1-5.3-20	95	22.4
ARRU	*Arctostaphylos rubra*	3-8.3-20	53	20.9
DROC	*Dryas octopetala*	1-7.7-15	47	19.1
CATE11	*Cassiope tetragona*	1-6.8-15	42	16.9
VAUL	*Vaccinium uliginosum*	3-6-10	16	9.7

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	2-14.3-30	79	33.6
LEGR	*Ledum groenlandicum*	1-6.9-15	42	17.0
LEPAD	*Ledum palustre ssp. decumbens*	1-4.8-10	47	15.0
BEGL	*Betula glandulosa*	7-11.7-18	16	13.6

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	2-21.5-60	79	41.2
SAPU15	*Salix pulchra*	2-14.7-40	89	36.3
SAGL	*Salix glauca*	3-16.2-55	47	27.7
SALIX	*Salix*	5-13.3-25	16	14.5
SABE2	*Salix bebbiana*	5-7.3-10	16	10.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	0-3.8-8	95	19.1
PIMA	*Picea mariana*	1-7.8-10	21	12.8

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-11.6-25	95	33.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-4.3-10	58	15.7

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	33-114-265	0.1-9-20.4	12-34-45	40	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
5-31.3-58	12

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use			Unknown
Moderate use	Willows	Moose	Summer
No observed use			Not grazed/browsed
Slight use		Caribou	Spring
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Winter

Notable Plants: *Cerastium maximum*

Species Richness: Number of stops—19; plant species per stop (min-avg-max)—26-35.4-48

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca*/*Alnus viridis ssp. fruticosa*

Ecological Classification ID: F231XY151AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: High flood plains

Slope (percent):	Min	Max
	1	3

Elevation (feet):	Min	Max
	656	2,133

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	2	110

Flooding:	Frequency	Duration
	Rare	Very brief

Ponding: None

Runoff: Low

Frost-Free Days:	Min	Max
	50	110

Mean Annual Precipitation (inches):	Low	High
	10	21

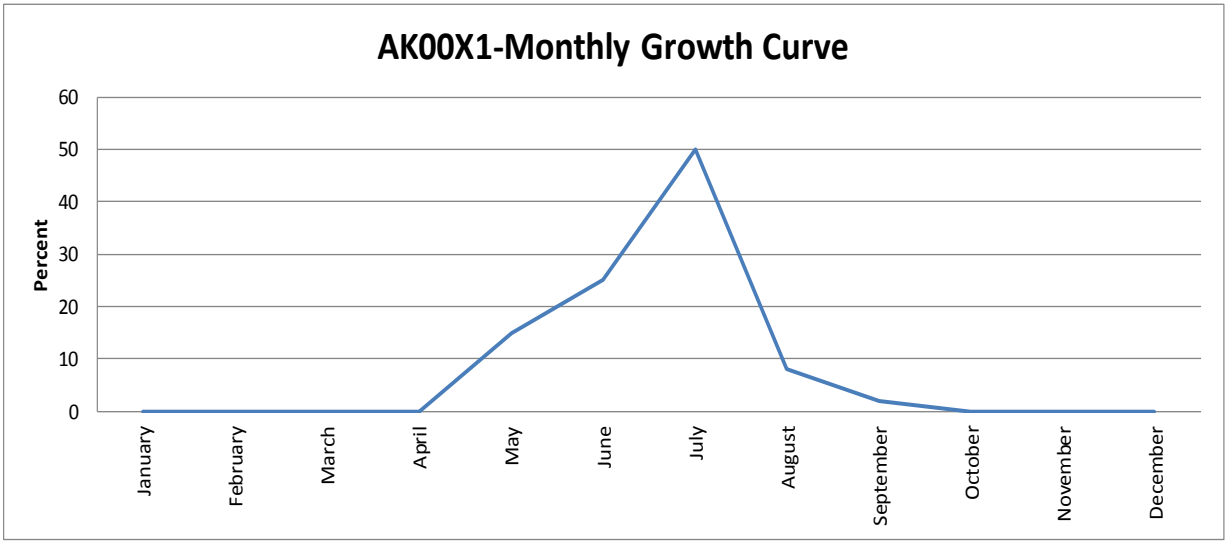
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31HL1—D31-Boreal forest loamy high flood plains, frozen
D31UC4—D31-Boreal forest loamy high flood plains, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels
Dominant Parent Material: Organic material over loamy alluvium
Representative Surface Texture: Peat
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	58

pH:	Low	RV	High
	3.4	6.6	7.4

Effective CEC (me/100g):	Low	High
	16	40

CEC (me/100g):	Min	RV	Max
	4.8	23.9	62

Organic Matter (percent):	Low	RV	High
	1	27.7	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.58	0.9	1.17

Plant Community Phases

Ecological Site Description ID:	F231XY151AK

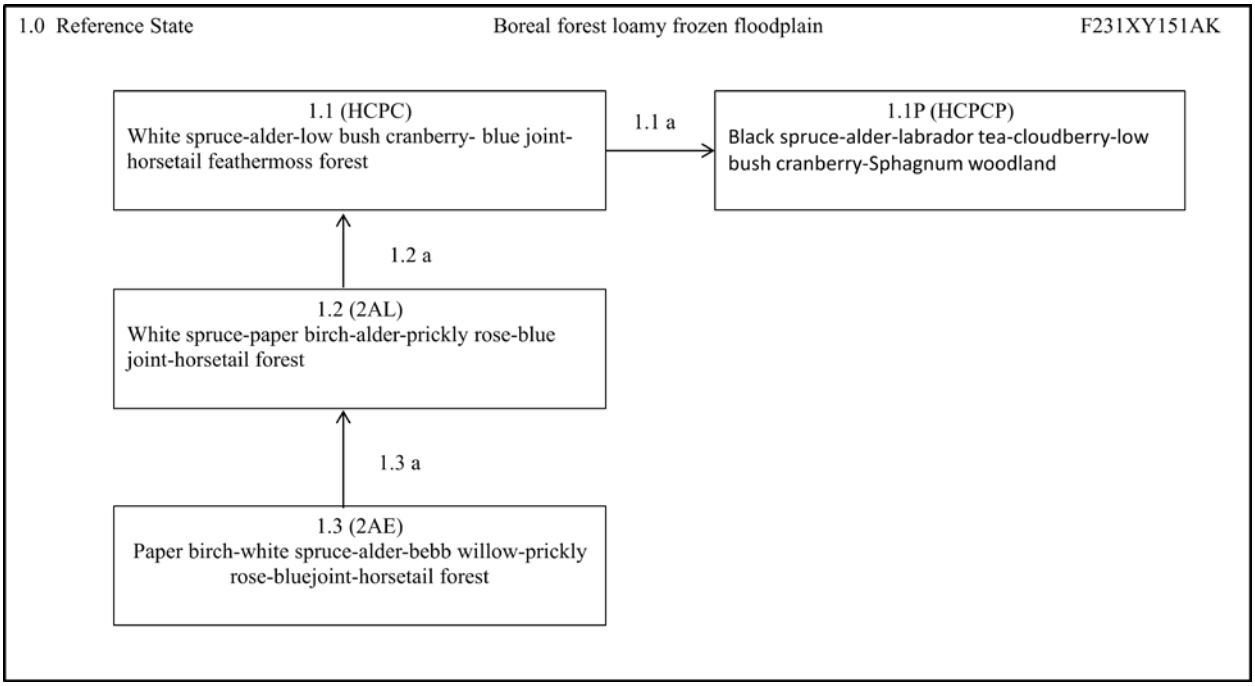
Ecological Dynamics of the Site:

This boreal ecological site is associated with all river systems that are subject to occasional to very rare flooding, with the exception of the Yukon River. A decrease in the intensity and frequency of flooding favors the replacement of tall scrubs with tree species, marking a successional progression from site F231XY130AK (starting with community phase 1.3). As the site progresses from community phase 1.3 to 1.1, the surface organic matter content and moss cover increases, permafrost rises in soil profile, and tree composition shifts from dominantly deciduous trees to dominantly coniferous trees. The soils in community phase 1.1 are classified as Haplorthels and are composed of organic material over loamy alluvium.

As flooding becomes very rare, this ecological site begins to shift toward that of a flood plain terrace community (e.g., site F231XY169AK). Indicators for this shift are a decrease in the size and density of white spruce, an increase in the abundance and density of ericaceous vegetation and black spruce, and an increase in the likelihood of fire disturbance. These areas are described as post-climax communities (community phase 1.1P).

Seven observations of this site were conducted.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	If the intensity of flooding results in removal the tree canopy, this site transitions to ecological site F231XY130AK. Fire and flooding are disturbances believed to occur in the post-climax community phase. Unique community phases occur with these associated disturbances, but limited sampling of post-climax plant communities was completed. As a result, no additional phases were created in association with the post-climax community. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-alder-low bush cranberry- blue joint-horsetail feathermoss forest
Community Phase Narrative:			
Picea glauca is the dominant canopy species. *Populus balsamifera* and *Betula neoalaskana* are trace species. The tree cover is primarily in the tall tree stratum (~40% total mature tree cover; average age of white spruce is 149 years). Shrub cover is distributed primarily between the tall and dwarf strata (~70% total shrub cover), and the most common species are *Alnus viridis ssp. fruticosa*, *Rosa acicularis*, *Arctostaphylos rubra*, and *Vaccinium vitis-idaea*. Graminoids and forbs are abundant (~45% combined cover), and common species are *Calamagrostis canadensis*, *Equisetum arvense, Mertensia paniculata, and Pyrola grandiflora.* Moss forms an extensive ground mat (~80% cover,) and the most common species is *Hylocomium splendens.* Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Normal time and growth without flooding. White spruce forest declines in productivity, and ericaceous plants and black spruce increase. Site begins to transition to a flood plain terrace site.

Phase 1.1P			
			
Community Phase Number:	1.3	Community Phase Name:	Black spruce-alder-Labrador tea-cloudberry-low bush cranberry-Sphagnum woodland
Community Phase Narrative:			
The tree canopy is composed primarily of *Picea mariana,* and *Betula neoalaskana* is a trace species. The tree cover is distributed among the tall, medium, and regenerative tree strata (~15% mature tree cover). The shrub cover is distributed among the tall, low, and dwarf strata (~110% cover), and the most abundant species are *Alnus viridis ssp. fruticosa*, *Ledum groenlandicum*, *Rubus chamaemorus*, and *Vaccinium vitis-idaea*. Forbs, graminoids, and lichen are minor vegetative components. *Sphagnum* moss is abundant (~50% cover). One observation of this phase was conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1Pa	Fire and flooding are believed to create unique plant communities for this post-climax community phase. Unique community types were not developed because of the limited sampling.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	White spruce-paper birch-alder-prickly rose-blue joint-horsetail forest
Community Phase Narrative:			
Picea glauca is the dominant canopy species, and *Betula neoalaskana* is codominant. The tree cover is distributed between the tall and medium tree strata (~55% total mature tree cover; average age of white spruce is 115 years). The shrub cover is distributed primarily between the tall and medium shrub strata (~55% shrub cover), and common species are *Alnus viridis ssp. fruticosa*, *Rosa acicularis*, *Viburnum edule*, and *Vaccinium vitis-idaea*. Graminoids and forbs are abundant (~70% combined cover), and common species are *Calamagrostis canadensis*, *Equisetum arvense, Mertensia paniculata, and Pyrola grandiflora.* Moss forms an extensive ground mat (~40% cover), and the most common species is *Hylocomium splendens.* Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Normal time and growth. White spruce forest matures and is dominant in the tree canopy.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Paper birch-white spruce-alder-bebb willow-prickly rose-bluejoint-horsetail forest
Community Phase Narrative:			
Betula neoalaskana is the dominant canopy species, and *Picea glauca* is codominant. The tree cover is distributed among the tall, medium, and regenerative strata (~60% total mature tree cover; average age of white spruce is 65 years). The shrub cover is distributed primarily among tall, medium, and low shrub strata (~90% cover), and common species are *Salix bebbiana*, *Alnus viridis ssp. fruticosa*, and *Rosa acicularis*. Graminoids and forbs are abundant (~70% combined cover), and the most abundant species are *Calamagrostis canadensis*, *Arctagrostis latifolia, Equisetum sylvaticum,* and *Equisetum pratense.* Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth. Deciduous trees are outcompeted by white spruce and are replaced by white spruce in the tree canopy.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2AE

Rooting Depth (cm): Min RV Max
65 76 87

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
2 2.5 3

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
6.5 6.5 6.6

Subsurface Layer

Thickness (cm): Min RV Max
63 73.5 84

Texture: Permanently frozen silt loam, silt loam

AWC (cm/cm):	Min	RV	Max
	0.22	0.24	0.25

pH:	Min	RV	Max
	6	6.6	7

Influencing Water Features

NWI Code: R2UB1

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Cobble-Gravel.

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool, channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-2	10-15	60-80	5-20	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-0.1	---	---	---
GT (>24 inches)	1-10	---	---	---
FD (<4 inches)	---	0.1-3	---	---
FM (4-24 inches)	---	0.1-5	---	---
FT (>24 inches)	---	0.1-2	---	---
SL (8-36 inches)	---	---	0.1-0.1	---
SM (3-10 feet)	---	---	45-5	---
ST (>10 feet)	---	---	2-50	---
TR (<15 feet)	---	---	---	1-1
TM (15-40 feet)	---	---	---	15-2
TT (>40 feet)	---	---	---	3-7

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARLA2	*Arctagrostis latifolia*	40-40-40	50	44.7
CACA4	*Calamagrostis canadensis*	10-15-20	100	38.7

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ORSE	*Orthilia secunda*	0.1-2.6-5	100	16.0
CIAL	*Circaea alpina*	3-3-3	50	12.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum* pratense	40-40-40	50	44.7
EQSY	*Equisetum sylvaticum*	15-15-15	50	27.4
EQAR	*Equisetum arvense*	5-5-5	50	15.8
CHAN9	*Chamerion angustifolium*	2-2-2	50	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
THOC	*Thalictrum occidentale*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	10-10-10	50	22.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	35-35-35	50	41.8
SPST3	*Spiraea stevenii*	5-5-5	50	15.8
RITR	*Ribes triste*	5-5-5	50	15.8
LEGR	*Ledum groenlandicum*	2-2-2	50	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	45-45-45	50	47.4
VIED	*Viburnum edule*	5-5-5	50	15.8

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-30-50	100	54.8
SABE2	*Salix bebbiana*	2-5-8	100	22.4
ALINT	*Alnus incana ssp. tenuifolia*	5-5-5	50	15.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-10-10	50	22.4
PIGL	*Picea glauca*	1-3-5	100	17.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	15-17.5-20	100	41.8
PIGL	*Picea glauca*	2-6-10	100	24.5

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-25-40	100	50.0
PIGL	*Picea glauca*	5-6-7	100	24.5
POBA2	*Populus balsamifera*	3-3-3	50	12.2

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	85-85-85	8.8-9-8.8	60-60-60	1	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
65-87.5-110	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown

Notable Plants: *Thalictrum occidentale*

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—22-27.5-33

Community Phase 2AL

Rooting Depth (cm):	Min	RV	Max
	50	56	62

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	1.5	3

Texture: Silt loam

AWC (cm/cm):	Min	RV	Max
	0.2	0.27	0.35

pH:	Min	RV	Max
	7.1	7.1	7.2

Subsurface Layer

Thickness (cm):	Min	RV	Max
	50	54.5	59

Texture: Permanently frozen silt loam, silt loam

AWC (cm/cm):	Min	RV	Max
	0.25	0.25	0.25

pH:	Min	RV	Max
	5.9	6.4	7.1

Influencing Water Features

NWI Code: R4SB4

NWI Description: Riverine, Intermittent, Stream Bed, Sand

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool, channels with point bars; moderately entrenched, moderate-gradient, riffle-dominate channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-3	10-70	25-80	10-10	0-4	0-0	0-3

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	20-20	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	2-70	---	---
SD (<8 inches)	---	---	3-3	---
SL (8-36 inches)	---	---	1-1	---
SM (3-10 feet)	---	---	25-3	---
ST (>10 feet)	---	---	5-5	---
TR (<15 feet)	---	---	---	2-3
TM (15-40 feet)	---	---	---	10-15
TT (>40 feet)	---	---	---	25-25

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	18-19-20	100	43.6
POA	*Poa*	2-2-2	50	10.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PYGR	*Pyrola grandiflora*	1-5.5-10	100	23.5
LYAN2	*Lycopodium annotinum*	3-3-3	50	12.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	15-42.5-70	100	65.2
MEPA	*Mertensia paniculata*	2-2.5-3	100	15.8
COPA28	*Comarum palustre*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	3-3-3	100	17.3
LIBO3	*Linnaea borealis*	2-2-2	50	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RIHU	*Ribes hudsonianum*	3-3-3	50	12.2
RITR	*Ribes triste*	2-2-2	50	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	25-27.5-30	100	52.4
VIED	*Viburnum edule*	3-3-3	50	12.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-10-15	100	31.6
ALINT	*Alnus incana ssp. tenuifolia*	5-5-5	50	15.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-2.5-3	100	15.8
BENE4	*Betula neoalaskana*	2-2.5-3	100	15.8

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	15-15-15	100	38.7
BENE4	*Betula neoalaskana*	10-10-10	100	31.6

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	20-22.5-25	100	47.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	67-115-153	5.5-10-15.6	37-62-91	6	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
65-67.5-70	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Other	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—16-27.5-39

Community Phase HCPC

Rooting Depth (cm): Min RV Max
42 64 86

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
14 15.5 17

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.9 5.1 5.3

Subsurface Layer

Thickness (cm): Min RV Max
28 48.5 69

Texture: Very cobbly loamy sand, silt loam, sandy loam

AWC (cm/cm): Min RV Max
0.06 0.14 0.25

pH: Min RV Max
6.4 7.2 7.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool, channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-3	75-80	5-35	7-10	0-0	0-0	0-2

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	30-30	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1-5	---	---
SD (<8 inches)	---	---	2-2	---
SL (8-36 inches)	---	---	0.1-1	---
SM (3-10 feet)	---	---	12-12	---
ST (>10 feet)	---	---	80-80	---
TM (15-40 feet)	---	---	---	3-5
TT (>40 feet)	---	---	---	35-35

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACO10	*Carex concinna*	5-5-5	50	15.8
EQSC	*Equisetum scirpoides*	2-2-2	50	10.0

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	5-5-5	50	15.8
CABI5	*Carex bigelowii*	2-2-2	50	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	30-30-30	50	38.7

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	30-30-30	50	38.7
PYAS	*Pyrola asarifolia*	5-5-5	50	15.8
CIAL	*Circaea alpina*	3-3-3	50	12.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	2-11-20	100	33.2
ARRU	*Arctostaphylos rubra*	15-15-15	50	27.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	5-5-5	50	15.8
SAPU15	*Salix pulchra*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	12-12-12	50	24.5
BEGL	*Betula glandulosa*	7-7-7	50	18.7
ALINT	*Alnus incana ssp. tenuifolia*	3-3-3	50	12.2
EMNI	*Empetrum nigrum*	3-3-3	50	12.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	80-80-80	50	63.2

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	4-4-4	50	14.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-4-5	100	20.0
BENE4	*Betula neoalaskana*	5-5-5	50	15.8
POBA2	*Populus balsamifera*	2-2-2	50	10.0

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	20-27.5-35	100	52.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	105-148-192	7.6-13-19.1	37-75-105	6	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
118-129-140	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use		Moose	Winter
Slight use	Other woody plants	Moose	Spring

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—23-24.5-26

Community Phase HCPCP

Rooting Depth (cm): Min 42 RV 42 Max 42

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min 38 RV 38 Max 38

Texture: Peat, mucky silt loam

AWC (cm/cm): Min 0.35 RV 0.35 Max 0.35

pH: Min 3.8 RV 3.8 Max 3.8

Subsurface Layer

Thickness (cm): Min 4 RV 4 Max 4

Texture: Permanently frozen silt loam

AWC (cm/cm): Not applicable

pH: Min 6.4 Avg 6.4 Max 6.4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-1	90-90	30-30	2-2	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
GT (>24 inches)	5-5	---	---	---
FM (4-24 inches)	---	0.1-5	---	---
SD (<8 inches)	---	---	0.1-10	---
SL (8-36 inches)	---	---	1-5	---
ST (>10 feet)	---	---	40-40	---
TR (<15 feet)	---	---	---	5-5
TM (15-40 feet)	---	---	---	1-10
TT (>40 feet)	---	---	---	7-7

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-5-5	100	22.4

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	5-5-5	100	22.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	5-5-5	100	22.4
LYAN2	*Lycopodium annotinum*	3-3-3	100	17.3
RALA	*Ranunculus lapponicus*	1-1-1	100	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	10-10-10	100	31.6
RUCH	*Rubus chamaemorus*	10-10-10	100	31.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	35-35-35	100	59.2
CHCA2	*Chamaedaphne calyculata*	5-5-5	100	22.4
VAUL	*Vaccinium uliginosum*	1-1-1	100	10.0

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	40-40-40	100	63.2

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-5-5	100	22.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-10-10	100	31.6
BENE4	*Betula neoalaskana*	1-1-1	100	10.0

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	7-7-7	100	26.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	94-126-158	0.1-0-0.1	36-39-42	2	B

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Other woody plants	Moose	Summer

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—24-24-24

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea mariana-Betula neoalaskana*/*Vaccinium uliginosum*/*Cladonia*

Ecological Classification ID: F231XY162AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills, mountains

Slope (percent):	Min	Max
	1	70

Elevation (feet):	Min	Max
	1,148	2,953

Range of Aspect Direction: All aspects

Water Table Depth (cm): None recorded

Flooding: None

Ponding: None

Runoff: High

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	25

Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

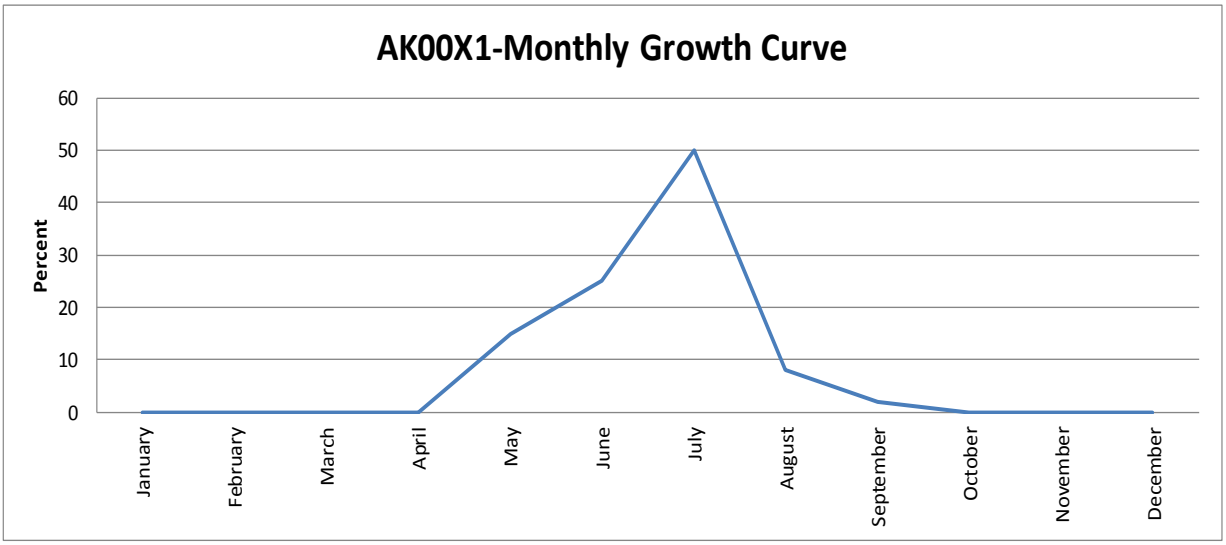
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH3—D31-Boreal woodland gravelly residual slopes
D31OF1—D31-Boreal woodland rocky colluvial slopes
D31TH1—D31-Boreal taiga gravelly colluvial slopes

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts

Dominant Parent Material: Organic material over loess over gravelly colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	3	12	20

pH:	Low	RV	High
	3.4	5.4	7.7

Effective CEC (me/100g):	Low	High
	12.6	40

CEC (me/100g):	Min	RV	Max
	3.1	25.9	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.46

Plant Community Phases

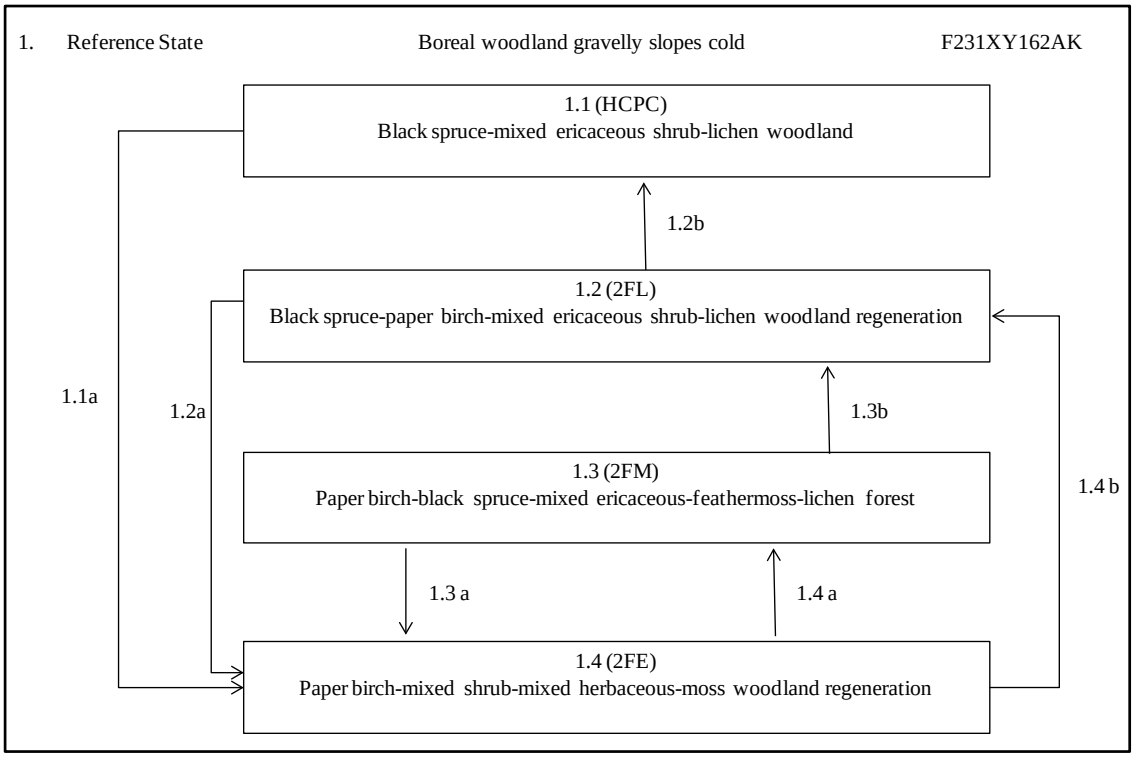
Ecological Site Description ID:	F231XY162AK

Ecological Dynamics of the Site:

This boreal ecological site is on summits, shoulders, and backslopes of mountains and hills at all aspects and commonly is in convex positions. Because of the varying landscape positions, slope varies substantially (1 to 60%). The soils are rocky and do not have permafrost. The climax phase community typically has a minimal organic layer (<15 cm. thick). The soils in community phase 1.1 are classified as Haplocryepts and are composed of organic matter over loess and/or gravelly colluvium. The climax phase community is characterized by black spruce woodland with ericaceous shrub and lichen understory.

Fire resulted in four documented phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. High-severity fire events are more typical than low-severity fire events. Low-severity and high-severity fire events appear to cause differences in the depth of the organic material on the soil surface and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn. Due in part to the lack of permafrost and the thin organic mat, the site tends to be well drained and likely burns hot during a fire event. The typical disturbance is a high-intensity fire regime. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Many pre-fire species likely regenerate after a fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The fire return interval plays a significant role in the structure of the forest. Longer fire return intervals favor the development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Black Spruce-Mixed Ericaceous Shrub-Lichen Woodland

Community Phase Narrative:
The majority of the tree cover is medium-sized and stunted *Picea mariana* (total mature tree cover ~20%). Black spruce is the dominant tree species, but *Picea glauca*, *Populus tremuloides,* and *Betula neoalaskana* are also present. The shrub canopy primarily is in the low and dwarf strata (total shrub cover ~60%). Common shrubs include *Ledum palustre*, *Empetrum nigrum*, *Vaccinium uliginosum*, and *Vaccinium vitis-idaea*. Forbs and graminoids are minor vegetative components. The diversity of lichen is high, and lichen forms an extensive ground cover (~50% cover). Moss is less abundant than lichen, but *Hylocomium splendens* and *Pleurozium schreberi* are common. Ten observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. Community phase 1.1 has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Black Spruce-Paper Birch-Mixed Ericaceous Shrub-Lichen Woodland Regeneration

Community Phase Narrative:
The tree cover is primarily distributed among the medium, stunted, and regenerative tree strata (~15% mature cover and 15% seedling cover). The dominant tree species are *Picea mariana* and *Betula neoalaskana*, but *Picea glauca* and *Populus tremuloides* are also present. Shrubs are evenly distributed between the low and dwarf shrub strata (total shrub cover ~60%). Common shrubs are *Ledum palustre*, *Vaccinium uliginosum*, *Empetrum nigrum*, and *Vaccinium vitis-idaea*. Forbs and graminoids are minor vegetative components. The diversity of lichen is high, and lichen forms an abundant ground cover (~45% cover). Moss also forms ground cover (~35% cover). Four observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Deciduous trees become less abundant and black spruce seedlings mature and form a black spruce woodland. The fire return interval is presumed to be shorter than that of phase 1.1 and longer than that of phase 1.4.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Paper birch-black spruce-mixed ericaceous shrub-feathermoss-lichen forest

Community Phase Narrative:
The tree cover is primarily distributed between the medium and regenerative tree strata. The dominant medium-sized trees are *Populus tremuloides* and *Betula neoalaskana*, and the dominant regenerative tree is *Picea mariana*. Shrubs are dominant in the understory (total shrub cover ~45%). Common shrubs are *Vaccinium vitis-idaea*, *Vaccinium uliginosum*, and *Rosa acicularis*. Graminoids and forbs are minor vegetative components. Lichen and moss are evenly distributed in the ground cover (combined cover ~40%). Seven observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Fire.
1.3b	Normal time and growth without fire. Deciduous trees begin to become less abundant, and black spruce seedlings grow and it begins to become dominant. The fire return interval is presumed to be shorter than that of phase 1.2 and longer than that of phase 1.4.

Phase 1.4			
			
Community Phase Number:	1.4	Community Phase Name:	Paper birch-Mixed Herbaceous-Moss Woodland Regeneration

Community Phase Narrative:	
The majority of the tree cover is a mixture of regenerating *Populus tremuloides* and *Betula neoalaskana*. The forb, graminoid, and lichen cover is less abundant in this phase than in the other phases. A common shrub is *Salix sp*., a common graminoid is *Calamagrostis canadensis*, and a common forb is *Chamerion angustifolium*. Moss is an abundant ground cover (~40%). Five observations of this phase were conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth without fire. High-severity burns occur. Deciduous trees continue to outpace growth of black spruce, and they eventually become dominant in the stand.
1.4b	Normal time and growth without fire. A transition from phase 1.3 is believed to occur on this ecological site, which might result from low-severity fires. Site conditions might favor more growth of black spruce and less dominance of deciduous trees. This phase might occur in areas where fire disturbances do not expose large areas of mineral soil.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
52 65 93

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
0 2.7 7

Texture: Channery silt loam, silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.21 0.31 0.4

pH: Min RV Max
5.1 5.6 6.4

Subsurface Layer

Thickness (cm): Min RV Max
52 62.2 86

Texture: Gravelly silt loam, very gravelly loam, extremely gravelly sandy loam, silt loam, extremely channery silt loam, extremely channery sandy loam

AWC (cm/cm): Min RV Max
0.03 0.16 0.24

pH: Min RV Max
5.5 6.2 6.7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-50	5-80	4-50	5-35	0-10	0-15	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GD (<4 inches)	20-20	---	---	---
GM (4-24 inches)	5-5	---	---	---
GT (>24 inches)	0.01-1	---	---	---
FD (<4 inches)	---	0.01-10	---	---
FM (4-24 inches)	---	0.01-5	---	---
SD (<8 inches)	---	---	0.01-1	---
SL (8-36 inches)	---	---	0.01-2	---
SM (3-10 feet)	---	---	2-2	---
TR (<15 feet)	---	---	---	0.01-1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACO10	*Carex* concinna	20-20-20	11	14.9

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-16.8-40	44	27.3
CAREX	*Carex*	1-6.3-10	33	14.5

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	0-10-20	22	14.9
CAPU	*Calamagrostis purpurascens*	15-15-15	11	12.9

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	2-6-10	22	11.5
SATR5	*Saxifraga tricuspidata*	10-10-10	11	10.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	1-15.2-40	44	26.0
PELA	*Pedicularis labradorica*	10-10-10	11	10.5
EQSC	*Equisetum scirpoides*	10-10-10	11	10.5
GELI2	*Geocaulon lividum*	1-2.7-5	33	9.4

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	5-9.5-15	44	20.5
POAL11	*Polygonum alpinum*	2-4.3-8	33	12.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	0-6.9-30	89	24.7
ARUV	*Arctostaphylos uva-ursi*	2-18.5-35	22	20.3
EMNI	*Empetrum nigrum*	3-4-5	22	9.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	1-3.3-8	78	16.0
VAUL	*Vaccinium uliginosum*	0-3-6	56	12.9
ROAC	*Rosa acicularis*	0-4-7	33	11.6
ARAL2	*Arctostaphylos alpina*	8-8-8	11	9.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	3-6-10	44	16.3
SABE2	*Salix bebbiana*	2-6-10	22	11.5

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	1-11.9-20	78	30.4
BENE4	*Betula neoalaskana*	4-7-10	67	21.6
PIMA	*Picea mariana*	0-3.6-10	89	18.0
PIGL	*Picea glauca*	0-2.7-7	33	9.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	1-7-15	33	15.3

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	89-92-94	3.7-5-5.5	22-23-24	2	B

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Severe use			Summer
Slight use		Dall sheep	Spring
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: *Cerastium maximum*

Species Richness: Number of stops—9; plant species per stop (min-avg-max)—16-23-30

Community Phase 2FM

Rooting Depth (cm): Min Avg Max
39 61.2 88

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min Avg Max
2 6.3 19

Texture: Slightly decomposed plant material

AWC (cm/cm): Min Avg Max
0.35 0.35 0.35

pH: Min Avg Max
4.4 5.1 6

Subsurface Layer

Thickness (cm): Min Avg Max
37 54.9 69

Texture: Gravelly coarse sand, gravelly coarse sandy loam, gravelly loam, gravelly silt loam, very gravelly coarse sandy loam, very cobbly fine sandy loam, very cobbly loamy coarse sand, very gravelly silt loam, very gravelly sandy loam, extremely gravelly loamy coarse sand, extremely gravelly sandy loam, very channery silt loam, loam, silt loam, extremely channery sandy loam, fine sandy loam

AWC (cm/cm): Min Avg Max
0.02 0.14 0.25

pH: Min Avg Max
4.3 5.6 7.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-40	2-70	30-75	1-25	0-10	0-1	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
FM (4-24 inches)	---	0.01-5	---	---
SD (<8 inches)	---	---	15-5	---
SL (8-36 inches)	---	---	0.01-3	---
ST (>10 feet)	---	---	5-5	---
TR (<15 feet)	---	---	---	35-40

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-12.5-15	22	16.7

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYCO3	*Lycopodium complanatum*	0-1.6-5	56	9.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	1-4.7-10	33	12.5
CHAN9	*Chamerion angustifolium*	10-10-10	11	10.5
MEPA	*Mertensia paniculata*	0-3-7	33	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	15-15-15	11	12.9

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-12-25	78	30.6
ARRU	*Arctostaphylos rubra*	60-60-60	11	25.8
EMNI	*Empetrum nigrum*	1-5.5-15	44	15.6
LIBO3	*Linnaea borealis*	15-15-15	11	12.9
CHCA2	*Chamaedaphne calyculata*	5-7.5-10	22	12.9

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARUV	*Arctostaphylos uva-ursi*	5-11.7-20	33	19.7
ROAC	*Rosa acicularis*	0-3.7-10	78	17.0
VAUL	*Vaccinium uliginosum*	0.1-4-10	56	14.9
RITR	*Ribes triste*	20-20-20	11	14.9
LEGR	*Ledum groenlandicum*	1-6-10	33	14.1
LEPAD	*Ledum palustre ssp. decumbens*	2-5.7-10	33	13.7
VAVI	*Vaccinium vitis-idaea*	15-15-15	11	12.9

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEOC2	*Betula occidentalis*	10-10-10	11	10.5
ALVIF	*Alnus viridis ssp. fruticosa*	3-4-5	22	9.4

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	7-8.5-10	22	13.7
SABE2	*Salix bebbiana*	3-4-5	22	9.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	2-14.4-35	100	38.0
POTR5	*Populus tremuloides*	0.1-8.7-40	67	24.1
BENE4	*Betula neoalaskana*	2-6.8-15	67	21.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	1-16.8-35	67	33.5
BEOC2	*Betula occidentalis*	40-40-40	11	21.1
PIMA	*Picea mariana*	1-5.6-15	78	20.8
POTR5	*Populus tremuloides*	15-17.5-20	22	19.7

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	20-20-20	11	14.9
BENE4	*Betula neoalaskana*	15-15-15	11	12.9

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	2.5-3-3.7	22-25-32	6	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
12-27.3-60	6

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—9; plant species per stop (min-avg-max)—16-21.9-27

Community Phase 2FL

Rooting Depth (cm):	Min	RV	Max
	57	59	61

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
3 3 3

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.8 5.2 5.7

Subsurface Layer

Thickness (cm): Min RV Max
54 56 58

Texture: Gravelly fine sandy loam, gravelly silt loam, gravelly sandy loam, very gravelly coarse sandy loam, extremely gravelly loamy sand

AWC (cm/cm): Min RV Max
0.04 0.13 0.22

pH: Min RV Max
5.1 5.8 6.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
25-75	5-75	5-40	0-20	0-1	0-2	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
FD (<4 inches)	---	1-2	---	---
SD (<8 inches)	---	---	3-3	---
SL (8-36 inches)	---	---	10-10	---
SM (3-10 feet)	---	---	15-5	---
TR (<15 feet)	---	---	---	2-5
TS (<15 feet)	---	---	---	5-5
TM (15-40 feet)	---	---	---	25-25

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	1-8.7-15	33	17.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYCL	*Lycopodium clavatum*	2-6.3-15	33	14.5
GELI2	*Geocaulon lividum*	1-4.5-10	44	14.1
LYAN2	*Lycopodium annotinum*	0.1-3.8-8	44	13.0
LYCO3	*Lycopodium complanatum*	2-5-10	33	12.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	1-3.8-8	56	14.5
POAL11	*Polygonum alpinum*	2-6-10	22	11.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	3-12.2-25	89	33.0
EMNI	*Empetrum nigrum*	2-10.7-20	67	26.7
RUCH	*Rubus chamaemorus*	2-6-10	22	11.5
LEPAD	*Ledum palustre ssp. decumbens*	1-5.5-10	22	11.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	5-19.5-40	44	29.4
LEPAD	*Ledum palustre ssp. decumbens*	10-25-45	33	28.9
VAUL	*Vaccinium uliginosum*	1-6.9-12	78	23.1
SPST3	*Spiraea stevenii*	0-5-15	44	14.9
ROAC	*Rosa acicularis*	0-2.7-10	67	13.4
VAVI	*Vaccinium vitis-idaea*	15-15-15	11	12.9

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	1-8.5-15	44	19.4
BEOC2	*Betula occidentalis*	5-10-15	22	14.9
SABE2	*Salix bebbiana*	0.1-5.1-10	22	10.6

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	0-10.9-35	100	33.0
BENE4	*Betula neoalaskana*	0-4.1-20	89	19.2
PIGL	*Picea glauca*	2-6-10	22	11.5

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	15-17.5-20	22	19.7
BENE4	*Betula neoalaskana*	15-15-15	11	12.9
POTR5	*Populus tremuloides*	2-3-5	33	10.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	2-10.2-25	67	26.0
BENE4	*Betula neoalaskana*	2-4.8-7	56	16.3
PIGL	*Picea glauca*	15-15-15	11	12.9

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	1.2-2-2.8	7-10-12	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
4-25.4-62	5

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Forbs, ferns, and	Moose	Unknown
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows		Unknown
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: *Salix candida*

Species Richness: Number of stops—9; plant species per stop (min-avg-max)—16-29.4-47

Community Phase HCPC

Rooting Depth (cm): Min RV Max
66 73.5 81

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
3 3.5 4

Texture: Sandy loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.15 0.28 0.35

pH: Min RV Max
3.6 4 4.3

Subsurface Layer

Thickness (cm): Min RV Max
63 70 77

Texture: Very gravelly sandy loam, extremely gravelly sandy loam, very channery silt loam, extremely channery loam, extremely channery loamy coarse sand

AWC (cm/cm): Min RV Max
0.02 0.11 0.24

pH: Min RV Max
4.6 5.1 6

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
30-90	5-65	2-25	2-15	0-5	0-10	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-1	---	---	---
FD (<4 inches)	---	0.1-5	---	---
FM (4-24 inches)	---	0.1-5	---	---
SD (<8 inches)	---	---	10-5	---
SL (8-36 inches)	---	---	1-5	---
TR (<15 feet)	---	---	---	5-5
TS (<15 feet)	---	---	---	1-20
TM (15-40 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	2-4-7	40	12.6
CABI5	*Carex bigelowii*	15-15-15	10	12.2
CACA4	*Calamagrostis canadensis*	5-6.5-8	20	11.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	5-6.7-10	30	14.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	2-3-5	30	9.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	2-10.7-30	100	32.7
VAVI	*Vaccinium vitis-idaea*	3-9.1-15	100	30.2
ARRU	*Arctostaphylos rubra*	3-6.5-10	20	11.4
LOPR	*Loiseleuria procumbens*	10-10-10	10	10.0
DROC	*Dryas octopetala*	10-10-10	10	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	5-15.8-40	90	37.7
LEPAD	*Ledum palustre ssp. decumbens*	5-27.5-70	40	33.2
LEGR	*Ledum groenlandicum*	1-12.2-25	50	24.7
ARUV	*Arctostaphylos uva-ursi*	10-10-10	10	10.0
BENA	*Betula nana*	5-5-5	20	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	7-9.7-12	30	17.0
BENA	*Betula nana*	15-15-15	10	12.2
ALINT	*Alnus incana ssp. tenuifolia*	3-6.5-10	20	11.4
ALVIF	*Alnus viridis ssp. fruticosa*	3-6.5-10	20	11.4
ROAC	*Rosa acicularis*	2-4.5-7	20	9.5

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEOC2	*Betula occidentalis*	20-20-20	10	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-9-15	100	30.0
BENE4	*Betula neoalaskana*	5-5-5	20	10.0

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	15-22-45	50	33.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-17.3-40	60	32.2

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-8.7-15	30	16.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	61-102-164	4.1-8-11.7	21-46-62	4	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
4-24.3-50	7

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Other	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: *Arnica lonchophylla*

Species Richness: Number of stops—10; plant species per stop (min-avg-max)—15-26.5-37

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca*/*Betula glandulosa*-*Empetrum nigrum*

Ecological Classification ID: F231XY164AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills, mountains

Slope (percent):	Min	Max
	1	60

Elevation (feet):	Min	Max
	2,625	3,281

Range of Aspect Direction: All aspects

Water Table Depth (cm): None recorded

Flooding: None

Ponding: None

Runoff: High

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	11	25

Mean Annual Air Temperature (°F):	Low	High
	21	28

Monthly Data:

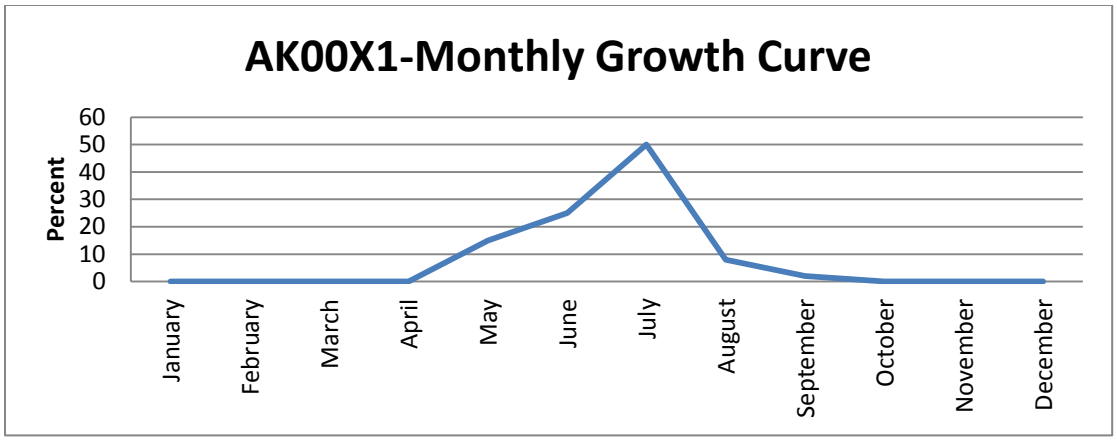
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH7—D31-Subalpine woodland rocky colluvial slopes
D31CF1—D31-Subalpine woodland rocky residual slopes

Characteristics of Representative Soil Components

Soil Classification: Fragmental, mixed Typic Haplocryepts; loamy-skeletal, mixed, superactive Typic Dystrocryepts

Dominant Parent Material: Organic material over gravelly colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Fragmental, loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	1	6	12

pH:	Low	RV	High
	3.2	5.2	6.7

Effective CEC (me/100g):	Low	High
	10.1	32

CEC (me/100g):	Min	RV	Max
	3.6	24.4	62

Organic Matter (percent):	Low	RV	High
	1	22.4	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.8	1.37

Plant Community Phases

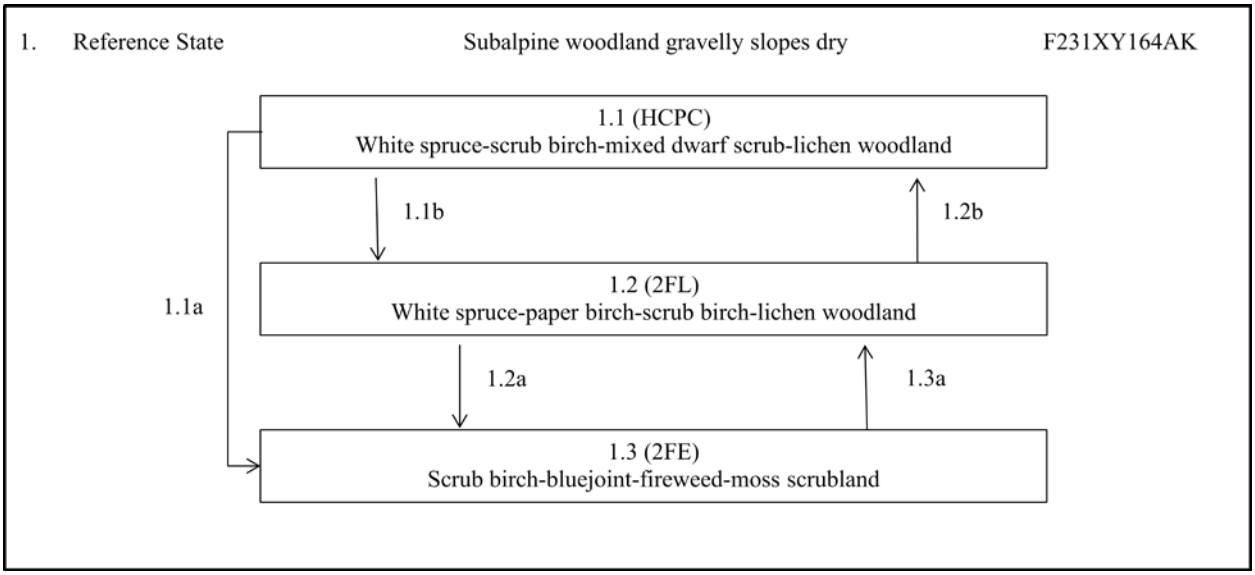
Ecological Site Description ID:	F231XY164AK

Ecological Dynamics of the Site:

This subalpine ecological site is on summits, shoulders, and backslopes of mountains at high elevations (slopes range from 2 to 57%; elevation ranges from 800 to 1,000 meters). The slope shape generally is convex, and the soils are drier than those of sites in concave positions (e.g., F231XY140AK). The tree cover in the climax phase is generally <25% and is limited in large part due to the cold microclimate. The soils are rocky and commonly have exposed rock fragments. The soils in community phase 1.1 are classified as Dystrocryepts or Haplocryepts and are composed of organic matter over gravelly colluvium. The communities are similar to those of site F231XY139AK, but this site has a higher abundance of tree cover, which might be because of the slightly lower elevations.

Fire is a documented disturbance regime resulting in three observed phases. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. High-severity fire events are believed to be more typical on this site than low-severity fire events. Low-severity and high-severity fire events appear to cause differences in the depth of the organic material on the soil surface and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	For the climax phase, the dominant vegetation is a mixture of trees, shrubs, and lichen. The tree cover is sporadic and is primarily in the medium tree stratum. The site is considered woodland (10 to 25% tree cover). Fire completely removed the tree canopy. Because the early phase vegetation is a mixture of broadleaf tree regeneration and herbaceous plants, the disturbance was likely a high-severity fire event. This fire likely consumed much of the organic mat, exposing mineral soils. Many pre-fire species likely regenerate post-fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). In interior Alaska, the dominant subalpine tree species is *Picea glauca*. As *Picea glauca* establishes after fire from offsite seed sources, the fire return interval likely plays a substantial role in controlling the abundance of white spruce cover. Areas with a shorter fire return interval will likely have less long-term coniferous tree cover than areas with a longer fire return interval. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-scrub birch-mixed dwarf scrub-lichen woodland

Community Phase Narrative:
The tree canopy is primarily medium-sized trees with a few regenerating, stunted, and tall trees. *Betula neoalaskana* and *Picea mariana* are present, but the most common tree species is *Picea glauca* (total mature tree cover ~15%). In this phase, *Picea glauca* averages 79 years of age (ranges from 31 to 147 years). The most abundant medium shrubs are *Betula glandulosa* and *Betula occidentalis,* and the most abundant dwarf shrubs are *Vaccinium vitis-idaea* and *Empetrum nigrum*. Graminoids and forbs are a minor vegetative component. The lichen cover is nearly twice as abundant as the moss cover (primarily *fruticose/foliose* lichen and feathermoss). The diversity of lichen is high (13 species), but no individual species is abundant. Common species include *Stereocaulon tomentosum*, *Cladina sp*., and *Cladonia sp*.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	High-intensity fire. The climax sites generally are well drained and have a thin organic layer (<15 cm. thick). The high-intensity fire likely consumed much of the organic mat, exposing mineral soils.
1.1b	Low-intensity fire or spot fire. A low-intensity or spot fire likely results in a community that resembles a late fire phase community. After a low-severity burn, some shrubs and graminoids can quickly recolonize and become dominant as a result of below-ground root reserves that are not consumed during the fire event.

Phase 1.2	

Community Phase Number:	1.2	Community Phase Name:	White spruce-paper birch-scrub birch-lichen woodland

Community Phase Narrative:
The majority of the tree canopy is a mixture of medium and regenerating *Betula neoalaskana* and *Picea glauca*. *Picea glauca* averages 69 years of age (ranges from 27 to 101 years). Shrubs are abundant, typically exceeding 50% cover, and are evenly distributed in the medium, low, and dwarf shrub strata. The most abundant medium shrubs are *Betula glandulosa* and *Betula occidentalis,* the most abundant low shrubs are *Betula glandulosa* and *Vaccinium uliginosum*, and the most abundant dwarf shrubs are *Vaccinium vitis-idaea* and *Empetrum nigrum*. Graminoids and forbs are a minor vegetative component. The lichen cover is nearly twice as abundant as the moss cover (primarily *fruticose/foliose* lichen and feathermoss). The diversity of lichen is high (19 species), but no individual species are abundant. Common species include *Stereocaulon tomentosum*, *Cladina sp*., and *Flavocetraria cucullata*. Four observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire disturbance. The late and climax phases were grouped in large part due to the typical size/age of the trees and the presence of broadleaf tree species. Over time, the abundance of broadleaf tree species decreases and that of *Picea glauca* increases. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Scrub birch-bluejoint-fireweed-moss scrubland
Community Phase Narrative:			
The tree canopy consists of regenerating *Betula neoalaskana* at low densities. As compared to the climax and late fire phases, the shrub cover is limited and is primarily in the medium shrub stratum. The dominant shrub is *Betula glandulosa*. As compared to the climax and late fire phases, the graminoid and forb cover is high. The most abundant graminoid is *Calamagrostis Canadensis,* and most abundant forb is *Chamerion angustifolium*. Fire appears to greatly reduce the overall lichen cover and increase the overall moss cover. One observation of this phase was conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	Normal time and growth without fire. Paper birch and spruce develop into a mixed woodland.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
70 70 70

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
6 6 6

Texture: Moderately decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4 4 4

Subsurface Layer

Thickness (cm): Min RV Max
64 64 64

Texture: Channers, very channery sandy loam, loam, silt loam

AWC (cm/cm): Min RV Max
0.13 0.19 0.25

pH: Min RV Max
5.2 5.2 5.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-1	93-93	20-20	5-5	1-1	5-5	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-15	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1-2	---	---
FT (>24 inches)	---	1-20	---	---
SD (<8 inches)	---	---	2-5	---
SL (8-36 inches)	---	---	0.1-25	---
SM (3-10 feet)	---	---	0.1-1	---
TR (<15 feet)	---	---	---	0.1-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-15-15	100	38.7

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LUAR2	*Lupinus arcticus*	2-2-2	100	14.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	20-20-20	100	44.7
POAL11	*Polygonum alpinum*	1-1-1	100	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-5-5	100	22.4
ARRU	*Arctostaphylos rubra*	2-2-2	100	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	25-25-25	100	50.0
ROAC	*Rosa acicularis*	1-1-1	100	10.0
LEGR	*Ledum groenlandicum*	1-1-1	100	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	1-1-1	100	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	5-5-5	100	22.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Other woody plants	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—23-23-23

Community Phase 2FL

Rooting Depth (cm):	Min	RV	Max
	53	59.3	65

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
3 3.7 4

Texture: Channery silt loam, moderately decomposed plant material, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.2 0.31 0.35

pH: Min RV Max
3.4 4.9 6.6

Subsurface Layer

Thickness (cm): Min RV Max
50 55.7 61

Texture: Very gravelly loam, very gravelly sandy loam, channers, very channery silt loam, extremely channery silt loam

AWC (cm/cm): Min RV Max
0.08 0.17 0.24

pH: Min RV Max
5.2 6 6.7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
55-70	30-40	10-20	1-5	1-5	1-35	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.01-0.01	---	---	---
FD (<4 inches)	---	0.01-4	---	---
SD (<8 inches)	---	---	1-4	---
SL (8-36 inches)	---	---	2-2	---
SM (3-10 feet)	---	---	10-15	---
TR (<15 feet)	---	---	---	2-2
TS (<15 feet)	---	---	---	10-10
TM (15-40 feet)	---	---	---	10-5
TT (>40 feet)	---	---	---	2-2

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
HIAL3	*Hierochloe alpina*	7-7-7	25	13.2
CAREX	*Carex*	0-2-3	75	12.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYAN2	*Lycopodium annotinum*	0.1-2.4-4	75	13.3
LYCL	*Lycopodium clavatum*	2-2.5-3	50	11.2
SATR5	*Saxifraga tricuspidata*	5-5-5	25	11.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LUAR2	*Lupinus arcticus*	4-4-4	25	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	4-10-25	100	31.6
VAVI	*Vaccinium vitis-idaea*	0.1-5.8-15	100	24.0
ARAL2	*Arctostaphylos alpina*	1-5.8-10	100	24.0
DROC	*Dryas octopetala*	10-10-10	25	15.8
SAAR27	*Salix arctica*	5-5-5	25	11.2
LOPR	*Loiseleuria procumbens*	1-2.5-4	50	11.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	1-7-15	75	22.9
VAUL	*Vaccinium uliginosum*	2-4.5-8	100	21.2
LEGR	*Ledum groenlandicum*	10-10-10	25	15.8
SPST3	*Spiraea stevenii*	3-4-5	50	14.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEOC2	*Betula occidentalis*	5-10-15	100	31.6
BEGL	*Betula glandulosa*	15-15-15	25	19.4
SAGL	*Salix glauca*	10-10-10	25	15.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-6.8-10	100	26.0
BENE4	*Betula neoalaskana*	2-8.5-15	50	20.6

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-10-10	25	15.8
PIGL	*Picea glauca*	8-8-8	25	14.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-8-15	100	28.3
BENE4	*Betula neoalaskana*	5-5-5	25	11.2

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	3.6-4-3.8	12-13-14	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
16-21.7-29	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Tree regeneration	Moose	Summer

Notable Plants: *Arnica mollis*

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—29-35.2-41

Community Phase HCPC

Rooting Depth (cm): Min RV Max
32 49.8 66

Restrictive Feature: Paralithic rock

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 2.8 6

Texture: Silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.25 0.33 0.35

pH: Min RV Max
3.8 4.5 5.5

Subsurface Layer

Thickness (cm): Min RV Max
32 47 60

Texture: Bedrock, gravelly coarse sandy loam, gravelly silt loam, very gravelly coarse sandy loam, very cobbly silt loam. very gravelly silt loam, extremely cobbly silt loam, channers, extremely gravelly coarse sand, extremely gravelly coarse sandy loam, extremely gravelly loamy coarse sand, channery sandy loam, extremely gravelly silt loam, extremely paragravelly loamy coarse sand, very channery silt loam, extremely channery sandy loam, coarse sandy loam, very flaggy silt loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.02 0.15 0.25

pH: Min RV Max
4.5 5.6 6.6

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
25-80	5-35	15-60	0-7	0-3	0-25	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
SD (<8 inches)	---	---	3-4	---
SL (8-36 inches)	---	---	3-5	---
TR (<15 feet)	---	---	---	5-5
TS (<15 feet)	---	---	---	5-5
TM (15-40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
FEBR	*Festuca brachyphylla*	10-10-10	11	10.5

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-10-10	11	10.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LUAR2	*Lupinus arcticus*	1-4.3-7	33	12.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	3-11-20	100	33.2
VAVI	*Vaccinium vitis-idaea*	2-7.4-10	89	25.6
LOPR	*Loiseleuria procumbens*	3-7-10	44	17.6
ARAL2	*Arctostaphylos alpina*	0-6.7-10	33	14.9
VAUL	*Vaccinium uliginosum*	2-4.3-6	33	12.0
DROC	*Dryas octopetala*	10-10-10	11	10.5

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	2-6-12	67	20.0
LEGR	*Ledum groenlandicum*	1-6.3-15	33	14.5
BEGL	*Betula glandulosa*	4-4.7-5	33	12.5
ROAC	*Rosa acicularis*	5-5-5	22	10.5
LEPAD	*Ledum palustre ssp. decumbens*	3-4-5	22	9.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEOC2	*Betula occidentalis*	10-15.7-25	78	35.0
BEGL	*Betula glandulosa*	2-12-20	67	28.3
ALVIF	*Alnus viridis ssp. fruticosa*	1-2.8-7	44	11.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-3.9-7	100	19.7

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-6.7-10	33	14.9

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-12.1-25	100	34.8

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	31-80-147	1.9-5-9.1	7-24-36	21	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
8-16.2-30	7

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Tree regeneration	Moose	Spring
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: *Poa porsildii*

Species Richness: Number of stops—9; plant species per stop (min-avg-max)—15-25.4-40

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Picea mariana*/*Ledum palustre ssp. decumbens*/*Empetrum nigrum*
Ecological Classification ID: F231XY169AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Pingos on terraces, terraces, alluvial fans

Slope (percent):	Min	Max
	0	25

Elevation (feet):	Min	Max
	666	1,604

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	25

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Low

Frost-Free Days:	Min	Max
	50	110

Mean Annual Precipitation (inches):	Low	High
	9	21

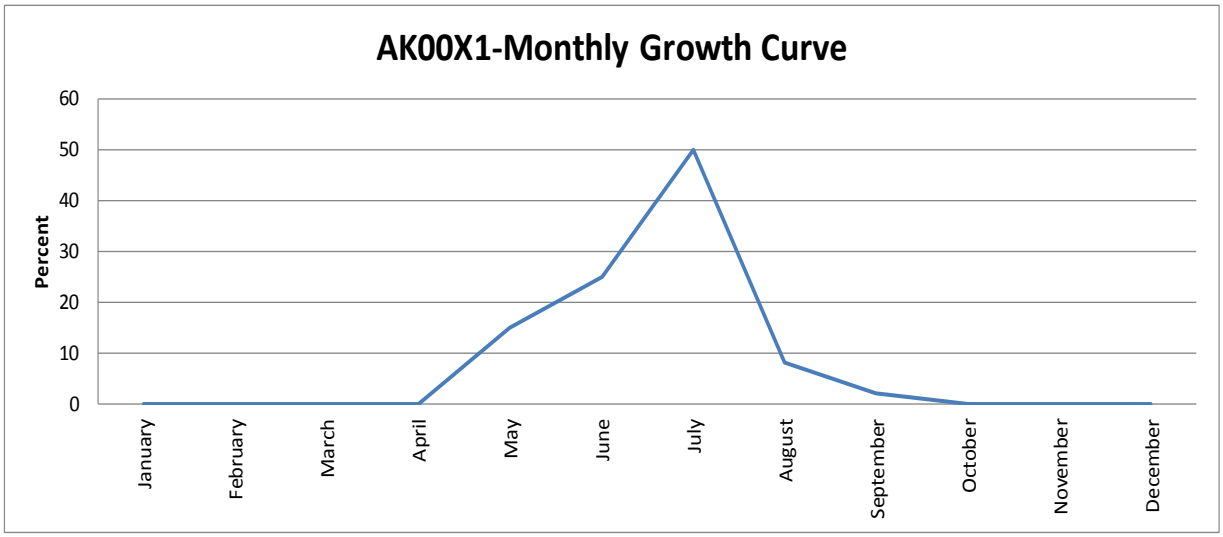
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH5—D31-Boreal taiga/tussock organic terraces, frozen
D31TE1—D31-Boreal taiga/tussock organic terraces, frozen
D31TE2—D31-Boreal taiga/tussock organic terraces, frozen
D31UC4—D31-Boreal taiga/tussock organic terraces, frozen
D31YV2—D31-Boreal taiga/tussock organic terraces, frozen
D31YV3—D31-Boreal taiga/tussock organic terraces, frozen

Characteristics of Representative Soil Components

Soil Classification: Loamy, mixed, euic, subgelic Terric Fibristels
Dominant Parent Material: Organic material over silty cryoturbate
Representative Surface Texture: Peat
Subsurface Texture Group: Loamy
Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	59

pH:	Low	RV	High
	3.8	6.2	7.4

Effective CEC (me/100g):	Low	High
	19.3	50

CEC (me/100g):	Min	RV	Max
	10	27.3	62

Organic Matter (percent):	Low	RV	High
	2	28	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.8	1.12

Plant Community Phases

Ecological Site Description ID:	F231XY169AK

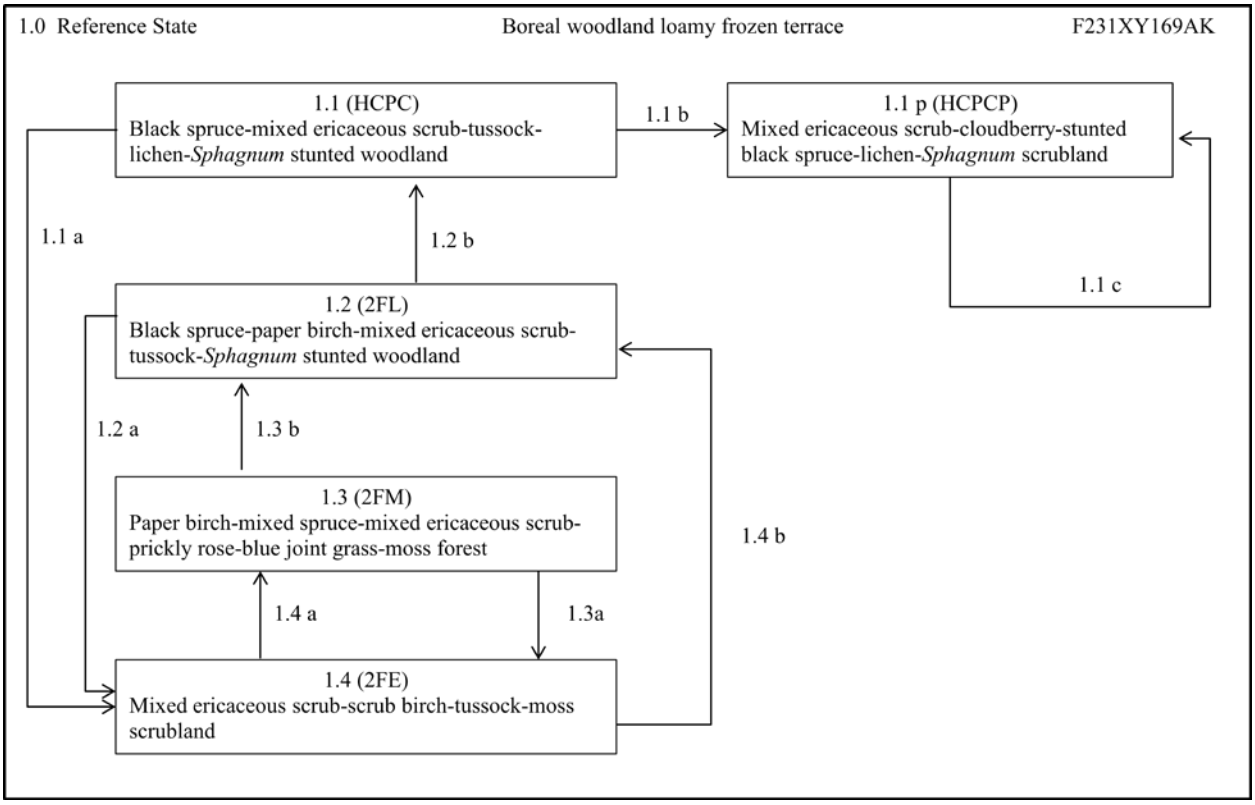
Ecological Dynamics of the Site:

This boreal ecological site is in flat areas of flood plain terraces (slope generally <5%). The soils in community phase 1.1 are classified as Fibristels and consist of thick organic material over cryoturbated silt or loam (organic mat commonly >50 cm. thick). The soils typically are saturated and commonly are ponded, likely due to the hick organic mat and shallow depth to permafrost. The climax phase community is characterized as stunted black spruce woodland with a thick mat of Sphagnum moss.

Fire resulted in five documented phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. Low-severity fire events are more typical than high-severity fire events on this site. Low-severity and high-severity fire events appear to cause differences in the depth of the organic material on the soil surface, the presence and/or depth to permafrost, and the present and potential vegetation.

It is presumed that sites not affected by fire for long periods of time eventually dominantly support a mat of Sphagnum moss. The organic material becomes so thick and contains enough moisture that a fire event would not necessarily reset the community to an early fire sere (phase 1.4). Communities that support dominantly Sphagnum moss have a less productive black spruce forest and thus are considered to be post-climax communities.

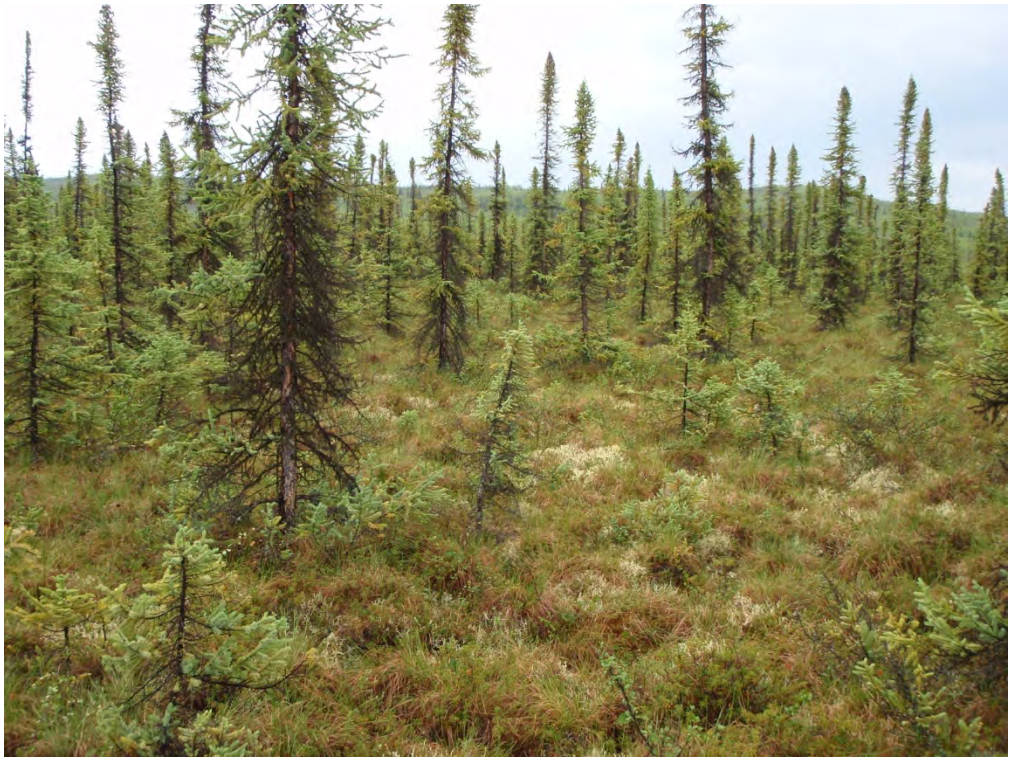
State and Transition Diagram:



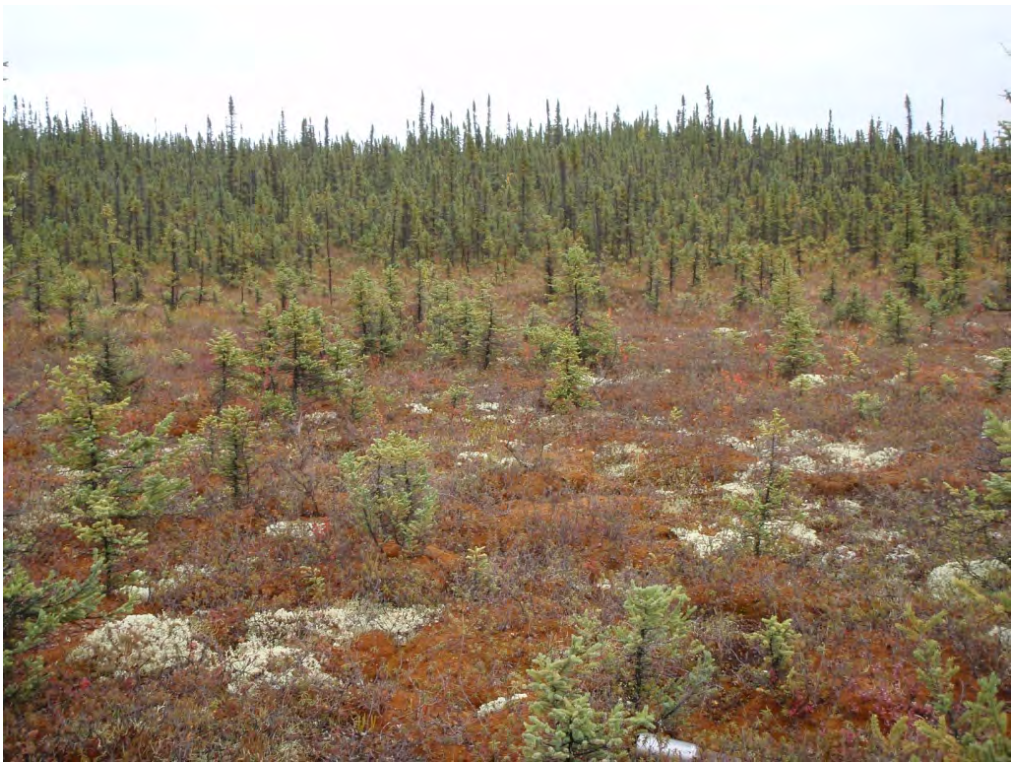
State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of the structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn. During a low-severity fire, minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Permafrost typically remains in the soil profile, and water commonly perches above it. Graminoids and scrubs quickly recolonize and become dominant as a result of below-ground root reserves that were not consumed during the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost commonly drops out of the soil profile, and the sites become drier. Many pre-fire species likely regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.3.

	The fire return interval plays a significant role in the structure of the forest. Longer fire return intervals favor the development of community phases 1.1 and 1.1P, and shorter fire return intervals favor the development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Black Spruce-Mixed Ericaceous Scrub-Tussock-Lichen-Sphagnum Stunted Woodland
Community Phase Narrative:			
The tree cover is evenly distributed among the medium, stunted, and regenerative strata (total mature tree cover ~15%). *Picea mariana* is the dominant tree species. The majority of the shrub cover is in the low and dwarf strata (total shrub cover ~60%). Common shrub species include *Ledum palustre*, *Rubus chamaemorus*, and *Vaccinium vitis-idaea*. Graminoids are prevalent (~20% cover), and the most common species are *Eriophorum vaginatum* and *Eriophorum angustifolium*. Forbs are a minor vegetative component. Moss (~60% cover) and lichen (~25% cover) form an expansive ground cover. Common species are *Sphagnum sp*. and *Cladina sp*. Twenty-seven observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire.
1.1b	Normal time and growth without fire disturbance. Ericaceous scrubs and Sphagnum moss become dominant in the understory and the content of surface organic matter increases. Tree and graminoid cover decreases. Areas are wetter and less productive.

Phase 1.1p	

Community Phase Number:	1.1p	Community Phase Name:	Mixed Ericaceous Scrub-Cloudberry-Stunted Black Spruce-Lichen-Sphagnum Scrubland
Community Phase Narrative:			
The tree cover is evenly distributed between the stunted and regenerative strata (total mature tree cover ~5%). *Picea mariana* is the dominant tree species. The majority of the shrub cover is in the low and dwarf strata (total shrub cover ~85%). Common shrubs include *Ledum palustre*, *Rubus chamaemorus*, *Betula nana*, *Vaccinium vitis-idaea*, *Vaccinium uliginosum*, *Empetrum nigrum*, and *Chamaedaphne calyculata*. Graminoids, forbs, and lichen are minor vegetative components. Sphagnum moss forms an expansive ground cover (total moss cover ~85%; Sphagnum moss cover ~65%). Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1c	Fire. This pathway was not observed in the field, but it was believed that fire in this post-climax community typically would not reset the succession. Post-climax communities have such a thick layer of organic matter that fire does not create a condition suitable for the competitive release of graminoids or trees. The transition results in a community that supports dominantly scrubs and Sphagnum moss.		

Phase 1.2			
Community Phase	1.2	Community	Black Spruce-Paper Birch-Mixed Ericaceous Scrub-

Number:		Phase Name:	Tussock-Sphagnum Stunted Woodland
Community Phase Narrative:			
In this community phase, remnants of charred trees are common. The tree cover is evenly distributed among the medium, stunted, and regenerative strata (total mature tree cover was 15%). The dominant tree species is *Picea mariana*, but *Betula neoalaskana* and *Picea glauca* are also present. Shrubs are in the medium, low, and dwarf strata (total shrub cover ~90%). Common shrubs include *Ledum palustre*, *Betula glandulosa*, *Rubus chamaemorus*, and *Vaccinium vitis-idaea*. Graminoids are abundant (~50% cover), and common species include *Carex bigelowii* and *Eriophorum vaginatum*. Lichen and forbs are minor vegetative components. Moss forms an expansive ground cover (~50% cover) and includes feathermoss and *Sphagnum sp*. Twenty-six observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Fire.		
1.2b	Normal time and growth without fire. The shrub and graminoid cover decreases, and the Sphagnum moss cover increases. The tree cover remains fairly constant. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.4.		

Phase 1.3	

Community Phase Number:	1.3	Community Phase Name:	Paper Birch-Mixed Spruce-Mixed Ericaceous Scrub-Prickly Rose-Blue Joint Grass-Moss Forest
Community Phase Narrative:			
This phase is characterized by an extensive paper birch community. The tree cover is primarily in the medium and regenerative strata (total mature tree cover ~40%). *Betula neoalaskana* is the dominant species, but *Picea glauca* and *Picea mariana* are also common. Shrubs are in the medium, low, and dwarf strata (total shrub cover ~80%). Common shrubs include *Alnus viridis*, *Ledum palustre*, *Rosa acicularis*, *Rubus chamaemorus*, and *Vaccinium vitis-idaea*. Graminoids (~25% cover) and forbs (~20% cover) are abundant, and common species include *Calamagrostis canadensis* and *Equisetum sp.* Moss forms an extensive ground cover (~40% cover) that is a mixture of feathermoss and Sphagnum moss. Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	Fire. Community phase 1.3 typically has much less surface organic matter than do community phases 1.2 and 1.1. Fire on community phase 1.3 might be more likely to expose mineral soils, resulting in site conditions that are more suitable to the re-establishment of broadleaf trees.		

1.3b	Normal time and growth without fire event. Permafrost moves upward into the soil profile, and eventually paper birch is replaced by a black spruce, ericaceous scrub, and Sphagnum moss community. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.4.

Phase 1.4	

Community Phase Number:	1.4	Community Phase Name:	Mixed Ericaceous Scrub-Scrub Birch-Tussock-Moss Scrubland

Community Phase Narrative:

Standing charred trees are common. The tree cover typically is minimal (total mature tree cover ~2%). The shrub cover is primarily in the low and dwarf strata (total shrub cover ~75%). Common shrubs include *Ledum palustre*, *Vaccinium vitis-idaea*, *Betula nana*, *Rubus chamaemorus*, and *Vaccinium uliginosum*. Graminoids are abundant (~60% cover). Common species include *Carex bigelowii* and *Eriophorum vaginatum*. Forbs and lichen are minor vegetative components. Moss is abundant (~40% cover) and is primarily feathermoss and Sphagnum moss. Twenty-seven observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth without fire. This pathway is the result of a high-intensity fire regime. Shrub, feathermoss, and paper birch likely all increase in abundance.
1.4b	Normal time and growth without fire. This pathway is the result of a low-intensity fire regime. Graminoids decrease, and black spruce, scrub, and Sphagnum moss increase.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
8 58.1 140
Restrictive Feature: Permafrost
Drainage Class: Very poorly drained
Surface Layer
Thickness (cm): Min RV Max
8 35.6 60
Texture: Highly decomposed plant material, mucky peat, peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.4

pH: Min RV Max
3.4 5.1 7.4

Subsurface Layer

Thickness (cm): Min RV Max
0 22.4 80

Texture: Permanently frozen loam, gravelly sandy loam, permanently frozen silt loam, permanently frozen very fine sandy loam, silt loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.12 0.25 0.35

pH: Min RV Max
5 6.2 7.3

Influencing Water Features

NWI Code: PEM1, PSS3, PSS1, PFO4

NWI Description: Palustrine, Emergent, Persistent; Palustrine, Forested, Needle-Leaved Evergreen; Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Palustrine, Scrub-Shrub, Broad-Leaved Evergreen

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-30	15-85	3-70	0-20	0-20	0-0	0-15

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GD (<4 inches)	1-1	---	---	---
GM (4-24 inches)	15-15	---	---	---
FM (4-24 inches)	---	0.01-2	---	---
SD (<8 inches)	---	---	0.01-2	---
SL (8-36 inches)	---	---	0.01-7	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	2-33.8-80	67	47.5
CABI5	*Carex bigelowii*	1-19.4-50	63	35.0
ERBR6	*Eriophorum brachyantherum*	10-31.7-70	11	18.8
CAMIM	*Carex microchaeta ssp. microchaeta*	70-70-70	4	16.1
ERIOP	*Eriophorum*	65-65-65	4	15.5
ERAN6	*Eriophorum angustifolium*	1-25.5-50	7	13.7
CAREX	*Carex*	0.1-10.5-20	15	12.5
CARO7	*Carex rotundata*	25-25-25	4	9.6

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	20-45-70	7	18.3
CAST10	*Carex stylosa*	75-75-75	4	16.7
CABI5	*Carex bigelowii*	50-50-50	4	13.6
CACA4	*Calamagrostis canadensis*	2-4.8-8	19	9.4

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	0.1-4.7-20	26	11.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	0.1-8.7-30	93	28.4
RUCH	*Rubus chamaemorus*	0.1-5-15	89	21.2
ANPO	*Andromeda polifolia*	1-5.4-20	30	12.6
VAOX	*Vaccinium oxycoccos*	0-2.1-10	63	11.6
CHCA2	*Chamaedaphne calyculata*	0.1-5.5-15	15	9.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	2-25.8-50	74	43.7
BENA	*Betula nana*	5-16.7-40	67	33.3
VAUL	*Vaccinium uliginosum*	1-9.4-65	74	26.3
SAPU15	*Salix pulchra*	1-9-25	52	21.6
BEGL	*Betula glandulosa*	0-11.2-30	41	21.3
CHCA2	*Chamaedaphne calyculata*	2-7.8-15	44	18.6
LEGR	*Ledum groenlandicum*	2-11.2-25	19	14.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENA	*Betula nana*	4-16.3-30	11	13.5
ALVIF	*Alnus viridis ssp. fruticosa*	1-10.2-25	15	12.3
BEGL	*Betula glandulosa*	10-12.5-15	7	9.6

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	0-4.6-20	85	19.7

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-4.3-15	26	10.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	61-62-63	0.9-2-3.5	4-11-18	2	G

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-0-0	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Caribou	Unknown
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows		Unknown
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Summer
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—27; plant species per stop (min-avg-max)—12-21.7-35

Community Phase 2FM

Rooting Depth (cm): Min RV Max
64 69 74

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
9 9.5 10

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.8 4.3 4.7

Subsurface Layer

Thickness (cm): Min RV Max
55 59.5 64

Texture: Gravelly loam, loam, silt loam

AWC (cm/cm): Min RV Max
0.2 0.22 0.24

pH: Min RV Max
5.4 5.6 5.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
4-15	20-80	18-55	8-25	0-0	0-0	0-5

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-5	---	---	---
GT (>24 inches)	2-2	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	10-10	---	---
SD (<8 inches)	---	---	10-25	---
SL (8-36 inches)	---	---	0.1-5	---
SM (3-10 feet)	---	---	5-5	---
TR (<15 feet)	---	---	---	10-55
TM (15-40 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	20-20-20	33	25.8
CAREX	*Carex*	15-15-15	33	22.4
ERVA4	*Eriophorum vaginatum*	5-5-5	33	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-16-30	67	32.7

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	8-8-8	33	16.3
EQSC	*Equisetum scirpoides*	3-3-3	33	10.0
PYGR	*Pyrola grandiflora*	3-3-3	33	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	30-30-30	33	31.6
EQSY	*Equisetum sylvaticum*	10-10-10	33	18.3
PEFRF	*Petasites frigidus var. frigidus*	8-8-8	33	16.3
COPA28	*Comarum palustre*	5-5-5	33	12.9

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-16.7-25	100	40.8
RUCH	*Rubus chamaemorus*	10-10-10	67	25.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	5-35-65	67	48.3
LEPAD	*Ledum palustre ssp. decumbens*	5-15-35	100	38.7
LEGR	*Ledum groenlandicum*	7-7-7	33	15.3
RIHU	*Ribes hudsonianum*	6-6-6	33	14.1
SPST3	*Spiraea stevenii*	3-3-3	33	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	20-20-20	33	25.8
ALVIF	*Alnus viridis ssp. fruticosa*	5-7.5-10	67	22.4
SALIX	*Salix*	15-15-15	33	22.4
SAPU15	*Salix pulchra*	5-5-5	33	12.9
RITR	*Ribes triste*	5-5-5	33	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	5-30-55	67	44.7
PIMA	*Picea mariana*	5-11.7-20	100	34.2
PIGL	*Picea glauca*	10-10-10	33	18.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	5-23.3-40	100	48.3
PIGL	*Picea glauca*	30-30-30	33	31.6
PIMA	*Picea mariana*	10-10-10	33	18.3

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-5-5	33	12.9
BENE4	*Betula neoalaskana*	5-5-5	33	12.9

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	51-51-51	3-3-3	27-27-27	1	G

Tree Basal Area:

Min-Avg-Max	Number of Stands
34-34-34	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other	Other	Unknown
Slight use	Other woody plants	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—16-23-29

Community Phase 2FL

Rooting Depth (cm):	Min	RV	Max
	7	49.9	112

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
21 35.5 59

Texture: Peat, permanently frozen peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.4 4.6 6.1

Subsurface Layer

Thickness (cm): Min RV Max
-14 14.4 53

Texture: Permanently frozen silt loam, silt loam

AWC (cm/cm): Min RV Max
0.24 0.25 0.25

pH: Min RV Max
5.5 6.4 7.2

Influencing Water Features

NWI Code: PFO4, PSS1, PSS3

NWI Description: Palustrine, Forested, Needle-Leaved Evergreen; Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Palustrine, Scrub-Shrub, Broad-Leaved Evergreen

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-40	6-95	4-60	0-15	0-7	0-0	0-20

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-7	---	---	---
FD (<4 inches)	---	0.01-1	---	---
FM (4-24 inches)	---	3-3	---	---
SD (<8 inches)	---	---	1-7	---
SL (8-36 inches)	---	---	0.01-3	---
SM (3-10 feet)	---	---	3-5	---
TR (<15 feet)	---	---	---	15-15
TS (<15 feet)	---	---	---	20-20
TM (15-40 feet)	---	---	---	7-7

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	3-29.7-70	22	25.7
CABI5	*Carex bigelowii*	1-17.9-40	30	23.0
ERVA4	*Eriophorum vaginatum*	1-11.7-30	41	21.9
ERIOP	*Eriophorum*	15-26.2-35	15	19.7
ERBR6	*Eriophorum brachyantherum*	15-30-45	7	14.9
ERAN6	*Eriophorum angustifolium*	55-55-55	4	14.3
CAMIM	*Carex microchaeta ssp. microchaeta*	45-45-45	4	12.9
CAAQ	*Carex aquatilis*	25-25-25	4	9.6

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	20-56.7-90	11	25.1
ERVA4	*Eriophorum vaginatum*	60-72.5-85	7	23.2
CACA4	*Calamagrostis canadensis*	0-18.8-70	15	16.7

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-10.2-25	85	29.5
RUCH	*Rubus chamaemorus*	0.1-7.7-35	85	25.5
ANPO	*Andromeda polifolia*	1-12.4-30	26	18.0
LEPAD	*Ledum palustre ssp. decumbens*	15-32.5-50	7	15.5
VAOX	*Vaccinium oxycoccos*	0.1-2.5-8	78	13.9
EMNI	*Empetrum nigrum*	2-10.4-20	19	13.9
ARRU	*Arctostaphylos rubra*	0.1-4.6-15	26	10.9
CHCA2	*Chamaedaphne calyculata*	1-10.3-25	11	10.7

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	5-21.7-80	85	42.9
CHCA2	*Chamaedaphne calyculata*	0.1-15.8-55	52	28.6
BENA	*Betula nana*	3-9.8-20	59	24.0
VAUL	*Vaccinium uliginosum*	2-7.4-20	74	23.4
BEGL	*Betula glandulosa*	5-13-25	22	17.0
MYGA	*Myrica gale*	0.1-15.7-40	11	13.2
SAPU15	*Salix pulchra*	1-4.3-15	41	13.2
LEGR	*Ledum groenlandicum*	7-11.8-20	15	13.2
SAIN3	*Salix interior*	30-30-30	4	10.5
ALINT	*Alnus incana ssp. tenuifolia*	10-12.5-15	7	9.6

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	3-21-60	22	21.6
SAPU15	*Salix pulchra*	2-18.6-45	19	18.6
ALVIF	*Alnus viridis ssp. fruticosa*	2-5.3-8	33	13.3
LEPAD	*Ledum palustre ssp. decumbens*	30-30-30	4	10.5
ALINT	*Alnus incana ssp. tenuifolia*	3-7.7-15	11	9.2
SAAR3	*Salix arbusculoides*	5-7.3-10	11	9.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-8.9-22	81	26.9
BENE4	*Betula neoalaskana*	0.1-3.7-5	22	9.0

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-15.2-60	63	31.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	0.1-14-40	48	26.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	68-92-114	0.8-3-4.9	12-24-38	8	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
2-34.2-55	4

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Moose	Summer
Slight use	Other	Other	Unknown
Slight use	Other woody plants	Other	Specialized system,
Slight use	Other woody plants	Other	Summer
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—27; plant species per stop (min-avg-max)—15-24.4-32

Community Phase HCPC

Rooting Depth (cm): Min RV Max
15 56.8 96

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
15 33.4 48

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
2.9 4.4 7.5

Subsurface Layer

Thickness (cm): Min RV Max
0 23.4 48

Texture: Permanently frozen mucky peat, permanently frozen silt loam, silt loam, mucky silt loam

AWC (cm/cm): Min RV Max
0.15 0.26 0.4

pH: Min RV Max
3.9 6.5 8.2

Influencing Water Features

NWI Code: PFO4, PSS1, PSS3, PSS4, PEM1

NWI Description: Palustrine, Emergent, Persistent; Palustrine, Forested, Needle-Leaved Evergreen; Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Palustrine, Scrub-Shrub, Broad-Leaved Evergreen; Palustrine, Scrub-Shrub, Needle-Leaved Evergreen

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-85	25-95	0-65	0-10	0-1	0-0	0-5

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-15	---	---	---
FD (<4 inches)	---	0.1-1	---	---
FM (4-24 inches)	---	1-1	---	---
SD (<8 inches)	---	---	1-5	---
SL (8-36 inches)	---	---	1-5	---
TR (<15 feet)	---	---	---	0.1-0.1
TS (<15 feet)	---	---	---	25-25
TM (15-40 feet)	---	---	---	1-1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	0.1-8.4-35	56	21.5
ERAN6	*Eriophorum angustifolium*	20-40-65	11	21.1
CABI5	*Carex bigelowii*	0.1-11.6-40	37	20.7
CAREX	*Carex*	3-13.2-20	15	14.0
ERIOP	*Eriophorum*	7-11.8-15	15	13.2
ERBR6	*Eriophorum brachyantherum*	30-30-30	4	10.5
CACA4	*Calamagrostis canadensis*	0.1-3.5-10	30	10.2

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	15-17.5-20	7	11.4

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	0.1-6.3-15	15	9.7

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-8.4-30	93	28.0
RUCH	*Rubus chamaemorus*	0.1-8.5-20	89	27.4
EMNI	*Empetrum nigrum*	0.1-6.9-20	26	13.3
ARRU	*Arctostaphylos rubra*	0.1-7.2-15	22	12.6
VAOX	*Vaccinium oxycoccos*	0.1-1.7-10	78	11.5
ANPO	*Andromeda polifolia*	0.1-2.7-5	33	9.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	1-18.5-40	89	40.5
VAUL	*Vaccinium uliginosum*	0-6.8-20	63	20.7
LEGR	*Ledum groenlandicum*	5-23.8-40	15	18.8
CHCA2	*Chamaedaphne calyculata*	0.1-6.9-20	41	16.8
BENA	*Betula nana*	0-5.3-15	44	15.4
BEGL	*Betula glandulosa*	2-6.1-10	30	13.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENA	*Betula nana*	10-20-30	7	12.2

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	0.1-12.7-30	93	34.3

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-17.8-35	56	31.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	0.1-8.9-25	70	25.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	53-97-238	1.2-3-7.4	5-20-39	30	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-13.6-20	9

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use			Winter
Slight use	Grasses and sedges	Caribou	Spring
Slight use	Grasses and sedges	Moose	Unknown
Slight use	Grasses and sedges	Other	Summer
Slight use	Other		Unknown
Slight use	Other	Moose	Unknown
Slight use	Other woody plants	Moose	Spring
Slight use	Other woody plants	Moose	Unknown
Slight use	Other woody plants	Other	
Slight use	Other woody plants	Other	Specialized system
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—27; plant species per stop (min-avg-max)—13-25-42

Community Phase HCPCP

Rooting Depth (cm):	Min	RV	Max
	45	49.5	54

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	45	45	45

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	3.6	4.1	4.4

Subsurface Layer

Thickness (cm):	Min	RV	Max
	0	4.5	9

Texture: Permanently frozen silt loam

AWC (cm/cm):	Min	RV	Max
	0.25	0.25	0.25

pH:	Min	RV	Max
	6.7	6.7	6.7

Influencing Water Features

NWI Code: PFO4, PSS3

NWI Description: Palustrine, Forested, Needle-Leaved Evergreen; Palustrine, Scrub-Shrub, Broad-Leaved Evergreen

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
7-25	75-95	10-15	0-5	0-0	0-0	0-1

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-8	---	---	---
FD (<4 inches)	---	0.01-3	---	---
FM (4-24 inches)	---	0.01-0.01	---	---
SD (<8 inches)	---	---	10-7	---
SL (8-36 inches)	---	---	0.01-5	---
TR (<15 feet)	---	---	---	2-2
TS (<15 feet)	---	---	---	15-15

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	15-15-15	33	22.4
ERVA4	*Eriophorum vaginatum*	0.1-4.1-8	67	16.4
CABI5	*Carex bigelowii*	0.1-2.6-5	67	13.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYAN2	*Lycopodium annotinum*	2-3.3-5	100	18.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PELA	*Pedicularis labradorica*	0-1-3	100	10.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUCH	*Rubus chamaemorus*	10-11.7-15	100	34.2
VAVI	*Vaccinium vitis-idaea*	7-9.7-15	100	31.1
EMNI	*Empetrum nigrum*	1-6.3-15	100	25.2
ANPO	*Andromeda polifolia*	15-15-15	33	22.4
VAOX	*Vaccinium oxycoccos*	0.1-2-3	100	14.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	10-21.7-35	100	46.5
BENA	*Betula nana*	8-11-15	100	33.2
VAUL	*Vaccinium uliginosum*	1-7.7-20	100	27.7
CHCA2	*Chamaedaphne calyculata*	3-9-15	67	24.5
ANPO	*Andromeda polifolia*	5-5-5	33	12.9

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	33	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	2-9-15	100	30.0

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-12.5-15	67	28.9

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	47-66-87	1.1-2-2.1	5-8-13	6	G

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—24-27.7-30

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Picea mariana*/*Vaccinium vitis-idaea-Rosa acicularis*
Ecological Classification ID: F231XY178AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Terraces, alluvial fans

Slope (percent):	Min	Max
	5	30

Elevation (feet):	Min	Max
	886	1,086

Range of Aspect Direction: Northeast to southwest (clockwise)

Water Table Depth (cm) :	Min	Max
	5	75

Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	10	15

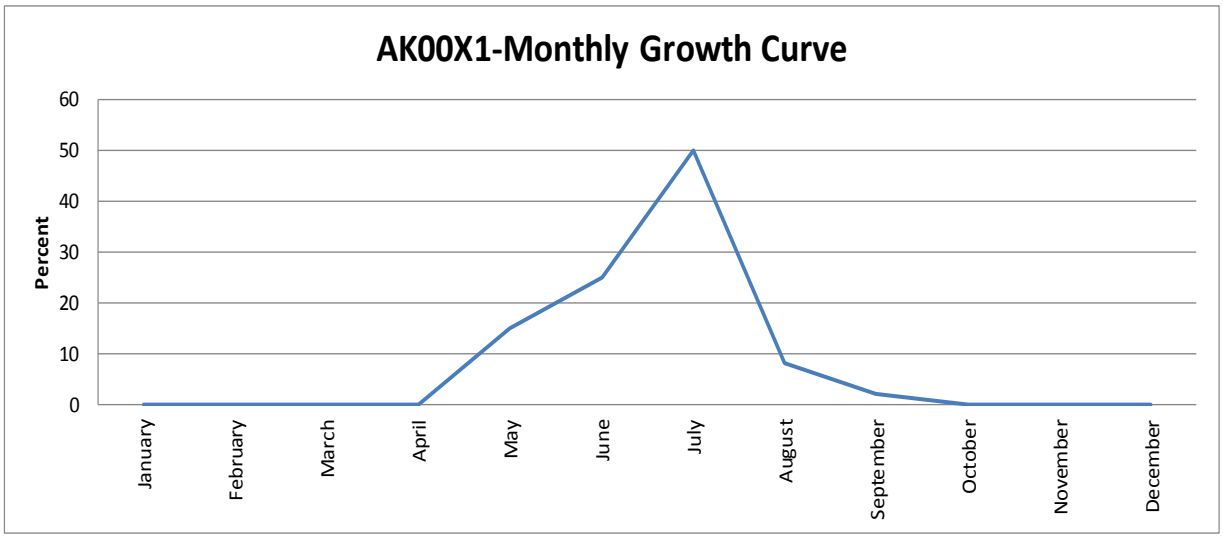
Mean Annual Air Temperature (°F):	Low	High
	25	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TE1—D31-Boreal taiga silty terraces, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, acid, subgelic Fluventic Haplorthels

Dominant Parent Material: Organic material over loamy alluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	27	48

pH:	Low	RV	High
	3.4	5.8	7.8

Effective CEC (me/100g):	Low	High
	12.5	40

CEC (me/100g):	Min	RV	Max
	4.9	24.2	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.33

Plant Community Phases

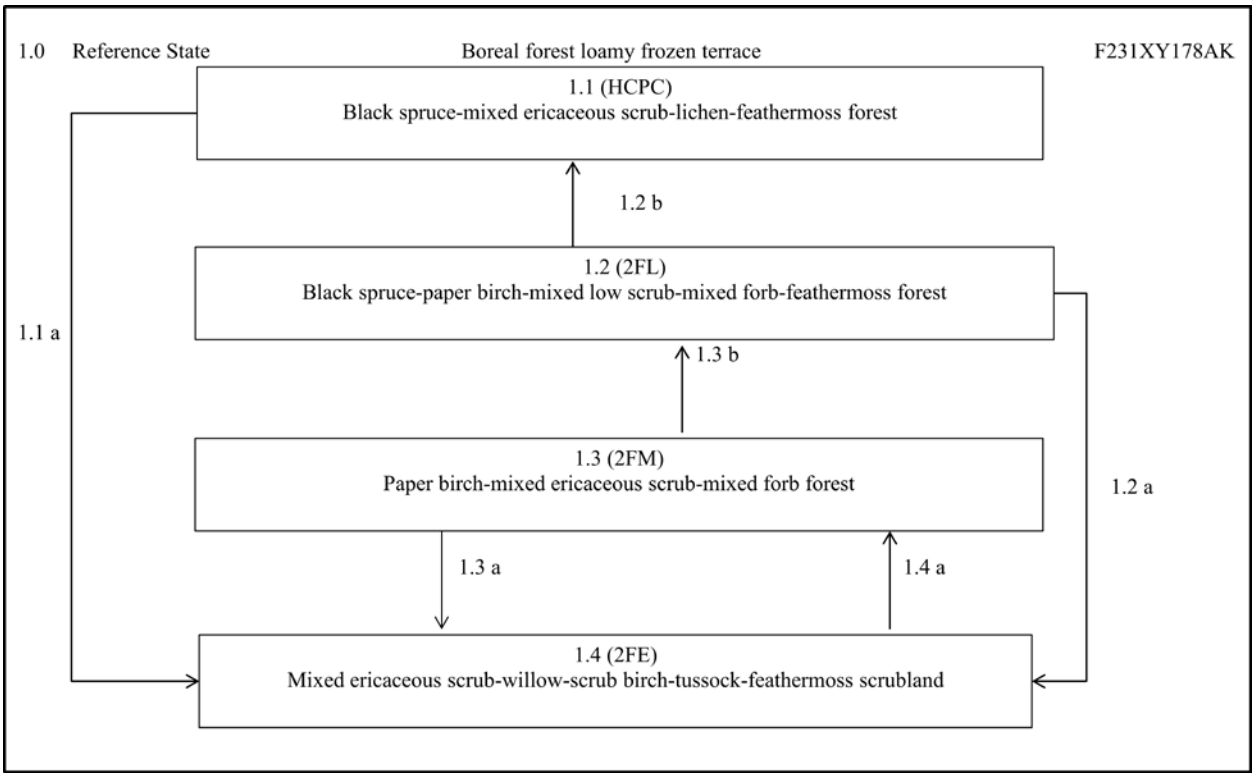
Ecological Site Description ID:	F231XY178AK

Ecological Dynamics of the Site:

This boreal ecological site is on moderate slopes of flood plain terraces (slopes >5%). The soils in community phase 1.1 are classified as Haplorthels and are composed of organic matter over loamy alluvium (organic mat commonly >20 cm. thick). As compared to trees on site F231XY169AK, trees on site F231XY178AK are more productive. Productivity likely differs due to the steepness of slope and drainage class of the soils. The steepness of slope appears to favor a fire regime that enables broadleaf tree species to become dominant.

Fire resulted in four documented phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. High-severity fire events are more typical than low-severity fire events. Low-severity and high-severity fire events cause differences in the post-fire depth of the organic material on the soil surface, the presence and/or depth to permafrost, and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state are grouped on the basis of the structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn. During a low-severity fire, minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Permafrost typically remains in the soil profile, and water commonly perches above it. Graminoids and scrubs quickly recolonize and become dominant because of the below-ground root reserves that were not consumed during the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost commonly drops out of the soil profile, and the soils become drier. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1	

Community Phase Number:	1.1	Community Phase Name:	Black spruce-mixed ericaceous scrub-lichen-feathermoss forest
Community Phase Narrative:			
The tree cover is primarily in the medium and regenerative strata (total mature tree cover ~30%). *Picea mariana* is the dominant tree species. The majority of the shrub cover is in the low and dwarf strata (total shrub cover ~20%). Common shrub species include *Ledum palustre*, *Rosa acicularis*, and *Vaccinium vitis-idaea*. Graminoids and forbs are minor vegetative components. Lichen (~20%) and moss (~70%) form an extensive ground cover. *Pleurozium schreberi* and *Hylocomium splendens* are abundant. Six observations of this phase were conducted.			
Community Pathways			

Pathway Number:	Pathway Name & Description:
1.1a	Fire. Communities associated with high-intensity fires.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Black spruce-paper birch-mixed low scrub-mixed forb-feathermoss forest

Community Phase Narrative:
Betula neoalaskana commonly occurs as standing or fallen dead trees, indicating a shift in the dominant vegetation. The tree cover is evenly distributed among the tall, medium, and regenerative strata. *Betula neoalaskana* and *Picea mariana* are dominant. The shrub cover is primarily in the low and dwarf strata. Common shrub species include *Ledum palustre*, *Rosa acicularis*, and *Vaccinium vitis-idaea*. Graminoids are a minor vegetative component, but *Calamagrostis canadensis* is common (~5% cover). Common forbs include *Geocaulon lividum*, *Mertensia paniculata*, and *Equisetum sylvaticum* (combined ~15% cover). *Pleurozium schreberi* and *Hylocomium splendens* are abundant (combined ~65% cover). Three observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Lichen cover increases, and graminoid and forb cover decreases. Permafrost moves upward into the soil profile, and eventually paper birch is replaced by black spruce, resulting in a community resembling that of phase 1.1. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3	

Community Phase Number:	1.3	Community Phase Name:	Paper birch-mixed ericaceous scrub-mixed forb forest

Community Phase Narrative:

Betula neoalaskana is the dominant tree species (total mature tree cover ~60%). The tree cover is distributed between the medium and regenerative strata. *Picea mariana* is prevalent in the regenerative stratum. The shrub cover is primarily in the low and dwarf shrub strata (total shrub cover ~60%). Common shrub species include *Rosa acicularis* and *Vaccinium vitis-idaea*. Graminoids are a minor vegetative component, but *Calamagrostis canadensis* is common (~5% cover). Common forbs include *Mertensia paniculata*, *Equisetum sp.,* and *Lycopodium annotinum* (combined ~20% cover). Lichen and moss are minor vegetative components. One observation of this phase was conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.3a	Fire. Stands of paper birch are less likely to burn and fire is less likely to spread as compared to stands that are dominantly spruce. However, stands of paper birch in the study area have been burned. If phase 1.3 is burned, the resulting community would likely resemble that of phase 1.4.
1.3b	Normal time and growth without fire. Shrub cover decreases. Black spruce becomes codominant with paper birch, resulting in a community resembling that of phase 1.2. The fire return interval is presumed to be shorter than that of phase 1.2 but longer than that of phase 1.4.

Phase 1.4			
Community Phase Number:	1.4	Community Phase Name:	Mixed ericaceous scrub-willow-scrub birch-tussock-feathermoss scrubland
Community Phase Narrative:			
Charred *Picea mariana* and *Betula neoalaskana* are present, but trees are a minor vegetative component (total mature tree cover ~3% cover). The shrub cover is primarily in the low and dwarf shrub strata (total shrub cover ~90%). Common shrub species include *Betula nana*, *Ledum palustre*, *Vaccinium uliginosum*, *Salix pulchra*, and *Vaccinium vitis-idaea*. Graminoids are prevalent (~30%). Common species include *Carex bigelowii*, *Eriophorum vaginatum*, and *Calamagrostis canadensis*. Lichen (~15% cover) and moss (~40% cover) form an extensive ground cover. One observation of this phase was conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth without fire disturbance. Paper birch and black spruce become established and mature. Because paper birch matures faster than black spruce, the resulting community will likely resemble that of phase 1.3. The shrub and graminoid cover decreases. If this phase burns, the resulting community would likely resemble that of phase 1.4.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min 38 RV 66 Max 94

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

- Thickness (cm): Min 18 RV 25.5 Max 33
- Texture: Slightly decomposed plant material
- AWC (cm/cm): Min 0.35 RV 0.35 Max 0.35
- pH: Min 3.9 RV 3.9 Max 3.9

Subsurface Layer

- Thickness (cm): Min 20 RV 40.5 Max 61
- Texture: Frozen silt loam
- AWC (cm/cm): Min 0.11 RV 0.12 Max 0.13
- pH: Min 5.7 RV 5.7 Max 5.7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
15-15	40-40	65-65	7-7	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-15	---	---	---
GT (>24 inches)	10-3	---	---	---
FM (4-24 inches)	---	7-7	---	---
SD (<8 inches)	---	---	0.1-20	---
SL (8-36 inches)	---	---	1-30	---
TR (<15 feet)	---	---	---	10-10
TS (<15 feet)	---	---	---	2-2
TM (15-40 feet)	---	---	---	1-1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	15-15-15	100	38.7

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	10-10-10	100	31.6
CACA4	*Calamagrostis canadensis*	3-3-3	100	17.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	7-7-7	100	26.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	20-20-20	100	44.7
VAOX	*Vaccinium oxycoccos*	2-2-2	100	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENA	*Betula nana*	30-30-30	100	54.8
LEPAD	*Ledum palustre ssp. decumbens*	20-20-20	100	44.7
SAPU15	*Salix pulchra*	10-10-10	100	31.6
VAUL	*Vaccinium uliginosum*	10-10-10	100	31.6
CHCA2	*Chamaedaphne calyculata*	3-3-3	100	17.3
SPST3	*Spiraea stevenii*	1-1-1	100	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-10-10	100	31.6

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	2-2-2	100	14.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—27-27-27

Community Phase 2FM

Rooting Depth (cm): Min RV Max
95 95 95

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
5 5 5

Texture: Slightly decomposed plant material, silt loam

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
5.3 5.3 5.3

Subsurface Layer

Thickness (cm): Min RV Max
90 90 90

Texture: Gravelly silt loam

AWC (cm/cm): Min RV Max
0.22 0.23 0.24

pH: Min RV Max
5.4 5.4 5.4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-5	20-20	65-65	35-35	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-5	---	---	---
FD (<4 inches)	---	5-5	---	---
FM (4-24 inches)	---	10-8	---	---
SD (<8 inches)	---	---	30-30	---
SL (8-36 inches)	---	---	1-5	---
SM (3-10 feet)	---	---	2-2	---
TR (<15 feet)	---	---	---	15-25
TM (15-40 feet)	---	---	---	5-55

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-5-5	100	22.4
CABI5	*Carex bigelowii*	2-2-2	100	14.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYAN2	*Lycopodium annotinum*	5-5-5	100	22.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	10-10-10	100	31.6
EQSY	*Equisetum sylvaticum*	8-8-8	100	28.3
EQAR	*Equisetum arvense*	3-3-3	100	17.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	30-30-30	100	54.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	30-30-30	100	54.8
ROAC	*Rosa acicularis*	5-5-5	100	22.4
SAPS	*Salix pseudomonticola*	1-1-1	100	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	2-2-2	100	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	25-25-25	100	50.0
PIMA	*Picea mariana*	15-15-15	100	38.7

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	55-55-55	100	74.2
PIMA	*Picea mariana*	5-5-5	100	22.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—20-20-20

Community Phase 2FL

Rooting Depth (cm): Min RV Max
55 78 111

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
5 12.3 19

Texture: Slightly decomposed plant material, silt loam

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.8 4.5 4.9

Subsurface Layer

Thickness (cm): Min RV Max
50 65.7 92

Texture: Permanently frozen loam, gravelly silt loam, permanently frozen sandy loam, extremely gravelly coarse sandy loam, permanently frozen water, loam, silt loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.07 0.19 0.25

pH: Min RV Max
4.7 6.3 7.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-10	65-75	20-40	2-25	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
GT (>24 inches)	10-2	---	---	---
FM (4-24 inches)	---	0.1-10	---	---
SD (<8 inches)	---	---	0.1-10	---
SL (8-36 inches)	---	---	2-8	---
SM (3-10 feet)	---	---	2-5	---
TR (<15 feet)	---	---	---	10-2
TM (15-40 feet)	---	---	---	15-5
TT (>40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	1-5.5-10	67	19.1
CAREX	*Carex*	5-5-5	33	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-10-10	33	18.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	10-10-10	67	25.8
GELI2	*Geocaulon lividum*	0.1-5-10	100	22.4
MEPA	*Mertensia paniculata*	0.1-5-10	100	22.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	8-9.3-10	100	30.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	0.1-9.4-20	100	30.6
ROAC	*Rosa acicularis*	1-6.3-10	100	25.2
RITR	*Ribes triste*	3-4-5	67	16.3
SAPU15	*Salix pulchra*	3-3-3	33	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	33	12.9

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SABE2	*Salix bebbiana*	5-5-5	67	18.3
ALVIF	*Alnus viridis ssp. fruticosa*	8-8-8	33	16.3

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-10-15	100	31.6
BENE4	*Betula neoalaskana*	0.1-1.7-3	100	13.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	15-15-15	100	38.7
BENE4	*Betula neoalaskana*	5-7.3-12	100	27.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-16.7-25	100	40.8
BENE4	*Betula neoalaskana*	10-10-10	33	18.3

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	57-69-82	3.6-6-8	36-42-45	8	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
95-95-95	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—24-25.7-27

Community Phase HCPC

Rooting Depth (cm): Min RV Max
25 71.5 126

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
14 31.2 53

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.6 4.3 5.8

Subsurface Layer

Thickness (cm): Min RV Max
11 40.2 73

Texture: Gravelly loam, extremely gravelly sandy loam, silt loam, sandy loam, fine sandy loam, very fine sandy loam, permanently frozen coarse sandy loam

AWC (cm/cm): Min RV Max
0.08 0.17 0.25

pH: Min RV Max
5.4 6.2 7.6

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-48	48-95	2-15	0-7	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
FM (4-24 inches)	---	1-2	---	---
SD (<8 inches)	---	---	1-1	---
SL (8-36 inches)	---	---	0.01-1	---
TR (<15 feet)	---	---	---	15-15
TM (15-40 feet)	---	---	---	40-40

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	3-4.8-7	83	20.0
CACA11	*Carex canescens*	5-5-5	17	9.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	5-5-5	17	9.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	2-2.5-3	33	9.1
GELI2	*Geocaulon lividum*	2-2.5-3	33	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-7.7-25	100	27.7

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	1-15-30	83	35.4
SPST3	*Spiraea stevenii*	3-4-5	33	11.5
ROAC	*Rosa acicularis*	0-1.8-3	67	10.8

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	1-5.5-10	33	13.5

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-12.5-30	100	35.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	17-27.8-40	100	52.8

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	59-94-132	1.7-4-8	11-24-44	14	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
30-50.8-65	4

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other	Other	Winter
Slight use	Other woody plants	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—21-25.7-32

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca*/*Rosa acicularis*

Ecological Classification ID: F231XY181AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills, escarpments

Slope (percent):	Min	Max
	50	95

Elevation (feet):	Min	Max
	656	2,625

Range of Aspect Direction: Northwest to southeast (clockwise)

Water Table Depth (cm): None recorded

Flooding: None

Ponding: None

Runoff: Very high

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	25

Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

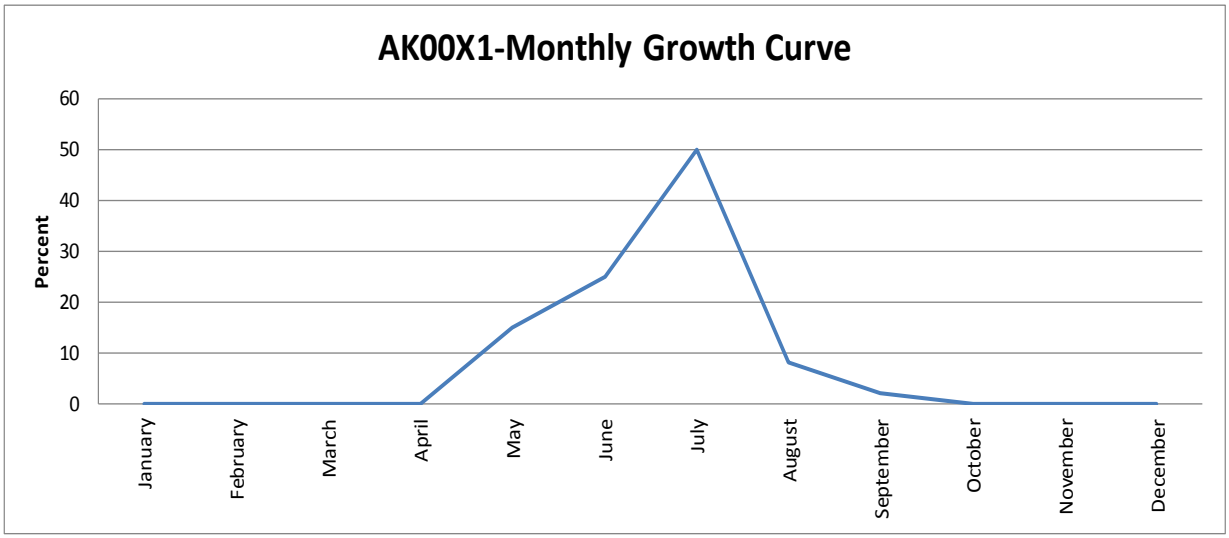
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH6—D31-Boreal forest gravelly colluvial escarpments

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, nonacid Typic Cryorthents

Dominant Parent Material: Organic material over gravelly colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	7	9	13

pH:	Low	RV	High
	3.4	6.5	8.2

Effective CEC (me/100g):	Low	High
	17.7	40

CEC (me/100g):	Min	RV	Max
	3.2	23.7	62

Organic Matter (percent):	Low	RV	High
	2	29.3	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.35

Plant Community Phases

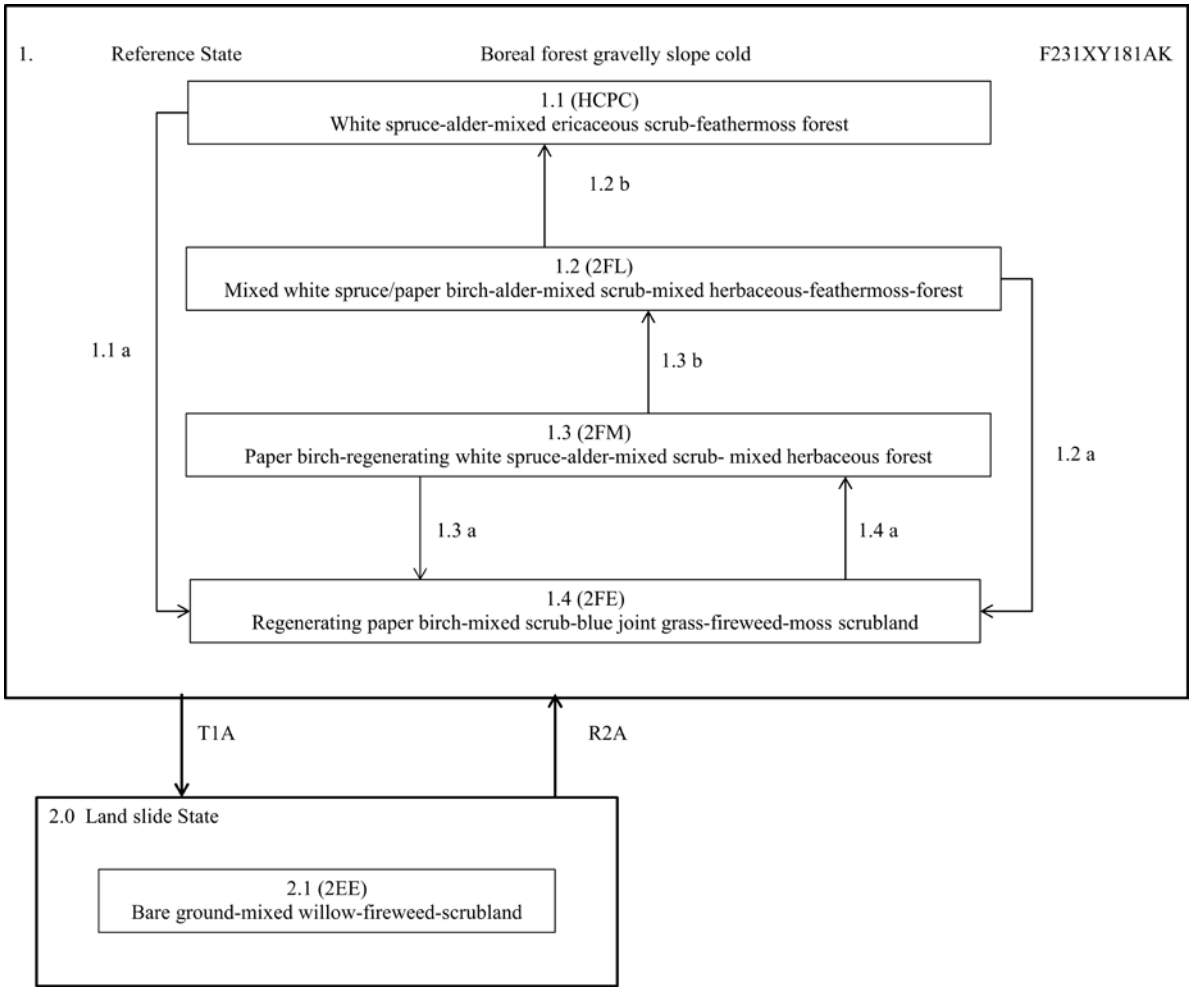
Ecological Site Description ID:	F231XY181AK

Ecological Dynamics of the Site:

This boreal ecological site is on steep, north-facing escarpments (slope typically more than 65%). The microclimate on the north aspects is cooler than that of the steep, south-facing slopes (i.e., R231XY109AK and F231XY110AK). The steepness of slope and gravelly soils on this site prevent the development of permafrost. This site supports an open white spruce forest. Site F231XY110AK is similar to this site, but site F231XY181AK has a thick organic mat and abundant moss ground cover. The soils in community phase 1.1 are classified as Cryorthents and are composed of organic matter over gravelly colluvium.

Fire resulted in four documented phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. Mass movement due to fire disturbance resulted in one observed alternate state with one documented phase.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event. Because of the steepness of slope and dominance of white spruce forest, a high-severity fire regime is considered to be the typical fire disturbance for this ecological site. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Many pre-fire species likely will regenerate after fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The fire return interval plays a significant role in the structure of the forest. Longer fire return intervals favor development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-alder-mixed ericaceous scrub-feathermoss forest
Community Phase Narrative:			
The dominant vegetation is tall trees, low shrubs, and moss. The majority of the tree canopy is distributed between the tall and medium tree strata. *Picea glauca* is the most common tree species (~30% cover), but *Picea mariana* and *Betula neoalaskana* are also present. *Picea glauca* averages 101 years of age (ranges from 24 to 128 years). Tall, low, and dwarf shrubs are common (combined ~30% cover). The most common tall shrub is *Alnus viridis*, the most common low shrubs are *Ledum palustre* and *Juniperus communis*, and the most common dwarf shrub is *Vaccinium vitis-idaea*. A common graminoid is *Calamagrostis purpurascens, and a common forb is Geocaulon lividum. Hylocomium splendens is an abundant ground cover.* Three observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. For this community phase, white spruce is the dominant tree species. This phase has the longest fire return interval of the ecological site.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Mixed white spruce/paper birch-alder-mixed scrub-mixed herbaceous-feathermoss-forest
Community Phase Narrative:			
The dominant vegetation is medium trees, tall shrubs, low shrubs, and moss. *Betula neoalaskana* and *Picea glauca* are evenly distributed among the tall, medium, and regenerative tree strata. *Picea glauca* averages 143 years of age (ranges from 118 to 159 years), and the average diameter at breast height is 7 inches. The most common tall shrub is *Alnus viridis*. The most common low shrubs are *Rosa acicularis, Ribes triste*, and *Ledum palustre*. The most common dwarf shrub is *Vaccinium vitis-idaea*. Forbs and graminoids make up approximately 40% cover. A common graminoid is *Calamagrostis canadensis*, and common forbs are *Polygonum alpinum* and *Geocaulon lividum.* Feathermoss is an abundant ground cover. Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire. White spruce and paper birch are codominant.
1.2b	Normal time and growth without fire. Paper birch eventually is replaced by white spruce, resulting in a community resembling that of phase 1.1. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Paper birch-alder-mixed scrub-mixed herbaceous forest
Community Phase Narrative:			
The dominant vegetation is tall trees, medium trees, and scrubs. The most common tall and medium tree species is *Betula neoalaskana* (~50% cover). *Picea glauca* is an abundant regenerating tree species (~10% cover). Scrubs are abundant (~50% cover). The most common tall scrub is *Alnus viridis*, the most common medium shrub is *Spiraea stevenii*, the most common low scrub is *Viburnum edule*, and the most common dwarf scrub is *Vaccinium vitis-idaea*. The most common graminoid is *Calamagrostis canadensis*, and the most common forb is *Equisetum pratense*. The abundant litter cover (80% cover) likely prevents the establishment of abundant moss ground cover. Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Fire. Stands of paper birch are less likely to burn and fire is less likely to spread as compared to stands that support dominantly spruce. However, stands of paper birch in the study area have burned. If phase 1.3 is burned, the resulting community would likely resemble that of phase 1.4.
1.3b	Normal time and growth without fire. White spruce becomes codominant with paper birch, resulting in a community resembling that of phase 1.2. The fire return interval is presumed to be shorter than that of phase 1.2 but longer than that of phase 1.4.

Phase 1.4			
			
Community Phase Number:	1.4	Community Phase Name:	Regenerating paper birch-mixed scrub-blue joint grass-fireweed-moss scrubland

Community Phase Narrative:	
The dominant vegetation is regenerating trees, scrubs, graminoids, forbs, and moss. *Betula neoalaskana* is the most common regenerating tree species, but *Picea glauca* and *Populus tremuloides* were also present. Scrubs are primarily a mixture of medium-sized *Salix alaxensis* and *Salix bebbiana*. The most common graminoid is *Calamagrostis canadensis*, and the most common forb is *Chamerion angustifolium*. Moss is an abundant ground cover. Two observations of this phase were conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth without fire disturbance. The aspen and birch should mature, and the community should resemble that of phase 1.3. If this phase burns, the resulting community would likely resemble that of phase 1.4.

Phase 2.1			
			
Community Phase Number:	2.1	Community Phase Name:	Bare ground-mixed willow-fireweed-scrubland

Community Phase Narrative:	
About 80% is exposed rock and soil. Scrub and forbs are the dominant vegetation. The most common medium scrub is *Salix alaxensis*, and the most common low scrub is *Rosa acicularis*. The most common forbs are *Chamerion angustifolium*, *Descurainia sophioides,* and *Artemisia tilesii.*	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	No additional phases were documented for this state.

Transition

Transition Number:	T1A
To State/Community Phase:	2.0 Landslide State
Transition Narrative:	
Landslides are assumed to occur after a fire event. These landslides would cause a transition from the reference state because the soil surface would remain highly erodible and unfavorable to the successional pathway in reference state 1.0.	

Restoration Pathway

Restoration Pathway Number:	R2A
To State/Community Phase:	1.0 Reference State
Restoration Pathway Narrative:	
It is currently unclear whether the sites can return to the reference state after a significant mass movement event. Vegetation might stabilize slopes sufficiently for the community to return to one resembling that of phase 1.3 or 1.4.	

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
50 88 126

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
0 3.5 7

Texture: Highly decomposed plant material, sandy loam

AWC (cm/cm): Min RV Max
0.15 0.28 0.4

pH: Min RV Max
6.9 7.5 8.2

Subsurface Layer

Thickness (cm): Min RV Max
50 84.5 119

Texture: Very gravelly loam, channery coarse sandy loam, extremely gravelly sandy loam, coarse sandy loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.07 0.14 0.35

pH: Min RV Max
6.3 7.5 8.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-3	40-80	10-30	15-25	0-10	10-15	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-5	---	---	---
FD (<4 inches)	---	2-2	---	---
FM (4-24 inches)	---	0.1-55	---	---
FT (>24 inches)	---	1-20	---	---
SL (8-36 inches)	---	---	5-5	---
SM (3-10 feet)	---	---	15-8	---
TR (<15 feet)	---	---	---	10-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	25-25-25	50	35.4
CAPU	*Calamagrostis purpurascens*	10-10-10	50	22.4
POGL	*Poa glauca*	5-5-5	50	15.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	0-1-2	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	30-42.5-55	100	65.2
ARTI	*Artemisia tilesii*	10-10-10	50	22.4
MEPA	*Mertensia paniculata*	0.1-1.1-2	100	10.2

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
DESO3	*Descurainia sophioides*	20-20-20	50	31.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUID	*Rubus idaeus*	5-5-5	50	15.8

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAALA	*Salix alaxensis var. alaxensis*	15-15-15	50	27.4
SAALL	*Salix alaxensis var. longistylis*	15-15-15	50	27.4
SABE2	*Salix bebbiana*	8-8-8	50	20.0
SASC	*Salix scouleriana*	7-7-7	50	18.7
ALVIF	*Alnus viridis ssp. fruticosa*	1-1.5-2	100	12.2
SAPU15	*Salix pulchra*	1-1.5-2	100	12.2

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-15-20	100	38.7
POTR5	*Populus tremuloides*	5-10-15	100	31.6
PIGL	*Picea glauca*	0-1.5-3	100	12.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Unknown			Unknown

Notable Plants: *Cerastium maximum*

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—20-22-24

Community Phase 2FM

Rooting Depth (cm): Min RV Max
78 81.5 85

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
6 7 8

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.6 5.2 6.8

Subsurface Layer

Thickness (cm): Min RV Max
72 74.5 77

Texture: Very gravelly silt loam, channers, channery loam, silt loam, extremely channery sandy loam

AWC (cm/cm): Min RV Max
0.03 0.17 0.25

pH: Min RV Max
4.9 5.4 6.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-5	10-12	80-80	8-15	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
FM (4-24 inches)	---	1-5	---	---
SD (<8 inches)	---	---	0.1-0.1	---
SL (8-36 inches)	---	---	10-5	---
ST (>10 feet)	---	---	10-10	---
TR (<15 feet)	---	---	---	5-5
TM (15-40 feet)	---	---	---	10-10
TT (>40 feet)	---	---	---	50-50

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-6-10	100	24.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	20-20-20	50	31.6
MEPA	*Mertensia paniculata*	5-5-5	50	15.8

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	10-10-10	50	22.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VIED	*Viburnum edule*	10-10-10	50	22.4
ROAC	*Rosa acicularis*	1-3-5	100	17.3

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SPST3	*Spiraea stevenii*	20-20-20	50	31.6

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-20-30	100	44.7

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-7.5-10	100	27.4
BENE4	*Betula neoalaskana*	2-2-2	50	10.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-30-50	100	54.8

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	50-50-50	50	50.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	3.5-5-5.4	34-37-42	4	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
50-50-50	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Forbs, ferns, and horsetails	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—14-22-30

Community Phase 2FL

Rooting Depth (cm): Min RV Max
82 91 100

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
10 11.5 13

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.4 5.5 6.7

Subsurface Layer

Thickness (cm): Min RV Max
72 79.5 87

Texture: Very channery sandy loam, silt loam, extremely channery coarse sandy loam, extremely channery silt loam, extremely channery sandy loam, sandy loam

AWC (cm/cm): Min RV Max
0.06 0.15 0.25

pH: Min RV Max
6.1 6.6 7.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-5	30-70	35-70	10-10	0-0	0-1	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-5	---	---	---
FD (<4 inches)	---	2-2	---	---
FM (4-24 inches)	---	0.1-3	---	---
FT (>24 inches)	---	10-10	---	---
SD (<8 inches)	---	---	0.1-0.1	---
SL (8-36 inches)	---	---	0.1-3	---
ST (>10 feet)	---	---	65-65	---
TR (<15 feet)	---	---	---	3-5
TM (15-40 feet)	---	---	---	15-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-17.5-20	100	41.8
POPA2	*Poa palustris*	5-5-5	50	15.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	3-3-3	50	12.2
SASP4	*Saxifraga spicata*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	3-6.5-10	100	25.5
GYDR	*Gymnocarpium dryopteris*	0-5-10	100	22.4
EQPR	*Equisetum pratense*	10-10-10	50	22.4
MEPA	*Mertensia paniculata*	2-2.5-3	100	15.8
BORO	*Boschniakia rossica*	0-1.5-3	100	12.3

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	7-8.5-10	100	29.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	0.1-5.1-10	100	22.5

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	5-10-15	100	31.6
RITR	*Ribes triste*	3-6.5-10	100	25.5
LEGR	*Ledum groenlandicum*	2-3.5-5	100	18.7
VAUL	*Vaccinium uliginosum*	1-3-5	100	17.3
SPST3	*Spiraea stevenii*	3-3-3	50	12.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	15-40-65	100	63.2

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-5-5	100	22.4
BENE4	*Betula neoalaskana*	3-3-3	50	12.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-12.5-20	100	35.4
BENE4	*Betula neoalaskana*	5-10-15	100	31.6

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	15-15-15	50	27.4
BENE4	*Betula neoalaskana*	5-5-5	50	15.8

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	3.9-7-9.7	35-43-51	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
58-68-78	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—31-32-33

Community Phase 2EE

Rooting Depth (cm):	Min	RV	Max
	97	97	97

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	0	0

Texture: Very channery sandy loam

AWC (cm/cm):	Min	RV	Max
	0.09	0.09	0.09

pH: Min RV Max
7 7 7

Subsurface Layer

Thickness (cm): Min RV Max
97 97 97

Texture: Extremely gravelly sandy loam, extremely channery coarse sandy loam, sandy loam

AWC (cm/cm): Min RV Max
0.06 0.12 0.15

pH: Min RV Max
7.3 7.4 7.5

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-3	10-10	25-25	5-5	25-25	55-55	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-3	---	---	---
FM (4-24 inches)	---	1-10	---	---
FT (>24 inches)	---	10-40	---	---
SL (8-36 inches)	---	---	1-5	---
SM (3-10 feet)	---	---	1-5	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAPU	*Calamagrostis purpurascens*	3-3-3	100	17.3
CACA4	*Calamagrostis canadensis*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARTI	*Artemisia tilesii*	10-10-10	100	31.6
PARA11	*Papaver radicatum*	1-1-1	100	10.0
MEPA	*Mertensia paniculata*	1-1-1	100	10.0
CEMA5	*Cerastium maximum*	1-1-1	100	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	40-40-40	100	63.2
DESO3	*Descurainia sophioides*	25-25-25	100	50.0
POAL11	*Polygonum alpinum*	10-10-10	100	31.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	10-10-10	100	31.6
RUID	*Rubus idaeus*	5-5-5	100	22.4
SAPU15	*Salix pulchra*	1-1-1	100	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAALA	*Salix alaxensis var. alaxensis*	12-12-12	100	34.6
SAALL	*Salix alaxensis var. longistylis*	12-12-12	100	34.6
SABE2	*Salix bebbiana*	5-5-5	100	22.4
ALVIF	*Alnus viridis ssp. fruticosa*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: *Cerastium maximum*

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—18-18-18

Community Phase HCPC

Rooting Depth (cm): Min RV Max
64 89.5 115

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
16 17 18

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.1 4.8 5.5

Subsurface Layer

Thickness (cm): Min RV Max
48 72.5 97

Texture: Extremely cobbly coarse sandy loam, very channery coarse sandy loam, very channery sandy loam

AWC (cm/cm): Min RV Max
0.06 0.09 0.12

pH: Min RV Max
6.5 7.1 7.6

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	80-90	10-30	3-5	0-1	0-1	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-3	---	---	---
FD (<4 inches)	---	0.1-1	---	---
FM (4-24 inches)	---	0.1-5	---	---
FT (>24 inches)	---	3-3	---	---
SD (<8 inches)	---	---	15-2	---
SL (8-36 inches)	---	---	2-45	---
SM (3-10 feet)	---	---	1-1	---
ST (>10 feet)	---	---	15-15	---
TR (<15 feet)	---	---	---	2-5
TM (15-40 feet)	---	---	---	10-5
TT (>40 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ELYMU	*Elymus*	5-5-5	33	12.9
CACA4	*Calamagrostis canadensis*	2-2.5-3	67	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAPU	*Calamagrostis purpurascens*	25-25-25	33	28.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	5-5-5	67	18.3
MEPA	*Mertensia paniculata*	1-3-5	67	14.1
HEAL	*Hedysarum alpinum*	3-3-3	33	10.0
GABO2	*Galium boreale*	3-3-3	33	10.0
ARTI	*Artemisia tilesii*	3-3-3	33	10.0
ACDE2	*Aconitum delphiniifolium*	3-3-3	33	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	3-3-3	33	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	15-15-15	33	22.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	45-45-45	33	38.7
JUCO6	*Juniperus communis*	10-10-10	33	18.3
ROAC	*Rosa acicularis*	2-2.7-3	100	16.3

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	15-15-15	33	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-3.5-5	67	15.3
PIMA	*Picea mariana*	5-5-5	33	12.9
BENE4	*Betula neoalaskana*	3-3-3	33	10.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	10-10-10	67	25.8
PIMA	*Picea mariana*	5-5-5	33	12.9
BENE4	*Betula neoalaskana*	5-5-5	33	12.9

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-25-50	100	50.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	62-101-128	7.2-20-99	46-69-94	9	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
40-50-65	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—13-25-32

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis*

Ecological Classification ID: F231XY182AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills, mountains, escarpments

Slope (percent):	Min	Max
	15	70

Elevation (feet):	Min	Max
	787	3,281

Range of Aspect Direction: East to west (clockwise)

Water Table Depth (cm): None recorded

Flooding: None

Ponding: None

Runoff: Very high

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	27

Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

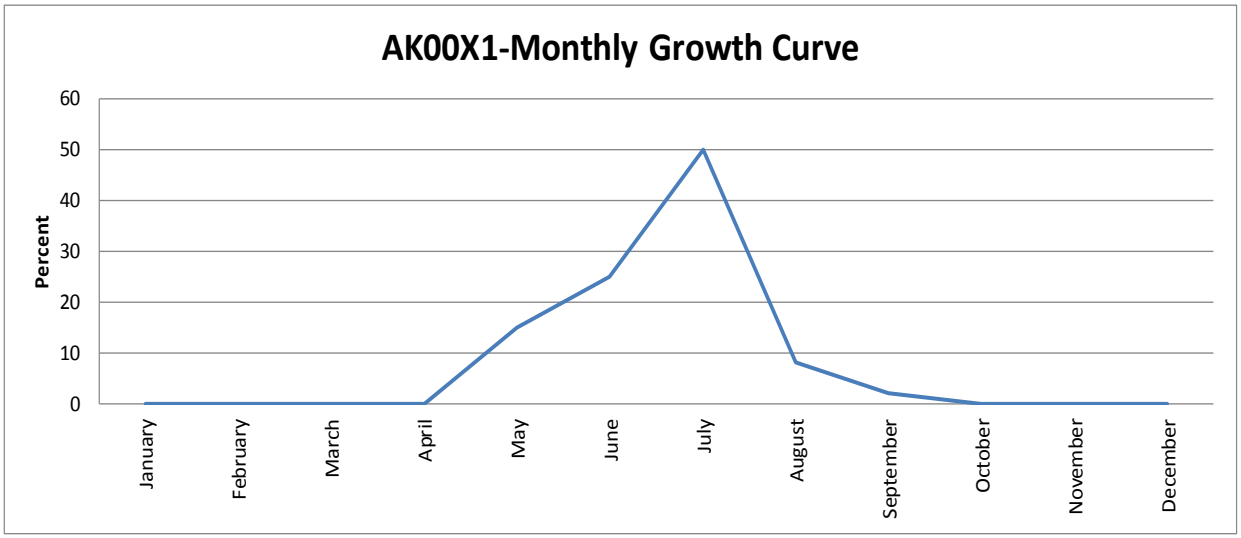
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH1—D31-Boreal forest rocky colluvial slopes
D31BH2—D31-Boreal forest rocky colluvial slopes
D31BH7—D31-Boreal forest rocky colluvial slopes
D31LB1—D31-Boreal forest rocky colluvial slopes
D31LB2—D31-Boreal forest rocky colluvial slopes
D31OF1—D31-Boreal forest rocky colluvial slopes
D31UC3—D31-Boreal forest rocky colluvial slopes

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts
Dominant Parent Material: Organic material over loess over gravelly colluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Loamy-skeletal
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	8	12	18

pH:	Low	RV	High
	3.4	5.7	7.8

Effective CEC (me/100g):	Low	High
	12.8	40

CEC (me/100g):	Min	RV	Max
	5.8	25.1	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.39

Plant Community Phases

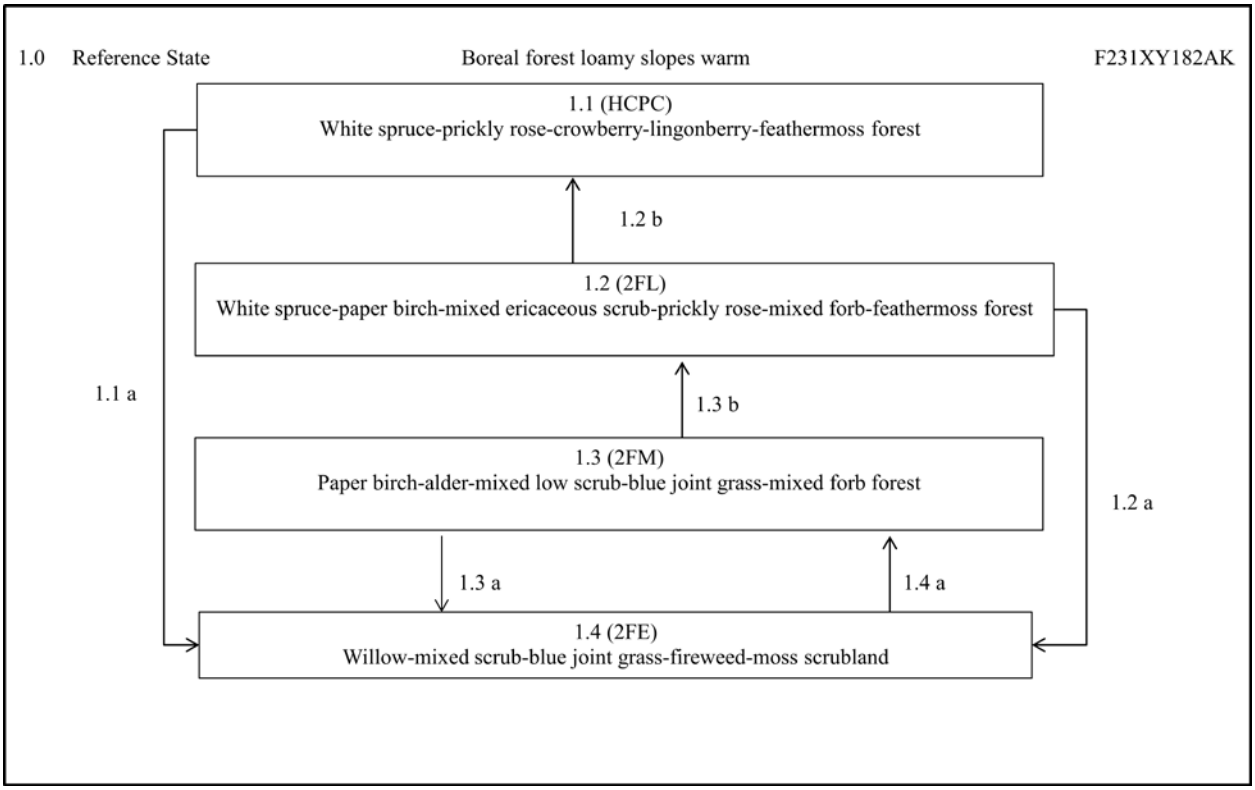
Ecological Site Description ID:	F231XY182AK

Ecological Dynamics of the Site:

This boreal ecological site is on south-facing backslopes of hills and mountains (slopes typically >25%). The soils in community phase 1.1 are classified as Haplocryepts and are composed of loess over gravelly colluvium. The climax phase community is characterized as a white spruce forest with a thick feathermoss mat. The surface organic layer of the climax phase community ranges from 6 to 23 centimeters thick. Ecological site F231XY117AK supports similar vegetation, but site F231XY182AK generally is on less steep slopes, has less productive forests, has a higher content of gravel in the soils, and generally does not have permafrost in the climax phase.

Fire resulted in four documented phases. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn. A high-severity fire regime is considered to be the typical fire disturbance. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Many pre-fire species likely will regenerate after a fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The fire return interval plays a significant role in the structure of the forest. Longer fire return intervals favor development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White Spruce-Prickly Rose-Crowberry-Lingonberry-Feathermoss Forest

Community Phase Narrative:
The majority of the tree cover is in the tall tree stratum (total mature tree cover ~50%). *Picea glauca* is the dominant tree species, but *Betula neoalaskana* is also present. The majority of the shrub cover is in the dwarf stratum (total shrub cover was 45%). Common shrubs are *Rosa acicularis*, *Empetrum nigrum*, and *Vaccinium vitis-idaea*. Forbs are minor components (~10% cover), and common species are *Geocaulon lividum* and *Mertensia paniculata*. Graminoids and lichen are minor vegetative components. Moss forms an extensive ground cover, primarily composed of *Hylocomium splendens* and *Pleurozium schreberi* (~75% total moss cover). Seven observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. White spruce is the dominant tree species. For this ecological site, this phase has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	White Spruce-Paper Birch-Mixed Ericaceous Scrub-Prickly Rose-Mixed Forb-Feathermoss Forest

Community Phase Narrative:
The majority of the tree cover is in the tall and medium tree strata (total mature tree cover ~40%). *Betula neoalaskana* and *Picea glauca* are the dominant tree species. Shrubs primarily are in the low and dwarf strata (total shrub cover ~75%). Common shrubs include *Alnus viridis*, *Rosa acicularis*, *Vaccinium vitis-idaea*, and *Ledum palustre*. As compared to phase 1.1, forbs makes up more cover (~25% cover). Common forbs are *Geocaulon lividum* and *Mertensia paniculata*. Graminoids and lichen are minor vegetative components. Although moss is less abundant as compared to phase 1.1, it still forms an extensive ground cover (~40%). Twelve observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Paper birch eventually is replaced by white spruce and results in a community resembling that of community phase 1.1. The fire return interval is presumed to be shorter than that of community phase 1.1 but longer than that of community phase 1.3. Paper birch commonly occurs as standing dead trees, which presumably indicates that the community is transitioning into a phase that is dominantly white spruce.

Phase 1.3	

Community Phase Number:	1.3	Community Phase Name:	Paper Birch-Alder-Mixed Low Scrub-Blue Joint Grass-Mixed Forb Forest
Community Phase Narrative:			
The majority of the tree cover is in the medium tree stratum (total mature tree cover ~55%). *Betula neoalaskana* is the dominant mature tree species. The shrub cover is evenly distributed among the tall, low, and dwarf strata (total shrub cover ~50%). Common shrubs are *Alnus viridis*, *Rosa acicularis*, *Vaccinium vitis-idaea*, and *Linnaea borealis*. Forbs and graminoids make up ~25% cover. A common graminoid is *Calamagrostis canadensis*, and a common forb is *Mertensia paniculata*. Moss and lichen are minor vegetative components, in part due to the litter debris from the deciduous forest. Seven observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Fire. Stands of paper birch are less likely to burn and fire is less likely to spread as compared to stands that are dominantly spruce. However, stands of paper birch in the study area have burned. If community phase 1.3 is burned, the resulting community resembles that of community phase 1.4.
1.3b	Normal time and growth without fire. White spruce becomes codominant with paper birch, resulting in a community resembling that of community phase 1.2. The fire return interval is presumed to be shorter than that of community phase 1.2 but longer than that of community phase 1.4.

Phase 1.4			
Community Phase Number:	1.4	Community Phase Name:	Willow-Mixed Scrub-Blue Joint Grass-Fireweed-Moss Scrubland
Community Phase Narrative:			
Standing charred trees are common. Seedlings of *Betula neoalaskana*, *Picea glauca*, and *Populus tremuloides* are common (combined ~15% cover). The shrub cover is in the medium and low strata. Common species include *Alnus viridis*, *Salix sp*., and *Rosa acicularis*. Phase 1.4 has the highest combined forb and graminoid cover (~95% cover). The most common forbs are *Chamerion angustifolium* and *Mertensia paniculata*, and the most common graminoid is *Calamagrostis canadensis*. Two observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.4a	Normal time and growth without fire. Paper birch matures, and eventually the community resembles that of community phase 1.3. It this phase burns, the resulting community likely resembles that of community phase 1.4.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm):	Min	RV	Max
	64	74.5	85

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	1.5	3

Texture: Slightly decomposed plant material, silt loam

AWC (cm/cm):	Min	RV	Max
	0.25	0.3	0.35

pH:	Min	RV	Max
	5.4	6.1	6.8

Subsurface Layer

Thickness (cm):	Min	RV	Max
	64	73	82

Texture: Very gravelly sandy loam, channery silt loam, silt loam, extremely channery loamy coarse sand, extremely channery sandy loam

AWC (cm/cm):	Min	RV	Max
	0.03	0.13	0.25

pH:	Min	RV	Max
	5.2	6.3	6.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-3	20-55	45-90	4-15	1-1	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	40-40	---	---	---
FD (<4 inches)	---	0.01-3	---	---
FM (4-24 inches)	---	0.01-7	---	---
FT (>24 inches)	---	15-5	---	---
SD (<8 inches)	---	---	10-10	---
SL (8-36 inches)	---	---	0.01-10	---
SM (3-10 feet)	---	---	10-7	---
TR (<15 feet)	---	---	---	15-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	55-55-55	50	52.4
CAPU	*Calamagrostis purpurascens*	2-2-2	50	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	40-40-40	50	44.7

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	3-3-3	50	12.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	30-30-30	50	38.7
MEPA	*Mertensia paniculata*	5-10-15	100	31.6
EQVA	*Equisetum variegatum*	7-7-7	50	18.7
STLO2	*Stellaria longipes*	5-5-5	50	15.8
GABO2	*Galium boreale*	3-3-3	50	12.2
ERACP2	*Erigeron acris ssp. politus*	2-2-2	50	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	15-15-15	50	27.4
DEGL3	*Delphinium glaucum*	5-5-5	50	15.8

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	10-10-10	50	22.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	3-6.5-10	100	25.5
RUID	*Rubus idaeus*	10-10-10	50	22.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	1-5.5-10	100	23.5
VIED	*Viburnum edule*	10-10-10	50	22.4
ALVIF	*Alnus viridis ssp. fruticosa*	7-7-7	50	18.7
SABE2	*Salix bebbiana*	5-5-5	50	15.8
ALINT	*Alnus incana ssp. tenuifolia*	4-4-4	50	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	1-8-15	100	28.3
POTR5	*Populus tremuloides*	2-3.5-5	100	18.7
PIGL	*Picea glauca*	5-5-5	50	15.8

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—22-26-30

Community Phase 2FM

Rooting Depth (cm): Min RV Max
58 69.4 81

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
3 5.4 9

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.33 0.35 0.35

pH: Min RV Max
5.5 6.1 7.2

Subsurface Layer

Thickness (cm): Min RV Max
55 64 72

Texture: Gravelly loam, extremely gravelly coarse sandy loam, channery loam, extremely gravelly loamy coarse sand, channery silt loam, very channery coarse sandy loam, extremely channery coarse sandy loam, extremely channery silt loam, very flaggy coarse sandy loam, extremely flaggy loam

AWC (cm/cm): Min RV Max
0.03 0.14 0.24

pH: Min RV Max
4.8 6.2 7.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-6	8-20	60-90	2-20	0-0	0-7	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	3-5	---	---	---
FD (<4 inches)	---	0.01-2	---	---
FM (4-24 inches)	---	1-3	---	---
FT (>24 inches)	---	0.01-0.01	---	---
SD (<8 inches)	---	---	15-5	---
SL (8-36 inches)	---	---	1-8	---
ST (>10 feet)	---	---	20-5	---
TR (<15 feet)	---	---	---	1-5
TM (15-40 feet)	---	---	---	60-60

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-5-5	29	12.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-9.2-15	57	23.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	2-4-5	43	13.1
GELI2	*Geocaulon lividum*	4-4.5-5	29	11.3
LYCO3	*Lycopodium complanatum*	6-6-6	14	9.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	0.1-5.4-10	71	19.7
GYDR	*Gymnocarpium dryopteris*	0.1-5.1-10	29	12.0
COCA13	*Cornus canadensis*	8-8-8	14	10.7
GABO2	*Galium boreale*	3-4-5	29	10.7
LYCO3	*Lycopodium complanatum*	7-7-7	14	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	10-10-10	29	16.9
SOMU	*Solidago multiradiata*	7-7-7	14	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	0.1-8.2-30	71	24.2
VAVI	*Vaccinium vitis-idaea*	2-8.2-15	71	24.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	3-7.2-10	71	22.7
LEGR	*Ledum groenlandicum*	3-6.7-12	43	16.9
RITR	*Ribes triste*	1-5.5-10	29	12.5
SHCA	*Shepherdia canadensis*	1-4-7	29	10.7
VIED	*Viburnum edule*	8-8-8	14	10.7

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VIED	*Viburnum edule*	15-15-15	14	14.6
SABE2	*Salix bebbiana*	1-3-5	29	9.3

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	4-19-40	86	40.4
SABE2	*Salix bebbiana*	5-10-15	29	16.9
SASC	*Salix* scouleriana	7-7-7	14	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-6.1-15	100	24.8
BENE4	*Betula neoalaskana*	3-5.4-10	100	23.3
PIMA	*Picea mariana*	1-3.7-8	43	12.5

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	7-41-60	100	64.0
PIGL	*Picea glauca*	3-7-15	43	17.3
POTR5	*Populus tremuloides*	5-7.5-10	29	14.6

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	15-40-65	29	33.8
PIGL	*Picea glauca*	7-7-7	14	10.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	2.5-4-5.2	20-30-42	6	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
19-52.5-140	5

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other		Unknown
Slight use	Other woody plants		Spring
Slight use	Other woody plants	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—7; plant species per stop (min-avg-max)—15-25-30

Community Phase 2FL

Rooting Depth (cm): Min RV Max
19 67.8 88

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
0 7.3 14

Texture: Slightly decomposed plant material, sandy loam

AWC (cm/cm): Min RV Max
0.15 0.33 0.35

pH: Min RV Max
4 5.1 6.3

Subsurface Layer

Thickness (cm): Min RV Max
19 60.4 74

Texture: Cobbly silt loam, gravelly sandy loam, very cobbly silt loam, very gravelly loamy coarse sand, extremely cobbly sandy loam, very gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly sandy loam, very channery silt loam, very channery sandy loam, loam, silt loam, extremely channery silt loam, extremely channery sandy loam, sandy loam, extremely stony sandy loam

AWC (cm/cm): Min RV Max
0.04 0.16 0.25

pH: Min RV Max
4.2 5.6 7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-35	12-75	10-80	2-70	0-3	0-8	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	1-10	---	---
SD (<8 inches)	---	---	3-5	---
SL (8-36 inches)	---	---	1-60	---
ST (>10 feet)	---	---	15-15	---
TR (<15 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	0-5-10	50	15.8

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	3-9.5-15	33	17.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	2-13-25	33	20.8
GELI2	*Geocaulon lividum*	2-7.2-10	33	15.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	1-6.2-20	67	20.4
GELI2	*Geocaulon lividum*	3-7.2-15	50	18.9
EQPA	*Equisetum palustre*	15-15-15	8	11.2
GABO2	*Galium boreale*	10-10-10	8	9.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	1-4.3-7	25	10.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	3-18.6-65	92	41.3
LIBO3	*Linnaea borealis*	3-4.3-7	50	14.7
EMNI	*Empetrum nigrum*	1-2.5-5	33	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	3-25.5-75	50	35.7
ROAC	*Rosa acicularis*	1-8.2-20	83	26.1
LEPAD	*Ledum palustre ssp. decumbens*	60-60-60	8	22.4
VAUL	*Vaccinium uliginosum*	0-8.8-25	50	21.0
SPST3	*Spiraea stevenii*	1-10.2-30	33	18.5
BEGL	*Betula glandulosa*	1-7-15	25	13.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	7-13.5-20	17	15.0
BEOC2	*Betula occidentalis*	10-12.5-15	17	14.4
SALIX	*Salix*	1-5.7-8	25	11.9
SABE2	*Salix bebbiana*	2-4.2-5	33	11.9
ROAC	*Rosa acicularis*	12-12-12	8	10.0

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	2-13.2-35	50	25.7
BEOC2	*Betula occidentalis*	5-7.5-10	17	11.2

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-5.1-10	92	21.6
BENE4	*Betula neoalaskana*	1-5.4-10	75	20.2
PIMA	*Picea mariana*	1-2.6-5	42	10.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-12.5-25	92	33.9
BENE4	*Betula neoalaskana*	5-11.2-25	92	32.0

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-10.8-35	92	31.5
BENE4	*Betula neoalaskana*	5-10.7-20	50	23.1
POTR5	*Populus tremuloides*	10-10-10	8	9.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	4.25-7-18.5	31-49-94	9	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
25-64.3-135	11

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—12; plant species per stop (min-avg-max)—15-28-43

Community Phase HCPC

Rooting Depth (cm): Min RV Max
33 65 88

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
6 13.8 23

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.9 5.5 6.5

Subsurface Layer

Thickness (cm): Min RV Max
27 51.2 65

Texture: Gravelly coarse sandy loam, very gravelly loamy coarse sand, very gravelly silt loam, extremely gravelly coarse sand, channery silt loam, extremely gravelly silt loam, very channery silt loam, silt loam, extremely channery silt loam, coarse sandy loam

AWC (cm/cm): Min RV Max
0.02 0.15 0.24

pH: Min RV Max
4.9 5.8 6.5

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-30	60-90	5-20	0-10	0-2	0-3	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FM (4-24 inches)	---	1-5	---	---
SD (<8 inches)	---	---	1-1	---
SL (8-36 inches)	---	---	5-5	---
ST (>10 feet)	---	---	10-10	---
TM (15-40 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	65-65

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-7.5-10	29	14.6

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	4-7-10	29	14.1
LYAN2	*Lycopodium annotinum*	10-10-10	14	12.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	5-8-15	71	23.9
MEPA	*Mertensia paniculata*	1-6.6-15	71	21.7

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-20.6-50	71	38.4
EMNI	*Empetrum nigrum*	40-45-50	29	35.9
LIBO3	*Linnaea borealis*	1-2.2-5	57	11.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	0-6.7-15	43	16.9
SHCA	*Shepherdia canadensis*	10-10-10	14	12.0
LEPAD	*Ledum palustre ssp. decumbens*	5-5-5	29	12.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	3-12.7-20	43	23.3

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	3-7.3-15	43	17.7
ALINT	*Alnus incana ssp. tenuifolia*	10-10-10	14	12.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-4.3-10	86	19.3
BENE4	*Betula neoalaskana*	5-6.7-10	43	16.9
PIMA	*Picea mariana*	10-10-10	14	12.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-11.6-30	71	28.8
BENE4	*Betula neoalaskana*	5-6-8	43	16.0

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	20-37.9-65	100	61.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	7-7-7	42-42-42	1	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
80-129.8-190	6

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other	Other	Unknown
No observed use			Not grazed/browsed
Slight use	Other woody plants	Other	Unknown

Notable Plants: None observed

Species Richness: Number of stops—7; plant species per stop (min-avg-max)—16-21.4-28

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea glauca*/*Salix-Vaccinium uliginosum*

Ecological Classification ID: F231XY184AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Turf hummocks on hills, hills, mountains

Slope (percent):	Min	Max
	15	65

Elevation (feet):	Min	Max
	2,461	3,937

Range of Aspect Direction: South to northeast (clockwise)

Water Table Depth (cm) :	Min	Max
	40	60

Flooding: None

Ponding: None

Runoff: Very high

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	11	27

Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

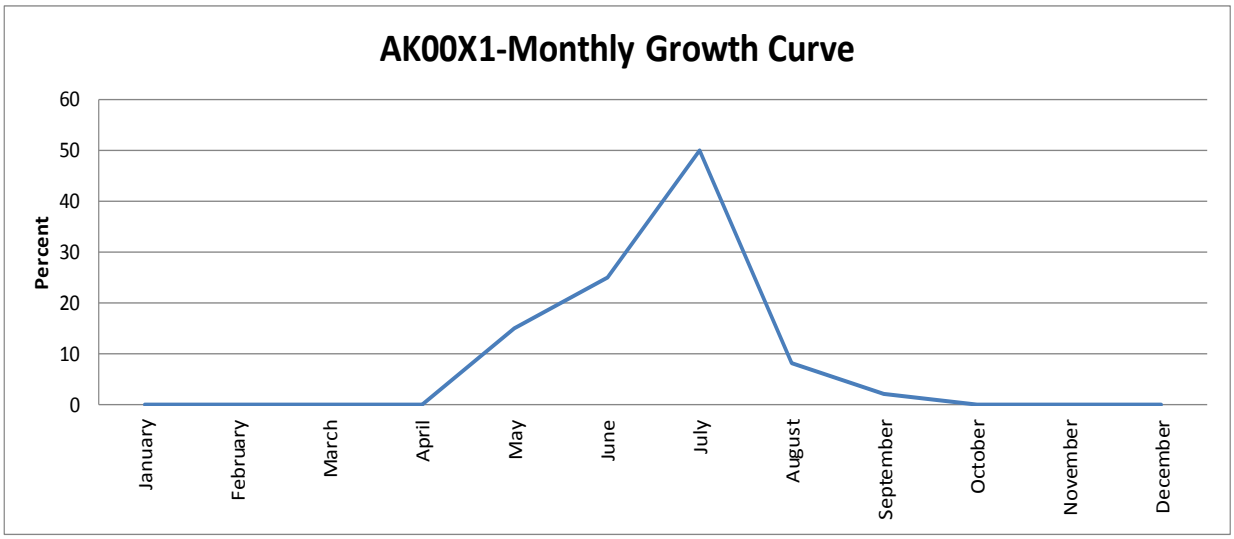
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31CF1—D31-Subalpine woodland silty colluvial slopes, frozen
D31OM2—D31-Subalpine woodland silty colluvial slopes, frozen
D31UC2—D31-Subalpine woodland silty colluvial slopes, frozen

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels

Dominant Parent Material: Organic material over loess over gravelly colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	8	18	30

pH:	Low	RV	High
	4.4	6.3	7.1

Effective CEC (me/100g):	Low	High
	11.5	29

CEC (me/100g):	Min	RV	Max
	5.1	26.6	88.2

Organic Matter (percent):	Low	RV	High
	1	22.2	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.41	1.1	1.56

Plant Community Phases

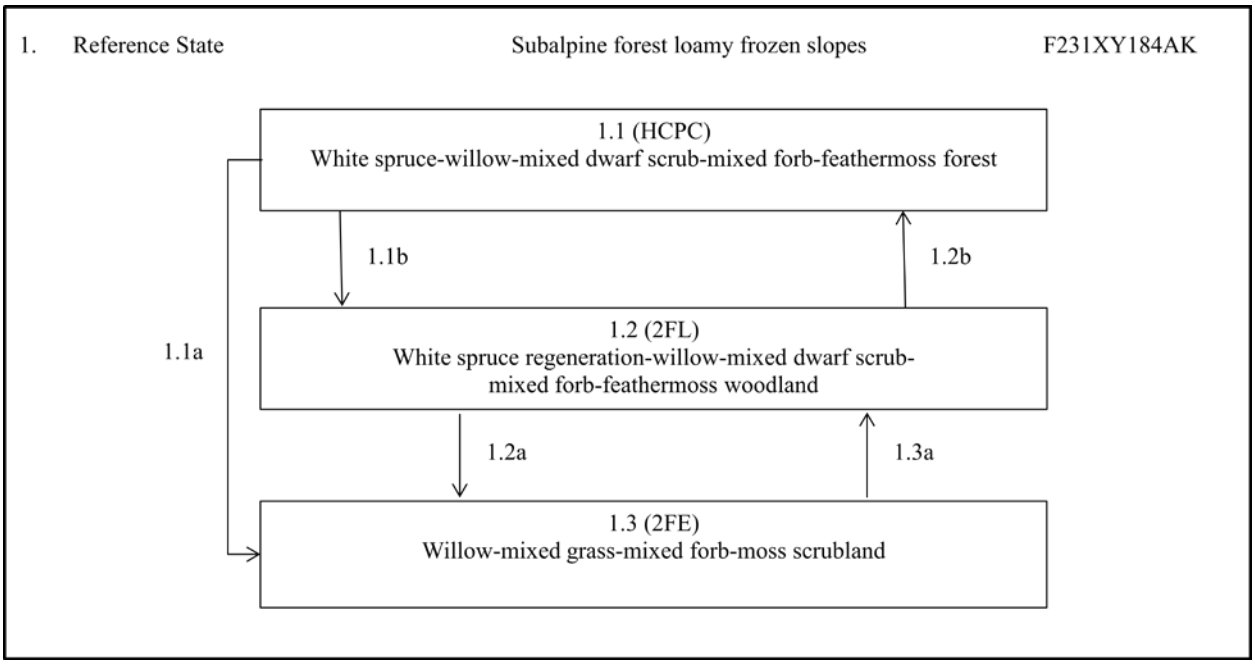
Ecological Site Description ID:	F231XY184AK

Ecological Dynamics of the Site:

This subalpine ecological site is generally on moderate slopes at high elevations (>20% slopes; 1,050 to 2,000 meters in elevation). F231XY140AK is a similar subalpine ecological site, but site F231XY184AK has a higher amount of rock fragments in the soil, does not have permafrost in the soil, and has a climax phase community that is considered white spruce woodland. The soils in community phase 1.1 are classified as Haplorthels and are composed of organic matter over loess and/or gravelly colluvium.

Fire is a documented disturbance regime resulting in three observed phases. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. High-severity fire events are more typical on this site than are low-severity fire events. Low-severity and high-severity fire events appear to cause differences in the depth of the organic material on the soil surface, the presence and/or depth to permafrost, and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Vegetation in the climax phase is a highly diverse mixture of trees, shrubs, graminoids, forbs, lichen, and moss. Trees primarily are in the tall and medium strata. The shrubs primarily are in the medium, low, and dwarf strata. The late and climax phases have similar vegetation. The decision to split the phases was based primarily on the general height and age of the tree strata, which seem to indicate the time since the fire disturbances. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. In interior Alaska, the dominant subalpine tree species is *Picea glauca*. As *Picea glauca* establishes after fire from offsite seed sources, the fire return interval likely plays a substantial role in controlling the abundance of white spruce. A shorter fire return interval likely results in a less abundant long-term coniferous tree cover than does a longer fire return interval. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-willow-mixed dwarf scrub-mixed forb-feathermoss forest

Community Phase Narrative:
The majority of the tree canopy is distributed between medium and tall trees, but stunted and regenerative trees are also present. *Picea glauca* is the most common tree species, but *Picea mariana* is also present. *Picea glauca* averages 135 years of age (ranges from 52 to 272 years) and has an average diameter at breast height of 8.3 inches. Medium, low, and dwarf shrubs are equally abundant, commonly more than 100% combined cover. The most common medium shrubs are *Betula glandulosa* and an assortment of willows, including *Salix pulchra*, *Salix glauca*, *Salix bebbiana*, and *Salix richardsonii*. The most common low shrubs are *Ledum palustre* and *Vaccinium uliginosum*. Numerous dwarf shrub species are present (9 species), and some common species are *Dryas octopetala*, *Arctostaphylos rubra*, *Cassiope tetragona,* and *Salix reticulata.* As compared to shrubs, graminoids and forbs are minor vegetative components. Common graminoids include *Festuca altaica* and *Carex scirpoidea.* The diversity of forbs is high (commonly more than 20 species per plot), but no individual species is abundant. Some forb species unique to this ecological site are *Saussurea angustifolia, Valeriana capitata*, and *Papavar sp*. Moss cover typically is higher than lichen cover and consists primarily of feathermoss species, including *Hylocomium splendens* and *Pleurozium schreberi.* The diversity of lichen is high, but no individual species is abundant. Thirteen observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	High-intensity fire. Climax sites generally have wet soils and a thick organic layer (commonly >15 cm. thick), which might hinder high-severity fires. However, the community resembles that associated with high-intensity fires (e.g., lacking permafrost and having a dominance of herbaceous plants).
1.1b	Low-intensity fire or spot fire. A low-intensity or spot fire likely would result in a community that resembles that of a late fire phase community. After a low-severity burn, some shrubs and graminoids can quickly recolonize and become dominant on a site as a result of below-ground root reserves that are not consumed in the fire event.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	White spruce regeneration-willow-mixed dwarf scrub-mixed forb-feathermoss woodland
Community Phase Narrative:			
Most other vegetative components in the late and climax phases are similar; therefore, the tree canopy is the major distinguishing factor. The tree canopy consists primarily of medium, stunted, and regenerating trees. *Picea glauca* is the most common species, but *Picea mariana* is also present. *Picea glauca* averages 87 years of age (ranges from 32 to 229 years) and has an average diameter at breast height of 4.8 inches. Medium, low, and dwarf shrubs are equally abundant, commonly exceeding 100% combined cover. The most common shrub species are similar to those of phase 1.1. Graminoids, forbs, and lichen are minor vegetative components. The most common graminoids are sedges, primarily *Carex sp*. The diversity of forbs is high. The moss cover typically is higher in abundance than the lichen cover. Most of the moss is feathermoss species, including *Hylocomium splendens and Pleurozium schreberi.* Four observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Fire.		

1.2b	Normal time and growth without fire. Overall, late and climax phase plant communities are very similar but they were split in large part due to the typical size/age of the trees. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Willow-mixed grass-mixed forb-moss scrubland
Community Phase Narrative:			
No live tree species were observed. As compared to the climax and late phase communities, the early fire phase community has a lower abundance of shrubs and a higher abundance of forbs and graminoids. The most common shrub is *Salix pulchra*. The most common graminoids are *Poa sp*. and *Calamagrostis canadensis*. The most common forb is *Chamerion angustifolium*. Moss is the dominant vegetative ground cover, and the most common species is *Hylocomium splendens*. One observation of this phase was conducted. Fire appears to greatly reduce the diversity of vegetation.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth without fire. Mixed spruce woodland develops.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
78 78 78

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
13 13 13

Texture: Moderately decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.4 4.4 4.4

Subsurface Layer

Thickness (cm): Min RV Max
65 65 65

Texture: Very gravelly silt loam, silt loam

AWC (cm/cm): Min RV Max
0.2 0.23 0.25

pH: Min RV Max

6.8 7 7.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-5	50-50	5-5	35-35	5-5	1-1	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-5	---	---	---
GT (>24 inches)	15-5	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
FM (4-24 inches)	---	0.01-5	---	---
SD (<8 inches)	---	---	1-5	---
SL (8-36 inches)	---	---	0.01-0.01	---
SM (3-10 feet)	---	---	2-20	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POARA2	*Poa arctica ssp. arctica*	15-15-15	100	38.7
POAL2	*Poa alpina*	15-15-15	100	38.7
CAPO	*Carex podocarpa*	10-10-10	100	31.6
POPA2	*Poa palustris*	5-5-5	100	22.4
LUPA4	*Luzula parviflora*	5-5-5	100	22.4

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-15-15	100	38.7
CASTI3	*Calamagrostis stricta ssp. inexpansa*	5-5-5	100	22.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	10-10-10	100	31.6
DEGL3	*Delphinium glaucum*	5-5-5	100	22.4
EQPR	*Equisetum pratense*	5-5-5	100	22.4
POVI3	*Polygonum viviparum*	2-2-2	100	14.1
MEPA	*Mertensia paniculata*	2-2-2	100	14.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUARA2	*Rubus arcticus ssp. acaulis*	5-5-5	100	22.4
ARRU	*Arctostaphylos rubra*	2-2-2	100	14.1
VAVI	*Vaccinium vitis-idaea*	1-1-1	100	10.0
EMNI	*Empetrum nigrum*	1-1-1	100	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	20-20-20	100	44.7
ALVIF	*Alnus viridis ssp. fruticosa*	2-2-2	100	14.1

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Willows	Moose	Spring

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—28-28-28

Community Phase 2FL

Rooting Depth (cm): Min RV Max
64 64 64

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
30 30 30

Texture: Slightly decomposed plant material, peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.6 4.6 4.6

Subsurface Layer

Thickness (cm): Min RV Max
34 34 34

Texture: Silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.28 0.32 0.36

pH: Min RV Max
7.1 7.1 7.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
8-55	40-85	7-55	2-7	0-4	0-1	0-8

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-50	---	---	---
GT (>24 inches)	20-7	---	---	---
FD (<4 inches)	---	2-2	---	---
FM (4-24 inches)	---	20-3	---	---
SD (<8 inches)	---	---	10-8	---
SL (8-36 inches)	---	---	10-8	---
SM (3-10 feet)	---	---	12-12	---
TR (<15 feet)	---	---	---	10-4
TS (<15 feet)	---	---	---	8-8
TM (15-40 feet)	---	---	---	5-7

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	5-27.5-50	50	37.1
CABI5	*Carex bigelowii*	3-7.2-15	100	26.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	6-12.7-20	75	30.8
ERVA4	*Eriophorum vaginatum*	7-7-7	25	13.2

Stratum—FD (<4 inches) % Cover Occurrence

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	7-7-7	25	13.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQUIS	*Equisetum*	4-12-20	50	24.5
PELA	*Pedicularis labradorica*	3-3.5-4	50	13.2
SELU	*Senecio lugens*	3-3.5-4	50	13.2
POVI3	*Polygonum viviparum*	3-3-3	50	12.2
SAAN3	*Saussurea angustifolia*	1-2-3	50	10.0
VACA3	*Valeriana capitata*	4-4-4	25	10.0
PEDIC	*Pedicularis*	4-4-4	25	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BORI2	*Boykinia richardsonii*	6-6-6	25	12.2
MEPA	*Mertensia paniculata*	5-5-5	25	11.2
POBO2	*Polemonium* boreale	4-4-4	25	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	3-6.8-10	100	26.0
EMNI	*Empetrum nigrum*	3-5.5-8	100	23.5
DROC	*Dryas octopetala*	4-9.5-15	50	21.8
ARRU	*Arctostaphylos rubra*	2-5-7	75	19.4
SARE2	*Salix reticulata*	5-6-7	50	17.3
CATE11	*Cassiope tetragona*	3-4-5	75	17.3
RUCH	*Rubus chamaemorus*	2-3.5-5	50	13.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	7-12.3-20	75	30.4
VAUL	*Vaccinium uliginosum*	2-9.2-25	100	30.4
LEPAD	*Ledum palustre ssp. decumbens*	6-18-30	50	30.0
LEGR	*Ledum groenlandicum*	5-6.5-8	50	18.0
ARRU	*Arctostaphylos rubra*	5-5-5	25	11.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	8-16-25	125	44.7
BEOC2	*Betula occidentalis*	15-17.5-20	50	29.6
BEGL	*Betula glandulosa*	30-30-30	25	27.4
SAGL	*Salix glauca*	25-25-25	25	25.0
ALVIF	*Alnus viridis ssp. fruticosa*	10-10-10	50	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	4-6-10	100	24.5
PIMA	*Picea mariana*	4-4-4	25	10.0

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	8-9-10	50	21.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-6.8-10	100	26.0
PIMA	*Picea mariana*	5-5-5	25	11.2

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	8-8-8	25	14.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	33-97-229	1.6-5-11.75	7-23-43	8	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
56-56-56	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—21-32-46

Community Phase HCPC

Rooting Depth (cm):

Min	RV	Max
38	58.6	78

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm):

Min	RV	Max
9	17.8	28

Texture: Slightly decomposed plant material, peat

AWC (cm/cm):

Min	RV	Max
0.35	0.35	0.35

pH:

Min	RV	Max
4.2	5.4	6.5

Subsurface Layer

Thickness (cm):

Min	RV	Max
29	40.8	50

Texture: Gravelly coarse sandy loam, very gravelly coarse sandy loam, very channery silt loam, silt loam, extremely channery sandy loam, extremely stony silt loam

AWC (cm/cm):	Min	RV	Max
	0.06	0.17	0.24

pH:	Min	RV	Max
	5.7	6.4	7.1

Influencing Water Features

NWI Code: PFO4

NWI Description: Palustrine, Forested, Needle-Leaved Evergreen

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
15-65	25-85	1-32	0-15	0-2	0-5	0-5

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	7-8	---	---	---
FD (<4 inches)	---	2-2	---	---
FM (4-24 inches)	---	0.1-5	---	---
SD (<8 inches)	---	---	10-5	---
SL (8-36 inches)	---	---	10-3	---
SM (3-10 feet)	---	---	10-5	---
TR (<15 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	35-35

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	3-7.7-15	54	20.4
CAPO	*Carex podocarpa*	2-9.4-20	38	19.0
CASC10	*Carex scirpoidea*	1-7-15	31	14.7
CABI5	*Carex bigelowii*	5-7.5-10	15	10.7
CAREX	*Carex*	5-6.5-8	15	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	3-5.5-8	15	9.2
FEAL	*Festuca altaica*	1-5.5-10	15	9.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	3-5.8-10	31	13.3
EQSC	*Equisetum scirpoides*	1-4.3-10	23	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	55-55-55	8	20.6
ANMO9	*Antennaria monocephala*	5-16.7-35	23	19.6
EQAR	*Equisetum arvense*	15-17.5-20	15	16.4
BORI2	*Boykinia richardsonii*	3-9.3-15	23	14.7
MEPA	*Mertensia paniculata*	1-2.7-7	69	13.6
SAAN3	*Saussurea angustifolia*	1-4.5-10	31	11.8
GELI2	*Geocaulon lividum*	0.1-2.2-7	46	10.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	3-12.9-25	92	34.5
VAVI	*Vaccinium vitis-idaea*	1-7.8-15	100	27.9
ARRU	*Arctostaphylos rubra*	1-10.1-15	62	25.0
SARE2	*Salix reticulata*	1-13-30	46	24.5
DROC	*Dryas octopetala*	1-7.2-25	69	22.4
CATE11	*Cassiope tetragona*	1-8.1-20	54	20.9
ARAL2	*Arctostaphylos alpina*	1-3-5	31	9.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	3-10.6-20	100	32.6
LEGR	*Ledum groenlandicum*	2-11.7-20	54	25.1
LEPAD	*Ledum palustre ssp. decumbens*	2-12-20	46	23.5
SAPU15	*Salix pulchra*	5-7.5-10	15	10.7

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	0-20.3-50	54	33.1
SARI4	*Salix richardsonii*	3-15.6-40	38	24.5
SAGL	*Salix glauca*	2-7.8-15	62	21.8
SAPU15	*Salix pulchra*	2-8.7-25	46	20.0
ALVIF	*Alnus viridis ssp. fruticosa*	2-5.4-10	38	14.4
SALIX	*Salix*	10-12.5-15	15	13.9
SABE2	*Salix bebbiana*	3-6-10	23	11.8
ALINT	*Alnus incana ssp. tenuifolia*	5-5-5	23	10.7

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	0-6-15	92	23.6
PIMA	*Picea mariana*	15-15-15	8	10.7

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-19.5-50	85	40.7

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-12.6-35	77	31.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	52-134-272	2-8-17.6	6-35-66	39	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
20-42.4-70	11

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use			Spring
Slight use		Moose	Spring
Slight use	Other		Unknown
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—13; plant species per stop (min-avg-max)—25-34-48

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Populus balsamifera-Picea glauca/Alnus incana ssp. tenuifolia-Salix alaxensis/Equisetum arvense-Mertensia paniculata*

Ecological Classification ID: F231XY189AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Middle and high flood plains

Slope (percent):	Min	Max
	1	15

Elevation (feet):	Min	Max
	623	984

Range of Aspect Direction: All aspects

Water Table Depth (cm) :	Min	Max
	0	0

Flooding:	Frequency	Duration
	Occasional	Brief

Ponding: None

Runoff: Low

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	16

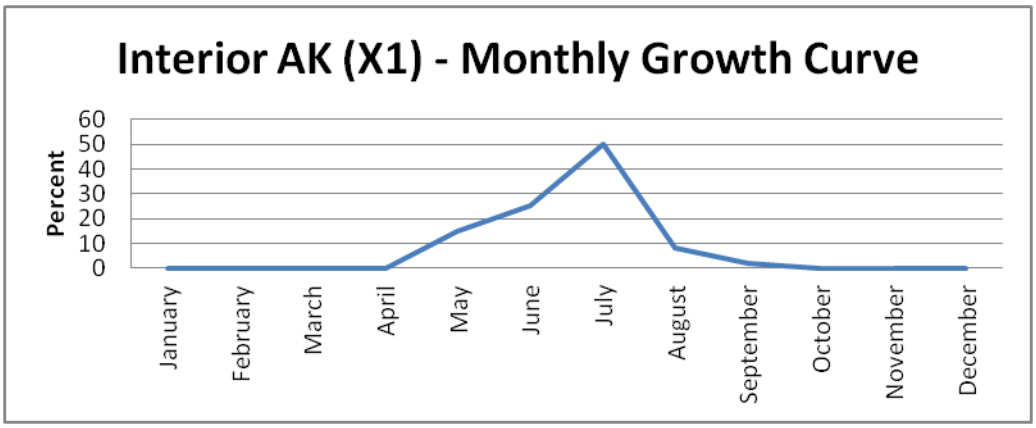
Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31YV1—D31-Boreal forest loamy mid flood plains
D31YV8—D31-Boreal forest loamy mid flood plains

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents
Dominant Parent Material: Organic material over loamy alluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	15	38	65

pH:	Low	RV	High
	4	7.7	8.2

Effective CEC (me/100g):	Low	High
	22.9	52.8

CEC (me/100g):	Min	RV	Max
	2.1	22.4	62

Organic Matter (percent):	Low	RV	High
	1	27.7	80

Bulk Density (1/3-Bar):	Min	RV	Max
	1.14	1.2	1.42

Plant Community Phases

Ecological Site Description ID:	F231XY189AK

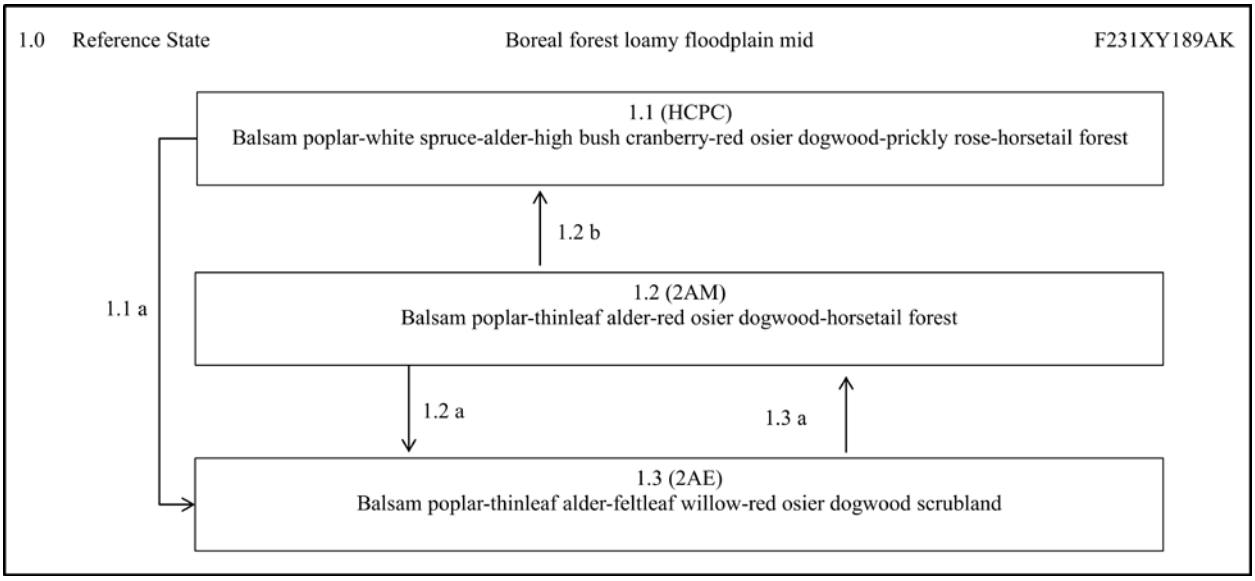
Ecological Dynamics of the Site:

This boreal ecological site is adjacent to the Yukon River, which floods frequently to occasionally. The soils are classified as Cryofluvents and are primarily stratified loamy alluvium. Flood events are common, but the low intensity of the flooding allows for the dominance of deciduous trees and the establishment of coniferous trees. The shift in the intensity of flooding results in a successional progression from site R231XY198AK (starting with community phase 1.3). As the site progresses from phase 1.3 to 1.1, the amount of exposed bare soil decreases and the content of organic matter increases. The soils in community phase 1.1 are classified as Cryofluvents and are composed of organic material over loamy alluvium.

As a river breaks up in spring, pack ice commonly breaches the riverbanks and causes a disturbance referred to as ice bulldozing. This ice-related disturbance completely removes stands of balsam poplar and white spruce. Common shrub and deciduous tree species quickly reestablish from below-ground root reserves after this disturbance. This disturbed community appears to resemble that of community phase 1.3, so no unique community phase was created.

Flooding is a disturbance regime that results in three unique community phases.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous tree species, which are believed to be directly related to the duration and intensity of flooding and/or ice damning in areas adjacent to the Yukon River. If the intensity of flooding increases and hinders the establishment and growth of tree species, the site transitions to ecological site R231XY198. If the flood regime shifts so that it favors growth of white spruce, the site transitions to site F231XY196AK. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Balsam poplar-white spruce-alder-high bush cranberry-red osier dogwood-prickly rose-horsetail forest

Community Phase Narrative:			
As compared to community phase 1.2, phase 1.1 has a taller and denser deciduous tree cover and a more abundant coniferous tree cover. The tree cover is primarily in the tall tree stratum (total mature tree cover ~70% cover). The dominant tree species is *Populus balsamifera,* and *Picea glauca* is codominant (tall, medium, and regenerative tree strata). The shrub cover is abundant and is primarily in the tall and medium shrub strata (~140% cover), and the most common species are *Alnus incana ssp. tenuifolia*, *Cornus sericea, Viburnum edule,* and *Rosa acicularis.* Forbs are a dominant understory component (~30% cover), and common species are *Equisetum arvense, Mertensia paniculata, and Galium boreale.* Two observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Intense flooding and/or ice shearing can remove a majority of the tree canopy. Species such as balsam poplar, alder, willow, and red osier dogwood quickly reestablish, resulting in a community that resembles that of community phase 1.3.		
Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Balsam poplar-thinleaf alder-red osier dogwood-horsetail forest

Community Phase Narrative:			
As compared to community phase 1.3, phase 1.2 has less willow cover and a taller and denser deciduous tree cover. The tree cover is primarily in the tall and medium tree strata (~40% cover), and the primary species is *Populus balsamifera*. The shrub cover is abundant and is primarily in the tall shrub stratum (~65% cover). The most common species are *Alnus incana ssp. tenuifolia*, *Alnus viridis ssp. fruticosa,* and *Cornus sericea.* Forbs are a dominant understory component (~30% cover), and common species are *Equisetum arvense, Mertensia paniculata,* and *Galium boreale.* Two observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Intense flooding and/or ice shearing can remove a majority of the tree canopy. Species such as balsam poplar, alder, willow, and red osier dogwood quickly reestablish, resulting in a community that resembles that of community phase 1.3.		
1.2b	Normal time and growth. Balsam poplar matures, and the flood regime allows for establishment and growth of white spruce.		
Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Balsam poplar-thinleaf alder-feltleaf willow-red osier dogwood scrubland

Community Phase Narrative:	
The tree cover is primarily in the regenerative stratum (2-15% cover), and the most common species is *Populus balsamifera*. Shrubs are the dominant vegetation, and they are primarily in the tall shrub stratum (total shrub cover ~150%). Common species include *Cornus sericea, Alnus incana ssp. tenuifolia,* and *Salix alaxensis.* Graminoids and forbs are minor vegetative components. Common species include *Eurybia sibirica*, *Mertensia paniculata*, and *Equisetum sp*. Two observations of this phase were conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth. The flood regime favors growth of balsam poplar, and the community shifts from one that is dominantly willow/alder to one that is deciduous forest.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2AE

Rooting Depth (cm): Min 103, RV 103, Max 103

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

- Thickness (cm): Min 0, RV 0, Max 0
- Texture: Highly organic very fine sandy loam
- AWC (cm/cm): Min 0.25, RV 0.25, Max 0.25
- pH: Min 8.1, RV 8.1, Max 8.1

Subsurface Layer

- Thickness (cm): Min 103, RV 103, Max 103
- Texture: Very gravelly loamy coarse sand
- AWC (cm/cm): Min 0.06, RV 0.12, Max 0.17
- pH: Min 7.4, RV 7.6, Max 7.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	5-5	50-50	40-40	10-10	3-3	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	3-3	---	---
FM (4-24 inches)	---	1-4	---	---
SL (8-36 inches)	---	---	7-7	---
ST (>10 feet)	---	---	10-60	---
TR (<15 feet)	---	---	---	15-15

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GABO2	*Galium boreale*	3-3-3	100	17.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EUSI13	*Eurybia sibirica*	4-4-4	100	20.0
MEPA	*Mertensia paniculata*	4-4-4	100	20.0
HEAL	*Hedysarum alpinum*	3-3-3	100	17.3
EQUIS	*Equisetum*	3-3-3	100	17.3
PAPA8	*Parnassia palustris*	1-1-1	100	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	7-7-7	100	26.5

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COSES	*Cornus sericea ssp. sericea*	60-60-60	100	77.5
ALINT	*Alnus incana ssp. tenuifolia*	20-20-20	100	44.7
SAPS	*Salix pseudomonticola*	15-15-15	100	38.7
SAGL	*Salix glauca*	15-15-15	100	38.7
SAALL	*Salix alaxensis var. longistylis*	15-15-15	100	38.7
SAALA	*Salix alaxensis var. alaxensis*	15-15-15	100	38.7
SAIN3	*Salix interior*	10-10-10	100	31.6

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	15-15-15	100	38.7

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Severe use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—15-15-15

Community Phase 2AM

Rooting Depth (cm): Min 88 RV 120 Max 152

Restrictive Feature: Permafrost

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min 1 RV 2 Max 3

Texture: Slightly decomposed plant material

AWC (cm/cm): Min 0.35 RV 0.35 Max 0.35

pH: Min 7.3 RV 7.3 Max 7.3

Subsurface Layer

Thickness (cm): Min 87 RV 118 Max 149

Texture: Permanently frozen silt loam

AWC (cm/cm): Min 0.13 RV 0.16 Max 0.17

pH: Min 7.3 RV 7.6 Max 7.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-1	1-5	70-80	10-30	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	3-3	---	---	---
FM (4-24 inches)	---	2-5	---	---
SL (8-36 inches)	---	---	10-10	---
ST (>10 feet)	---	---	10-65	---
TR (<15 feet)	---	---	---	0.1-0.1
TM (15-40 feet)	---	---	---	35-35

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	0.1-1.6-3	100	12.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	45-45-45	50	47.4
GABO2	*Galium boreale*	5-5-5	50	15.8
MEPA	*Mertensia paniculata*	5-5-5	50	15.8
SOMU	*Solidago multiradiata*	3-3-3	50	12.2
BORO	*Boschniakia rossica*	2-2-2	50	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COSES	*Cornus sericea ssp. sericea*	10-10-10	50	22.4
ROAC	*Rosa acicularis*	8-8-8	50	20.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAALA	*Salix alaxensis var. alaxensis*	3-3-3	50	12.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	65-65-65	50	57.0
ALINT	*Alnus incana ssp. tenuifolia*	10-25-40	100	50.0
SABE2	*Salix bebbiana*	15-15-15	50	27.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	35-35-35	50	41.8

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	35-35-35	50	41.8

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Other	Other	Winter
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—9-11.5-14

Community Phase HCPC

Rooting Depth (cm): Min RV Max
110 160.5 211

Restrictive Feature: Permafrost

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
2 2.5 3

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
7.2 7.5 7.8

Subsurface Layer

Thickness (cm): Min RV Max
108 158 208

Texture: Sandy loam, slightly decomposed plant material, fine sandy loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.14 0.23 0.4

pH: : Min RV Max
7 7.8 8.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-2	5-10	65-90	15-20	2-3	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FM (4-24 inches)	---	2-4	---	---
FT (>24 inches)	---	7-7	---	---
SM (3-10 feet)	---	---	15-25	---
ST (>10 feet)	---	---	7-75	---
TM (15-40 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	10-50

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BRINP5	*Bromus inermis ssp. pumpellianus var. pumpellianus*	5-5-5	50	15.8

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	5-15-25	100	38.7
GABO2	*Galium boreale*	4-6-8	100	24.5
EQPR	*Equisetum pratense*	10-10-10	50	22.4
BORO	*Boschniakia rossica*	1-2-3	100	14.1
DEGL3	*Delphinium glaucum*	2-2-2	50	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	5-6-7	100	24.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	15-40-65	100	63.2
VIED	*Viburnum edule*	25-32.5-40	100	57.0
COSES	*Cornus sericea ssp. sericea*	15-17.5-20	100	41.8

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	2-38.5-75	100	62.0
ALINT	*Alnus incana ssp. tenuifolia*	25-25-25	50	35.4
SALIX	*Salix*	7-7-7	50	18.7

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	15-15-15	50	27.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	10-10-10	50	22.4
PIGL	*Picea glauca*	5-5-5	50	15.8

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	50-52.5-55	100	72.5
PIGL	*Picea glauca*	10-10-10	50	22.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	144-175-206	14.8-16-16.5	78-80-83	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
125-138.5-152	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Severe use	Other	Other	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—13-16.5-20

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea mariana*/*Alnus viridis ssp. fruticosa*/*Calamagrostis canadensis*

Ecological Classification ID: F231XY192AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways of hills, mountains, and escarpments

Slope (percent):	Min	Max
	5	80

Elevation (feet):	Min	Max
	823	2,520

Range of Aspect Direction: North to south (clockwise)

Water Table Depth (cm) :	Min	Max
	40	60

Flooding: None

Ponding: None

Runoff: High

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	28

Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

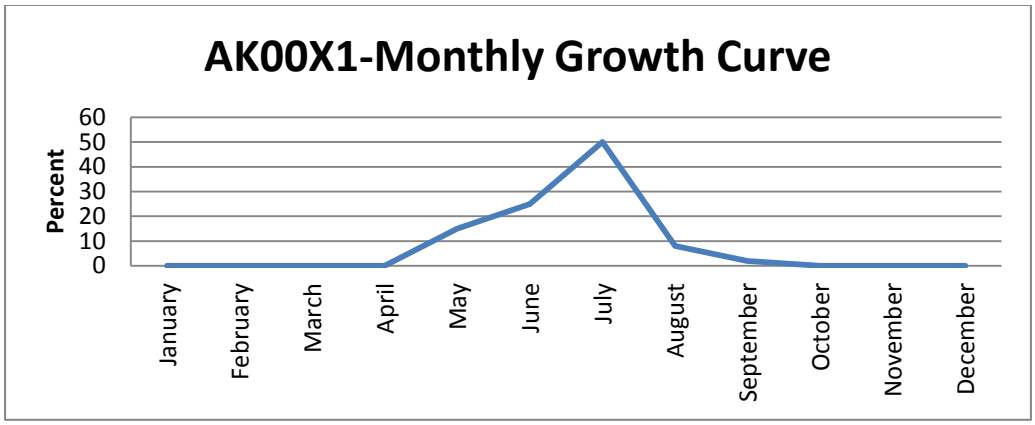
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH6—D31-Boreal tiaga gravelly drainages
D31CF1—D31-Boreal tiaga gravelly drainages
D31TL1—D31-Boreal tiaga gravelly drainages

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Dominant Parent Material: Organic material over gravelly alluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Loamy-skeletal
Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	12	16	21

pH:	Low	RV	High
	3.8	6.5	8

Effective CEC (me/100g):	Low	High
	16.1	47.3

CEC (me/100g):	Min	RV	Max
	3.2	18.3	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.27

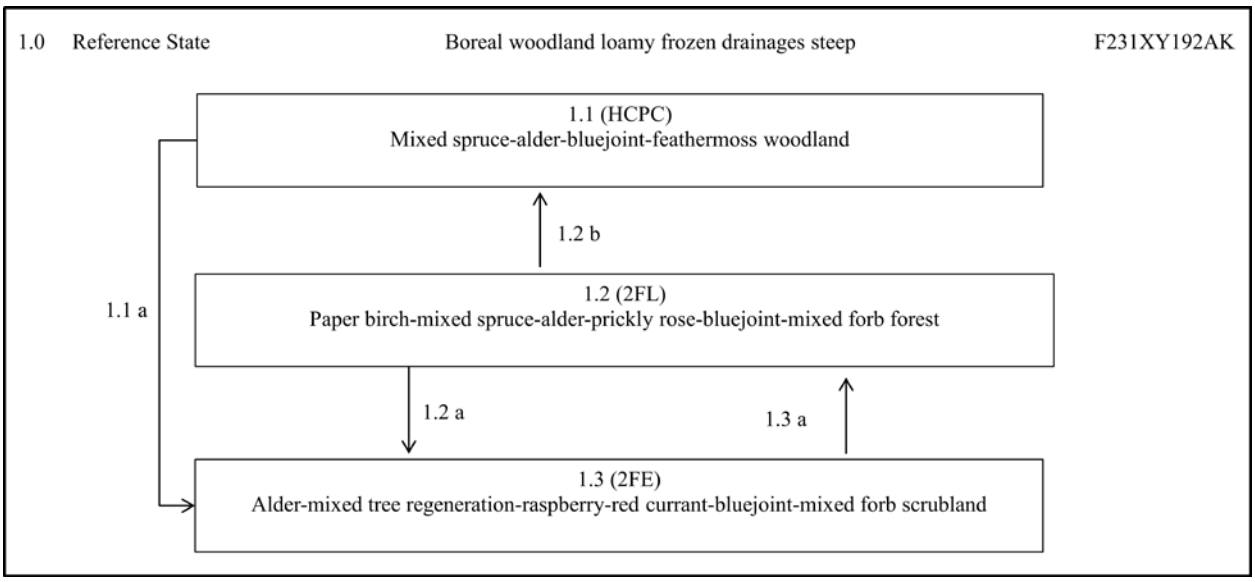
Plant Community Phases

Ecological Site Description ID:	F231XY192AK

Ecological Dynamics of the Site:

This boreal ecological site is associated with high-gradient drainageways that are on hills, mountains, and escarpments (average slope is 40%, ranges from 17 to 79%). This ecological site is on various aspects. Communities resulting from disturbances from a flood regime are not present. Differences in the plant communities in this ecological site are presumed to be due to the fire history. The soils in community phase 1.1 are classified as Haplorthels and are composed of organic matter over gravelly alluvium.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn. Due to the steepness of slope and presence of dense paper birch communities, a high-severity fire regime is considered to be the typical fire disturbance for this ecological site. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost commonly drops out of the soil profile, and the sites become drier. Many pre-fire species likely will regenerate after fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Mixed spruce-alder-bluejoint-feathermoss woodland

Community Phase Narrative:
Picea mariana is the most abundant tree species, and is primarily in the medium and regenerative tree strata. *Betula neoalaskana* and *Picea glauca* occur at lower densities (total mature tree cover ~10%). The shrub cover primarily is in the tall and low strata (total shrub cover ~100%), and the most common shrub species are *Alnus viridis ssp. fruticosa*, *Rosa acicularis*, *Rubus arcticus*, and *Vaccinium vitis-idaea*. Graminoids (~20% cover) and forbs (~40% cover) are abundant. Common species are *Calamagrostis canadensis*, various *Equisetum sp*., and *Mertensia paniculata*. Moss (~50% cover) and leaf litter (~50% cover) make up the dominant ground cover. The moss mat consists primarily of *Hylocomium splendens* mixed with *Sphagnum sp*. Two observations of this phase were conducted.
Community Pathways

Pathway Number:	Pathway Name & Description:
1.1a	Fire. For this ecological site, this phase has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Paper birch-mixed spruce-alder-prickly rose-bluejoint-mixed forb forest

Community Phase Narrative:
Betula neoalaskana is the most abundant tree species, and is primarily in the tall and medium tree strata. *Picea mariana* and *Picea glauca* occur in lower densities (total mature tree cover ~25%). The shrub cover primarily is in the tall shrub stratum (total shrub cover ~75%), and the most common shrub species are *Alnus viridis ssp. fruticosa* and *Rosa acicularis*. Graminoids are limited (~10% cover). Forbs are abundant and highly diverse (~50% cover). Common species include *Calamagrostis canadensis*, various *Equisetum sp*., and *Mertensia paniculata*. Leaf litter (~60% cover) and moss (~25% cover) make up the dominant ground cover, and the moss mat is primarily *Hylocomium splendens* mixed with *Sphagnum sp*. Five observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Paper birch is replaced by maturing spruce woodland. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Alder-mixed tree regeneration-raspberry-red currant-bluejoint-mixed forb scrubland

Community Phase Narrative:	
Betula neoalaskana, *Picea mariana*, and *Picea glauca* occur in low densities and are primarily in the regenerative tree stratum (~5% total tree cover). The shrub cover primarily is in the tall, medium, and low shrub strata (total shrub cover ~90%), and the most common shrub species are *Alnus viridis ssp. fruticosa*, *Salix bebbiana*, *Rubus idaeus*, *Rosa acicularis*, and *Ribes triste*. Graminoids are limited (~15% cover), and forbs are abundant and highly diverse (~40% cover). Common species include *Calamagrostis canadensis*, various *Equisetum sp*., *Mertensia paniculata*, *Polygonum alpinum*, *Cystopteris fragilis,* and *Boschniakia rossica*. Leaf litter (~70% cover) and moss (~25% cover) make up the dominant ground cover, and the moss mat is composed primarily of *Hylocomium splendens* mixed with *Sphagnum sp*. Four observations of this phase were conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth without fire. Paper birch and spruce mature into woodland.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm):

Min	RV	Max
58	76.5	95

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
6 8.5 11

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
6.6 6.9 7.2

Subsurface Layer

Thickness (cm): Min RV Max
52 68 84

Texture: Extremely channery coarse sandy loam, extremely channery silt loam, extremely channery sandy loam, extremely flaggy sandy loam

AWC (cm/cm): Min RV Max
0.03 0.07 0.1

pH: Min RV Max
7.2 7.6 8

Influencing Water Features

NWI Code: R4SB5

NWI Description: Riverine, Intermittent, Stream Bed, Mud

Rosgen Classification: Steep, entrenched, cascading step-pools; very steep, deeply entrenched, debris transport streams

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-3	20-35	60-75	1-15	0-5	0-10	0-1

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	25-25	---	---	---
FD (<4 inches)	---	15-15	---	---
FM (4-24 inches)	---	5-5	---	---
FT (>24 inches)	---	7-7	---	---
SD (<8 inches)	---	---	3-5	---
SL (8-36 inches)	---	---	1-5	---
SM (3-10 feet)	---	---	3-80	---
ST (>10 feet)	---	---	7-7	---
TS (<15 feet)	---	---	---	0.1-0.1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-17.5-25	50	29.6

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	25-25-25	25	25.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYAN2	*Lycopodium annotinum*	15-15-15	25	19.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GYDR	*Gymnocarpium dryopteris*	3-14-25	50	26.5
EQAR	*Equisetum arvense*	5-10-15	50	22.4
CYFR2	*Cystopteris fragilis*	2-8.5-15	50	20.6
MEPA	*Mertensia paniculata*	2-5.7-10	75	20.6
EQPR	*Equisetum pratense*	5-7.5-10	50	19.4
ACDE2	*Aconitum delphiniifolium*	3-4-5	50	14.1
ARTI	*Artemisia tilesii*	0.1-2.6-5	50	11.3

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	0.1-3-7	75	15.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	5-5-5	25	11.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUID	*Rubus idaeus*	3-12.7-25	75	30.8
RITR	*Ribes triste*	5-8.3-10	75	25.0
ROAC	*Rosa acicularis*	5-5-5	50	15.8
SPST3	*Spiraea stevenii*	10-10-10	25	15.8
VIED	*Viburnum edule*	10-10-10	25	15.8

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	80-80-80	25	44.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	25-53.3-70	75	63.2
BEOC2	*Betula occidentalis*	7-7-7	25	13.2
SABE2	*Salix bebbiana*	1-2-3	75	12.2

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	0.1-2.7-5	75	14.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	2-3.5-5	50	13.2

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	68-68-68	5.1-5-5.6	24-26-28	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-0-0	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Willows		Winter

Notable Plants: None observed

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—17-20-24

Community Phase 2FL

Rooting Depth (cm): Min RV Max
-19 45.4 91

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
1 18 39

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4 5.6 6.5

Subsurface Layer

Thickness (cm): Min RV Max
-20 27.4 52

Texture: Extremely channery silt loam, extremely stony silt loam

AWC (cm/cm): Min RV Max
0.12 0.21 0.25

pH: Min RV Max
5.3 6.3 7.3

Influencing Water Features

NWI Code: R3UB1, R4SB4

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Intermittent, Stream Bed, Sand

Rosgen Classification: Steep, entrenched, cascading step-pools; very steep, deeply entrenched, debris transport streams

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-20	5-40	10-95	2-25	0-10	0-1	0-10

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	35-35	---	---	---
FD (<4 inches)	---	0.1-1	---	---
SD (<8 inches)	---	---	2-5	---
SL (8-36 inches)	---	---	2-2	---
SM (3-10 feet)	---	---	5-5	---
TR (<15 feet)	---	---	---	3-3
TS (<15 feet)	---	---	---	2-2
TM (15-40 feet)	---	---	---	15-5
TT (>40 feet)	---	---	---	1-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	7-17.3-35	60	32.2

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-15-15	20	17.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
HUSES	*Huperzia selago var. selago*	10-10-10	20	14.1
ORSE	*Orthilia secunda*	10-10-10	20	14.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	10-21.7-45	60	36.1
EQAR	*Equisetum arvense*	10-16.7-25	60	31.6
PYGR	*Pyrola grandiflora*	18-18-18	20	19.0
MEPA	*Mertensia paniculata*	2-4-5	60	15.5
EQSY	*Equisetum sylvaticum*	10-10-10	20	14.1
GELI2	*Geocaulon lividum*	3-4-5	40	12.6
ACDE2	*Aconitum delphiniifolium*	7-7-7	20	11.8
GYDR	*Gymnocarpium dryopteris*	5-5-5	20	10.0
DRYOP	*Dryopteris*	5-5-5	20	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	2-9-15	60	23.2
ARRU	*Arctostaphylos rubra*	5-7.5-10	40	17.3
RUCH	*Rubus chamaemorus*	10-10-10	20	14.1
LIBO3	*Linnaea borealis*	2-2.5-3	40	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	2-6-10	40	15.5
VIED	*Viburnum edule*	2-4-5	60	15.5
ROAC	*Rosa acicularis*	2-4-5	60	15.5
RITR	*Ribes triste*	5-5-5	40	14.1
RIHU	*Ribes hudsonianum*	5-5-5	20	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	10-12.5-15	40	22.4
RITR	*Ribes triste*	15-15-15	20	17.3
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	20	10.0

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	20-43.8-80	80	59.2
ALINT	*Alnus incana ssp. tenuifolia*	20-20-20	20	20.0
SAALL	*Salix alaxensis var. longistylis*	15-15-15	20	17.3
SABE2	*Salix bebbiana*	10-10-10	20	14.1
SAPU15	*Salix pulchra*	10-10-10	20	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	3-4.3-5	60	16.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-15-25	80	34.6
PIMA	*Picea mariana*	5-5-5	40	14.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-20-30	40	28.3
PIGL	*Picea glauca*	15-15-15	20	17.3

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	187-187-187	9-9-9	49-49-49	1	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
10-35-60	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows		Winter
No observed use			Not grazed/browsed
Slight use	Other woody plants	Other	Unknown

Notable Plants: None observed

Species Richness: Number of stops—5; plant species per stop (min-avg-max)—15-25.6-37

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	66	78	90

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min 4 RV 4 Max 4

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min 0.35 RV 0.35 Max 0.35

pH: Min 5.4 RV 6 Max 6.7

Subsurface Layer

Thickness (cm): Min 62 RV 74 Max 86

Texture: Permanently frozen very gravelly sandy loam, very gravelly sandy loam, extremely gravelly sandy loam

AWC (cm/cm): Min 0.09 RV 0.12 Max 0.15

pH: Min 6.1 RV 6.4 Max 6.8

Influencing Water Features

NWI Code: R4SB4, R4SB5

NWI Description: Riverine, Intermittent, Stream Bed, Sand; Riverine, Intermittent, Stream Bed, Mud

Rosgen Classification: Steep, entrenched, cascading step-pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-2	50-50	45-50	8-15	2-10	0-3	5-5

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	15-3	---	---	---
FD (<4 inches)	---	0.01-7	---	---
FM (4-24 inches)	---	0.01-25	---	---
SD (<8 inches)	---	---	0.01-5	---
SL (8-36 inches)	---	---	0.01-3	---
SM (3-10 feet)	---	---	1-1	---
ST (>10 feet)	---	---	60-60	---
TR (<15 feet)	---	---	---	1-2
TM (15-40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-15-15	100	38.7
CAREX	*Carex*	3-3-3	50	12.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
WIPH	Wilhelmsia *physodes*	7-7-7	50	18.7
LYAN2	*Lycopodium annotinum*	7-7-7	50	18.7
EQSC	*Equisetum scirpoides*	3-3-3	50	12.2
RALA	*Ranunculus lapponicus*	3-3-3	50	12.2
MOUN2	*Moneses uniflora*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	30-30-30	50	38.7
EQAR	*Equisetum arvense*	25-25-25	50	35.4
MEPA	*Mertensia paniculata*	10-10-10	50	22.4
BORI2	*Boykinia richardsonii*	2-2-2	50	10.0
PEFR5	*Petasites frigidus*	2-2-2	50	10.0
LYAN2	*Lycopodium annotinum*	2-2-2	50	10.0
GELI2	*Geocaulon lividum*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	10-10-10	50	22.4
RUAR	*Rubus arcticus*	3-4-5	100	20.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	0-5-10	100	22.4
RITR	*Ribes triste*	10-10-10	50	22.4
VAVI	*Vaccinium vitis-idaea*	10-10-10	50	22.4
VAUL	*Vaccinium uliginosum*	7-7-7	50	18.7
RIGL	*Ribes glandulosum*	3-3-3	50	12.2
LEGR	*Ledum groenlandicum*	2-2-2	50	10.0
SAPU15	*Salix pulchra*	2-2-2	50	10.0

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	60-62.5-65	100	79.1
SABE2	*Salix bebbiana*	15-15-15	50	27.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-1.5-2	100	12.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-7.5-10	100	27.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—22-26.5-31

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea mariana*/*Salix-Ledum groenlandicum*

Ecological Classification ID: F231XY193AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways of hills and plains

Slope (percent):	Min	Max
	1	15

Elevation (feet):	Min	Max
	1,014	3,051

Range of Aspect Direction: All aspects

Water Table Depth (cm) :	Min	Max
	5	20

Flooding: None

Ponding: None

Runoff: Medium

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	28

Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

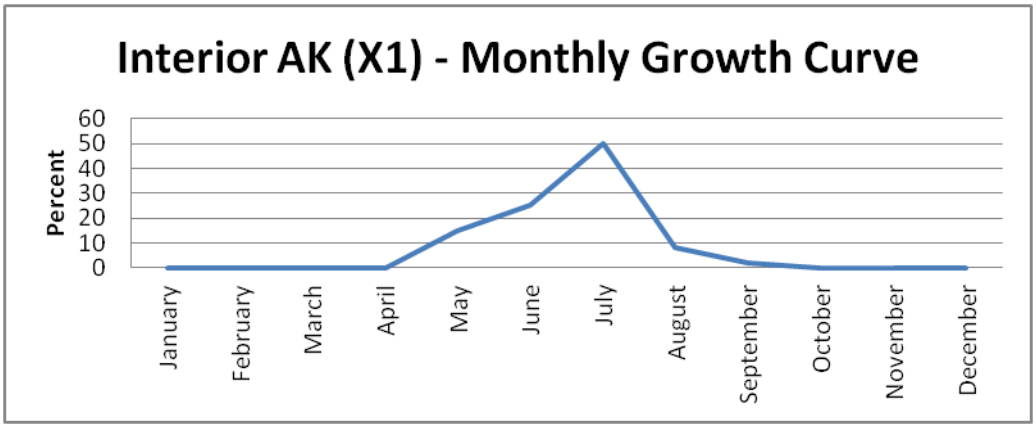
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH1—D31-Boreal taiga silty drainages, frozen
D31HL2—D31-Boreal taiga silty drainages, frozen
D31LB1—D31-Boreal taiga silty drainages, frozen
D31TH1—D31-Boreal taiga silty drainages, frozen
D31UC3—D31-Boreal taiga silty drainages, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluvaquentic Aquorthels

Dominant Parent Material: Organic material over loamy alluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	31	59

pH:	Low	RV	High
	3.4	6	7.4

Effective CEC (me/100g):	Low	High
	14.2	40

CEC (me/100g):	Min	RV	Max
	4	18.5	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.9	1	1.11

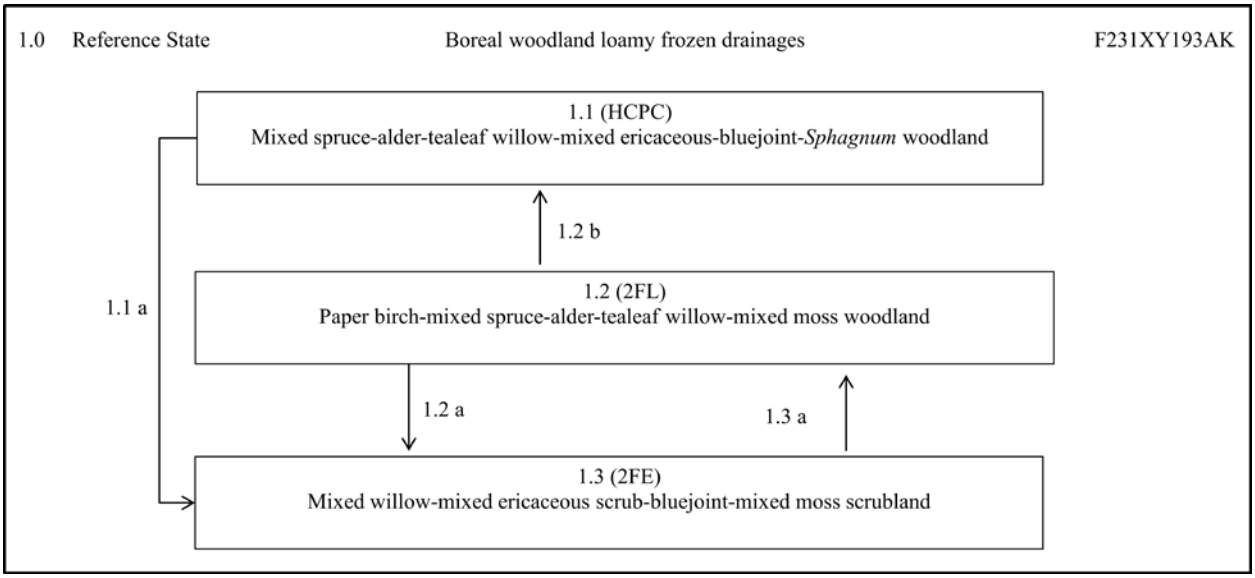
Plant Community Phases

Ecological Site Description ID:	F231XY193AK

Ecological Dynamics of the Site:

This boreal ecological site is associated with low-gradient drainageways on hills (slope averages 6%, but ranges from 2 to 13%). Communities based on disturbances from an intense flood regime were not observed. Differences in plant communities in this ecological site are presumed to be a result of the fire history. As sites progress from community phase 1.3 to 1.1, the surface organic matter increases and a mixed spruce woodland develops. Permafrost remains in the soil profile after fire disturbances. The soils in community phase 1.1 are classified as Aquorthels and are composed of organic matter over loamy alluvium.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

<table>
<tr><td>State Narrative:</td><td colspan="3">Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn.

Fires are thought to be typically low-severity events. During a low-severity fire (phase 1.3), minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Permafrost typically remains in the soil profile, and water commonly perches on it. Graminoids and scrubs quickly recolonize and become dominant as a result of the below-ground root reserves that were not consumed in the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2.

The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.</td></tr>
<tr><td>Phase 1.1</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.1</td><td>Community Phase Name:</td><td>Mixed spruce-alder-tealeaf willow-mixed ericaceous-bluejoint-Sphagnum woodland</td></tr>
</table>

Community Phase Narrative:
Picea glauca and *Picea mariana* are the dominant tree species, and they are primarily in the medium and tall tree strata. *Betula neoalaskana* are present in lower densities (total mature tree cover ~10%). The shrub cover is distributed among all shrub strata (total shrub cover ~75%), and the most common shrub species are *Alnus viridis ssp. fruticosa*, *Salix pulchra*, *Vaccinium uliginosum*, *Ledum groenlandicum*, *Rubus chamaemorus*, and *Vaccinium vitis-idaea*. Neither graminoids (~10% cover) nor forbs (~5% cover) are abundant, but *Calamagrostis Canadensis* commonly is present. Moss (~50% cover) and leaf litter (~20% cover) are the most extensive ground cover, and the moss mat is composed primarily of *Sphagnum* species. Five observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. For this ecological site, this phase has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Paper birch-mixed spruce-alder-tealeaf willow-mixed moss woodland

Community Phase Narrative:
Betula neoalaskana is the dominant tree species, and it is primarily in the medium and regenerative tree strata. *Picea glauca* and *Picea mariana* are present in lower densities (total mature tree cover ~10%). The shrub cover is primarily in the tall, medium, and low shrub strata (total shrub cover ~65%), and the most common shrub species are *Alnus viridis ssp. fruticosa*, *Salix pulchra*, and *Vaccinium uliginosum*. Graminoids (30% cover) are abundant, and a common species is *Calamagrostis canadensis*. Leaf litter (~55% cover) and moss (~20% cover) make up the most extensive ground cover. The moss is a mixture of various species, including *Sphagnum sp*., *Hylocomium splendens*, and *Pleurozium schreberi*. Seven observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Paper birch is replaced by a mixture of maturing black spruce and/or white spruce. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Mixed willow-mixed ericaceous scrub-bluejoint-mixed moss scrubland

Community Phase Narrative:	
Picea mariana and *Betula neoalaskana* are common as saplings, but neither occurs in high densities (~10% total cover). The shrub cover is distributed among the tall, medium, and low shrub strata (total shrub cover ~60%). Common species include *Salix sp*., *Vaccinium uliginosum*, and *Ledum groenlandicum*. Graminoids (~55% cover) and forbs (~20% cover) are abundant. Common species are *Calamagrostis canadensis*, *Chamerion angustifolium*, *Petasites frigidus*, and various *Equisetum sp*. Leaf litter (~70% cover) and moss (~30% cover) make up extensive ground cover. The moss is a mixture of various species, including *Sphagnum sp*., *Polytrichum sp*., and *Bryum sp*. Two observations of this phase were conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth without fire. Mixed spruce and/or paper birch develop into woodland.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
46 65 75

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Slightly decomposed plant material, very fine sandy loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
5.5 6.4 7.3

Subsurface Layer

Thickness (cm): Min RV Max
46 65 75

Texture: Mucky peat, very fine sandy loam

AWC (cm/cm) : Min RV Max:
0.25 0.28 0.35

pH: Min RV Max
5.8 6.4 7.4

Influencing Water Features

NWI Code: R3UB3

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-2	25-30	70-70	10-10	1-5	0-0	10-15

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	55-55	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
FM (4-24 inches)	---	0.01-10	---	---
FT (>24 inches)	---	5-5	---	---
SD (<8 inches)	---	---	5-5	---
SL (8-36 inches)	---	---	1-8	---
SM (3-10 feet)	---	---	15-5	---
TR (<15 feet)	---	---	---	7-8

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	55-55-55	100	74.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	25-25-25	50	35.4
PEFR5	*Petasites frigidus*	10-10-10	50	22.4
RALA	*Ranunculus lapponicus*	3-3-3	50	12.2

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	5-5-5	50	15.8

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-5-5	50	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFL15	*Pentaphylloides floribunda*	15-15-15	50	27.4
VAUL	*Vaccinium uliginosum*	1-5.5-10	100	23.5
LEGR	*Ledum groenlandicum*	2-5-8	100	22.4
BEGL	*Betula glandulosa*	8-8-8	50	20.0
SPST3	*Spiraea stevenii*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	15-15-15	50	27.4
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	50	15.8
SACA4	*Salix candida*	3-3-3	50	12.2
SAPS	*Salix pseudomonticola*	2-2-2	50	10.0

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	15-15-15	50	27.4
SAAR3	*Salix arbusculoides*	15-15-15	50	27.4
SABE2	*Salix bebbiana*	10-10-10	50	22.4
SAALL	*Salix alaxensis var. longistylis*	10-10-10	50	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-5-7	100	22.4
BENE4	*Betula neoalaskana*	8-8-8	50	20.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

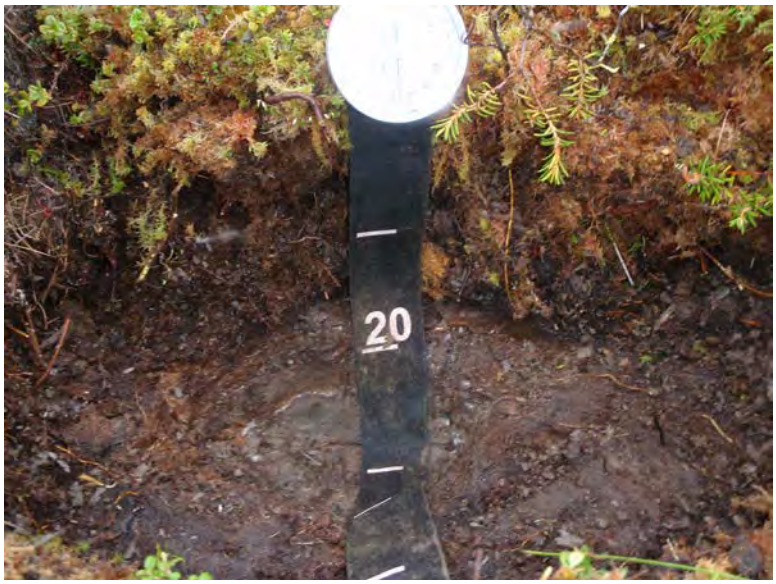
Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: *Salix candida*

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—22-22.5-23

Community Phase 2FL



Rooting Depth (cm): Min RV Max
29 63.1 106

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 2.4 7

Texture: Silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.25 0.31 0.35

pH: Min RV Max
4.8 5.6 6.5

Subsurface Layer

Thickness (cm): Min RV Max
29 60.7 99

Texture: Permanently frozen silt loam, silt loam, mucky peat, very fine sandy loam

AWC (cm/cm):	Min	RV	Max
	0.12	0.27	0.4

pH:	Min	RV	Max
	4.5	5.9	6.8

Influencing Water Features

NWI Code: R3UB3, R4SB5, R4SB7, R5UB3

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Mud; Riverine, Intermittent, Stream Bed, Mud; Riverine, Intermittent, Stream Bed, Vegetated; Riverine, Unknown Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Steep, entrenched, cascading step-pools; moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools; entrenched, meandering riffle/pool channel of low gradient, with high W/D ratio

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-20	1-50	20-85	2-35	0-60	0-3	1-30

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	20-3	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
FM (4-24 inches)	---	1-2	---	---
FT (>24 inches)	---	0-0	---	---
SD (<8 inches)	---	---	0.01-0.01	---
SL (8-36 inches)	---	---	0.01-0.01	---
SM (3-10 feet)	---	---	1-65	---
ST (>10 feet)	---	---	1-1	---
TR (<15 feet)	---	---	---	0.01-1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-15-20	29	20.7
ERVA4	*Eriophorum vaginatum*	15-15-15	14	14.6
LUPA4	*Luzula parviflora*	10-10-10	14	12.0
CABI5	*Carex bigelowii*	3-4-5	29	10.7

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-26.2-45	57	38.7
FEAL	*Festuca altaica*	5-10-15	29	16.9
ARLA2	*Arctagrostis latifolia*	15-15-15	14	14.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COPA28	*Comarum palustre*	1-10.5-20	29	17.3
EQPA	*Equisetum palustre*	15-15-15	14	14.6

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	0.1-3.7-10	43	12.6
ANPO	*Andromeda polifolia*	10-10-10	14	12.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	0-4.5-15	57	16.0
SAAR3	*Salix arbusculoides*	15-15-15	14	14.6
CHCA2	*Chamaedaphne calyculata*	3-6.5-10	29	13.6
LEGR	*Ledum groenlandicum*	1-3.7-8	43	12.5
SAPU15	*Salix pulchra*	10-10-10	14	12.0
BEGL	*Betula glandulosa*	8-8-8	14	10.7

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	5-20-65	57	33.8
SAHA	*Salix hastata*	60-60-60	14	29.3
SAPS8	*Salix pseudomyrsinites*	15-15-15	14	14.6
SASC	*Salix scouleriana*	15-15-15	14	14.6
ALVIF	*Alnus viridis ssp. fruticosa*	3-6.5-10	29	13.6
ALINT	*Alnus incana ssp. tenuifolia*	2-6-10	29	13.1
SABE2	*Salix bebbiana*	3-4-5	29	10.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	1-24.8-50	57	37.6

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	0-6.3-15	57	18.9
PIMA	*Picea mariana*	0.1-2.4-5	43	10.1
PIGL	*Picea glauca*	1-3-5	29	9.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	5-10-15	43	20.7

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	24-45-58	1.3-2-2.1	12-16-19	3	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
20-25.5-31	2

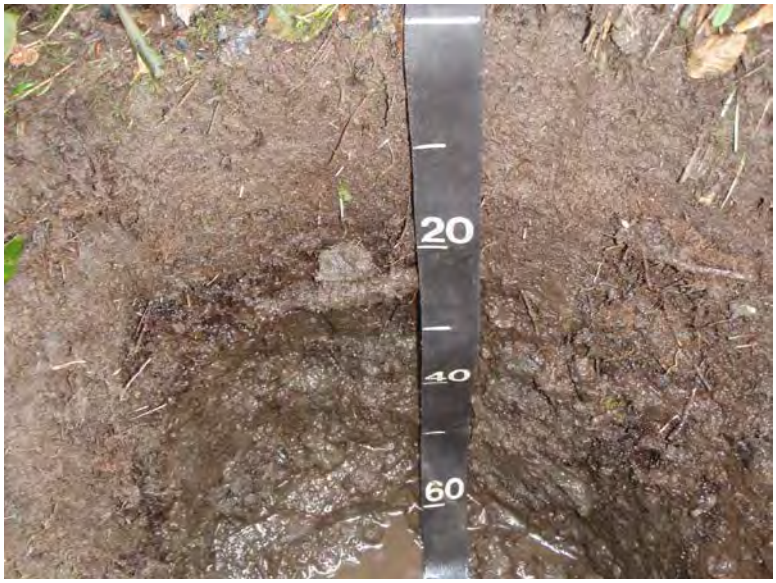
Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Summer
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—7; plant species per stop (min-avg-max)—6-18.3-26

Community Phase HCPC



Rooting Depth (cm):	Min	RV	Max
	30	48.8	67

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 9.2 24

Texture: Peat, silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.25 0.33 0.35

pH: Min RV Max
4.8 5.6 6.8

Subsurface Layer

Thickness (cm): Min RV Max
30 39.6 43

Texture: Permanently frozen silt loam, silt, silt loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.24 0.26 0.33

pH: Min RV Max
5 6.2 7.2

Influencing Water Features

NWI Code: R3UB3, PSS1

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Mud; Palustrine, Scrub-Shrub, Broad-Leaved Deciduous

Rosgen Classification: Steep, entrenched, cascading step-pools; moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	25-85	0-40	1-10	0-20	0-0	10-15

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	35-35	---	---	---
FD (<4 inches)	---	0.01-0.01	---	---
SD (<8 inches)	---	---	1-1	---
SL (8-36 inches)	---	---	1-5	---
SM (3-10 feet)	---	---	15-5	---
ST (>10 feet)	---	---	10-5	---
TR (<15 feet)	---	---	---	1-1
TM (15-40 feet)	---	---	---	2-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	3-6.5-10	40	16.1
ERVA4	*Eriophorum vaginatum*	0.1-3.6-7	40	11.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	25-30-35	40	34.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COPA28	*Comarum palustre*	10-12.5-15	40	22.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-6.8-20	100	26.1
RUCH	*Rubus chamaemorus*	1-2.5-5	80	14.1
RUARA2	*Rubus arcticus ssp. acaulis*	10-10-10	20	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	2-8.4-20	100	29.0
LEGR	*Ledum groenlandicum*	2-5.8-15	80	21.4
CHCA2	*Chamaedaphne calyculata*	1-5.3-10	60	17.9
SAPU15	*Salix pulchra*	15-15-15	20	17.3
SPST3	*Spiraea stevenii*	1-2.3-5	60	11.8
BENA	*Betula nana*	5-5-5	20	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	10-15-20	60	30.0
ALVIF	*Alnus viridis ssp. fruticosa*	2-10.7-15	60	25.3
BENA	*Betula nana*	3-11.5-20	40	21.4
BEGL	*Betula glandulosa*	5-10-15	40	20.0
ROAC	*Rosa acicularis*	15-15-15	20	17.3
SAAR3	*Salix arbusculoides*	10-10-10	20	14.1
SAPS	*Salix pseudomonticola*	5-5-5	20	10.0

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-12.5-20	40	22.4
ALINT	*Alnus incana ssp. tenuifolia*	20-20-20	20	20.0
SAAR3	*Salix arbusculoides*	10-10-10	20	14.1
SABE2	*Salix bebbiana*	10-10-10	20	14.1
SAPU15	*Salix pulchra*	5-5-5	20	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-4-8	80	17.9
PIGL	*Picea glauca*	12-12-12	20	15.5
BENE4	*Betula neoalaskana*	1-3-5	40	11.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-8.2-15	80	25.7

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	15-15-15	20	17.3
BENE4	*Betula neoalaskana*	10-10-10	20	14.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	15-64-91	5.8-6-6.2	30-33-37	3	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
25-97.5-170	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other woody plants	Moose	Summer
Moderate use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Unknown
Slight use	Willows	Moose	Winter

Notable Plants: None observed

Species Richness: Number of stops—5; plant species per stop (min-avg-max)—17-21.8-30

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Betula neoalaskana*/*Alnus incana ssp. tenuifolia*
Ecological Classification ID: F231XY195AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways of hills, low flood plains, mountains, and terraces

Slope (percent):	Min	Max
	1	10

Elevation (feet):	Min	Max
	646	1,358

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	5	75

Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	15

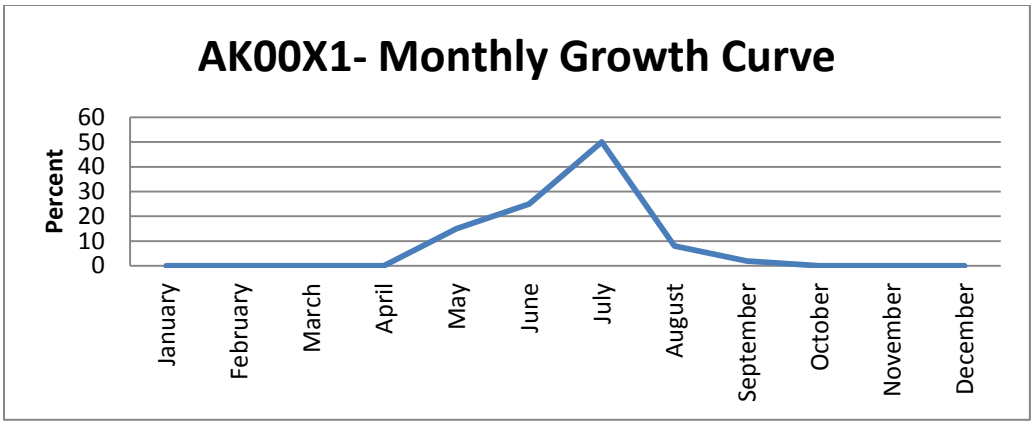
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TE1—D31-Boreal forest silty drainages, frozen
D31TE2—D31-Boreal forest silty drainages, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluvaquentic Aquorthels
Dominant Parent Material: Organic material over gravelly alluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	47

pH:	Low	RV	High
	4.5	6.4	7.9

Effective CEC (me/100g):	Low	High
	14	29

CEC (me/100g):	Min	RV	Max
	3.2	31.8	88.2

Organic Matter (percent):	Low	RV	High
	2	29.3	80

Bulk Density (1/3-Bar):	Min	RV	Max
	1	1.1	1.17

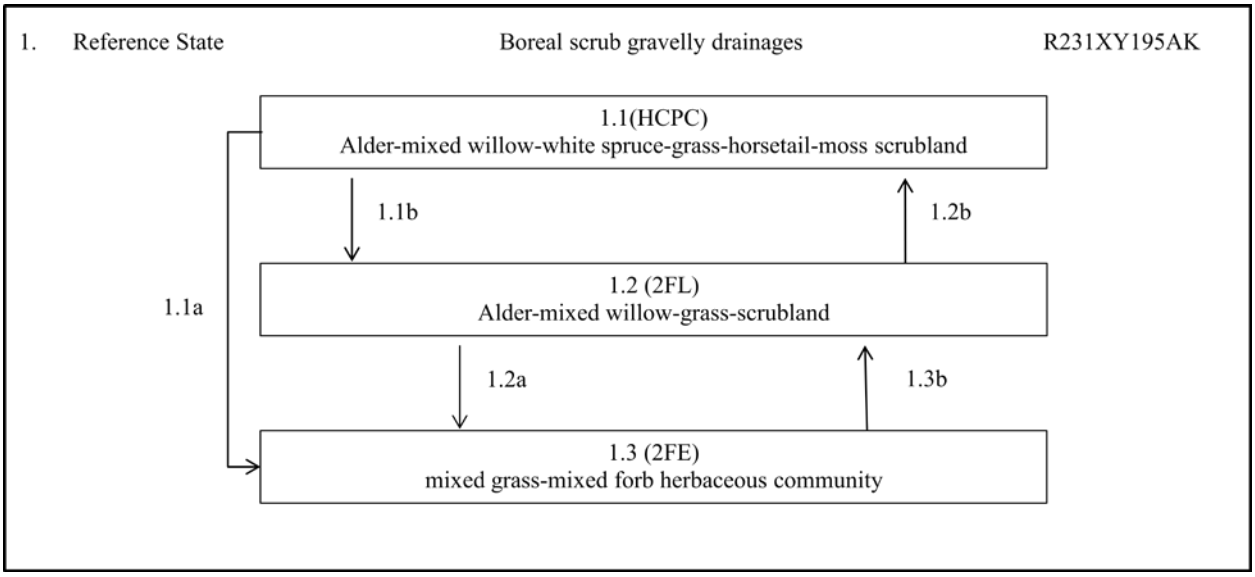
Plant Community Phases

Ecological Site Description ID:	R231XY195AK

Ecological Dynamics of the Site:

This boreal ecological site is in a low-gradient drainageway that dissected hills, mountains, and plains. (<15% slopes). Sites are characterized by a dense shrub canopy directly adjacent to flowing water. Trees are present, but the climax phase does not have sufficient tree cover to qualify as woodland (<10% tree cover). Because the drainageway does not have unvegetated bars, flooding is not included as a disturbance regime. Fire is the dominant disturbance regime. The soils in community phase 1.1 are classified as Cryofluvents and are composed of organic material over gravelly alluvium. Fire is a disturbance regime that resulted in three phases. No alternate states were observed.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	For the climax phase, the dominant vegetation is a mixture of trees, shrubs, graminoids, forbs, and moss. Trees are in the tall, medium, stunted, and regenerative strata. The shrubs are in the tall, medium, low, and dwarf strata. The climax and late phase communities are very similar, but they are separated based on the size/age of trees. During a low-severity fire, minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Graminoids and scrubs quickly recolonize and become dominant as a result of the below-ground root reserves that are not consumed in the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Alder-mixed willow-white spruce-grass-horsetail-moss scrubland

Community Phase Narrative:
The tree cover primarily is in the tall and medium strata. The most common tree species is *Picea glauca,* but *Betula neoalaskana* and *Populus balsamifera* are also present. *Picea glauca* averages 90 years of age, and the diameter at breast height averages 5.7 inches. Medium shrubs are most abundant, but tall, low, and dwarf species are also common. The most common tall shrubs are *Alnus sp*. and *Salix sp*., the most common medium shrubs are *Salix sp*., and the most common low shrub is *Vaccinium uliginosum*. Graminoids and forbs are abundant, totally more than 25% cover. A common graminoid is *Calamagrostis canadensis*, and a common forb is *Equisetum sp*. Moss is an abundant ground cover.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	High-intensity fire. No field observations. Under a high-severity fire regime, the resulting community would likely be dominantly herbaceous plants.
1.1b	Low-intensity fire. Evidence of fire (i.e., standing burned trees and charcoal) in late fire phase areas. It is unclear whether a fire typically resets the community (high-intensity fire) or merely removes isolated pockets of shrubs and white spruce (low-intensity fire). Under a low-severity fire regime, the resulting community would likely resemble that of community phase 1.2.

Phase 1.2	

Community Phase Number:	1.2	Community Phase Name:	Alder-mixed willow-grass-scrubland
Community Phase Narrative:			
The tree cover is primarily in the medium and regenerative strata and is less abundant than that of the climax phase. The dominant tree species are *Picea glauca*, *Betula neoalaskana*, and *Populus balsamifera*. The dominant shrub stratum is tall shrubs, but medium, low, and dwarf shrubs are also common. The most common tall shrubs are *Alnus* and *Salix sp*. The most common medium and low shrubs is *Salix sp*. Graminoids and forbs are abundant, totally more than 25% cover. A common graminoid is *Calamagrostis canadensis*, and common forbs are *Equisetum sp.* and *Parnassia palustris*. The moss cover is less abundant than that of the climax phase.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire may occur within this phase, but it was not observed.
1.2b	Normal time and growth without fire. The difference in the vegetation between the late and climax phases is minimal. As time progresses, late phase vegetation will eventually develop a limited amount of tall *Picea glauca* and the shrub understory will shift from tall to medium shrubs.

Phase 1.3	No data.		
Community Phase Number:	1.3	Community Phase Name:	Mixed grass-mixed forb herbaceous community
Community Phase Narrative:			
No data. This phase is included because there is a theoretical chance for fire that removes a majority of the tree and shrub canopy. This community would likely be best characterized as a herbaceous community.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	No data.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FL

Rooting Depth (cm): Min RV Max
50 69.7 93

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 2.4 5

Texture: Slightly decomposed plant material, fine sandy loam, silt loam, gravelly silt loam

AWC (cm/cm): Min RV Max
0.17 0.31 0.35

pH: Min RV Max
4.7 6.2 7.2

Subsurface Layer

Thickness (cm): Min RV Max
50 67.3 88

Texture: Gravelly silt loam, extremely cobbly sandy loam, very gravelly sandy loam

AWC (cm/cm): Min RV Max
0.03 0.14 0.35

pH: Min RV Max
5.2 6.6 7.6

Influencing Water Features

NWI Code: R3UB1, R3UB2

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Upper Perennial, Unconsolidated Bottom, Sand

Rosgen Classification: Steep, entrenched, cascading step-pools; moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	15-30	15-55	2-15	2-35	2-35	10-20

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.01-1	---	---	---
FD (<4 inches)	---	0.01-1	---	---
FM (4-24 inches)	---	0.01-5	---	---
SD (<8 inches)	---	---	3-7	---
SL (8-36 inches)	---	---	1-7	---
SM (3-10 feet)	---	---	40-40	---
TR (<15 feet)	---	---	---	0.01-0.01

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	1-23-45	33	27.7
CARO7	*Carex rotundata*	10-10-10	17	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	7-14.2-25	67	30.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
WIPH	*Wilhelmsia physodes*	1-4.3-7	50	14.7
EQSC	*Equisetum scirpoides*	2-4-5	50	14.1
RALA	*Ranunculus lapponicus*	8-8-8	17	11.5
CHAN9	*Chamerion angustifolium*	5-5-5	17	9.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	5-13.3-20	50	25.8
PAPA8	*Parnassia palustris*	1-6.5-15	67	20.8
EQAR	*Equisetum arvense*	5-12.5-20	33	20.4
RALA	*Ranunculus lapponicus*	15-15-15	17	15.8
HEAL	*Hedysarum alpinum*	10-10-10	17	12.9
CHLA13	*Chamerion latifolium*	0-4-8	33	11.6
EQVA	*Equisetum variegatum*	7-7-7	17	10.8
MEPA	*Mertensia paniculata*	5-5-5	17	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	7-7-7	17	10.8
RUCH	*Rubus chamaemorus*	5-5-5	17	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	7-9-10	50	21.2
RIHU	*Ribes hudsonianum*	15-15-15	17	15.8
VAUL	*Vaccinium uliginosum*	15-15-15	17	15.8
SAGL	*Salix glauca*	10-10-10	17	12.9
LEGR	*Ledum groenlandicum*	1-2.3-3	50	10.8
PEFL15	*Pentaphylloides floribunda*	0-2.5-5	33	9.1
PEFL15	*Pentaphylloides floribunda*	0-2.5-5	33	9.1
LEPAD	*Ledum palustre ssp. decumbens*	5-5-5	17	9.1
SAPS	*Salix pseudomonticola*	5-5-5	17	9.1
ROAC	*Rosa acicularis*	5-5-5	17	9.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	5-22.5-40	33	27.4
BEOC2	*Betula occidentalis*	1-5.5-10	33	13.5
SARE2	*Salix reticulata*	10-10-10	17	12.9
SAALL	*Salix alaxensis var. longistylis*	10-10-10	17	12.9
SAAR3	*Salix arbusculoides*	10-10-10	17	12.9
SAPS	*Salix pseudomonticola*	5-5-5	17	9.1

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	25-27.5-30	33	30.3
ALVIF	*Alnus viridis ssp. fruticosa*	50-50-50	17	28.9
SABE2	*Salix bebbiana*	5-10-15	50	22.4
SAALL	*Salix alaxensis var. longistylis*	5-12.5-20	33	20.4
SAAL	*Salix alaxensis*	20-20-20	17	18.3
SAALA	*Salix alaxensis var. alaxensis*	20-20-20	17	18.3
SAAR3	*Salix arbusculoides*	15-15-15	17	15.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	2-3.5-5	33	10.8
PIGL	*Picea glauca*	0-2.5-5	33	9.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-4.7-10	50	15.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Summer
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—10-20.5-29

Community Phase HCPC

Rooting Depth (cm): Min RV Max
32 63.5 97

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 3.9 9

Texture: Highly organic silt loam, moderately decomposed plant material, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.22 0.33 0.35

pH: Min RV Max
5.1 6.5 8.1

Subsurface Layer

Thickness (cm): Min RV Max
32 59.6 88

Texture: Very bouldery highly decomposed organic matter, gravelly sandy loam, very gravelly coarse sandy loam, very gravelly loamy coarse sand, channers, silt loam

AWC (cm/cm): Min RV Max
0.03 0.14 0.39

pH: Min RV Max
5.7 6.5 7.5

Influencing Water Features

NWI Code: PSS1, R2RS2, R3UB1, R3UB2, R3UB3

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Riverine, Lower Perennial, Rocky Shore, Rubble; Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Upper Perennial, Unconsolidated Bottom, Sand; Riverine, Upper Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Steep, entrenched, cascading step-pools; moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools; low-gradient, meandering, riffle-pool stream with low W/D ratio and little deposition

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	10-95	1-80	1-20	0-85	0-35	0-20

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	20-5	---	---	---
FM (4-24 inches)	---	0.1-2	---	---
SD (<8 inches)	---	---	10-30	---
SL (8-36 inches)	---	---	40-40	---
SM (3-10 feet)	---	---	10-45	---
TR (<15 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	10-10-10	10	10.0

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	4-14.1-20	70	31.5
CAPO	*Carex podocarpa*	25-25-25	10	15.8
CAAQ	*Carex aquatilis*	20-20-20	10	14.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	0-10-20	20	14.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
WIPH	*Wilhelmsia physodes*	1-5.5-10	20	10.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	25-27.5-30	20	23.5
EQAR	*Equisetum arvense*	1-12.8-20	40	22.6
COPA28	*Comarum palustre*	15-15-15	10	12.2
CHAN9	*Chamerion angustifolium*	1-5.5-10	20	10.5
RALA	*Ranunculus lapponicus*	10-10-10	10	10.0
ACDE2	*Aconitum delphiniifolium*	10-10-10	10	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	3-16.5-30	20	18.2
RUCH	*Rubus chamaemorus*	5-7.5-10	20	12.2
ARRU	*Arctostaphylos rubra*	10-10-10	10	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	1-10-40	70	26.5
ROAC	*Rosa acicularis*	0-3.8-7	40	12.3
SAPU15	*Salix pulchra*	5-5-5	20	10.0
LEPAD	*Ledum palustre ssp. decumbens*	2-3-5	30	9.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	10-33-75	50	40.6
ALINT	*Alnus incana ssp. tenuifolia*	1-14-35	40	23.7
SARI4	*Salix richardsonii*	45-45-45	10	21.2
ALVIF	*Alnus viridis ssp. fruticosa*	1-12-20	30	19.0
SABE2	*Salix bebbiana*	1-12-30	30	19.0
PEFL15	*Pentaphylloides floribunda*	20-20-20	10	14.1
PEFL15	*Pentaphylloides floribunda*	20-20-20	10	14.1
SAGL	*Salix glauca*	5-6.7-10	30	14.1
BEOC2	*Betula occidentalis*	15-15-15	10	12.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-16-33	30	21.9
SAALL	*Salix alaxensis var. longistylis*	30-30-30	10	17.3
SAIN3	*Salix interior*	10-10-10	20	14.1
ALINT	*Alnus incana ssp. tenuifolia*	20-20-20	10	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	0.1-2.9-5	70	14.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-4.3-5	30	11.4

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-9.2-15	50	21.4
BENE4	*Betula neoalaskana*	1-5.5-10	20	10.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	33-92-182	1.4-6-16.4	5-31-79	17	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
30-40-60	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Severe use	Willows	Moose	Summer
Slight use			Spring
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Summer

Notable Plants: None observed

Species Richness: Number of stops—10; plant species per stop (min-avg-max)—9-17.8-25

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Picea glauca*
Ecological Classification ID: F231XY196AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: High flood plains, swales of terraces and flood plains, middle flood plains

Slope (percent):	Min	Max
	0	20

Elevation (feet):	Min	Max
	640	860

Range of Aspect Direction: All aspects

Water Table Depth (cm) :	Min	Max
	0	141

Flooding:	Frequency	Duration
	Rare	Brief

Ponding: None
Runoff: Low

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	16

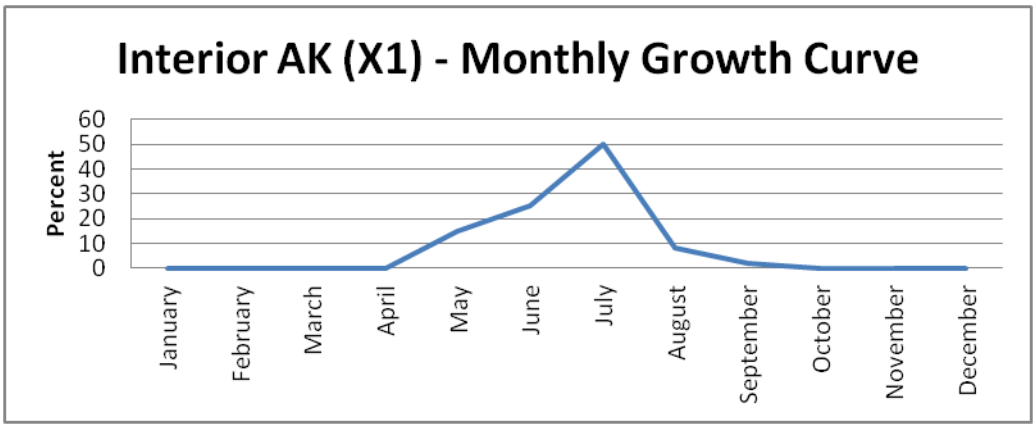
Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31YV1—D31-Boreal taiga loamy high flood plains, frozen
D31YV2—D31-Boreal taiga loamy high flood plains, frozen
D31YV9—D31-Boreal taiga loamy high flood plains, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels
Dominant Parent Material: Organic material over loamy alluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	38	65

pH:	Low	RV	High
	3.5	7.5	8.1

Effective CEC (me/100g):	Low	High
	12.3	29

CEC (me/100g):	Min	RV	Max
	3.1	31.8	88.2

Organic Matter (percent):	Low	RV	High
	2	28	80

Bulk Density (1/3-Bar):	Min	RV	Max
	1.13	1.2	1.28

Plant Community Phases

Ecological Site Description ID:	F231XY196AK
Ecological Dynamics of the Site:	

This boreal ecological site is in areas adjacent to the Yukon River that occasionally to very rarely flood. The decreased intensity and frequency of flooding favors the replacement of deciduous trees with coniferous trees and represents a successional progression from site F231XY189AK (starting with community phase 1.3). As the site progresses from community phase 1.3 to 1.1, the surface organic matter content increases and permafrost develops and rises in the soil profile. The soils in community phase 1.1 are classified as Haplorthels and are composed of organic matter over sand and loamy alluvium.

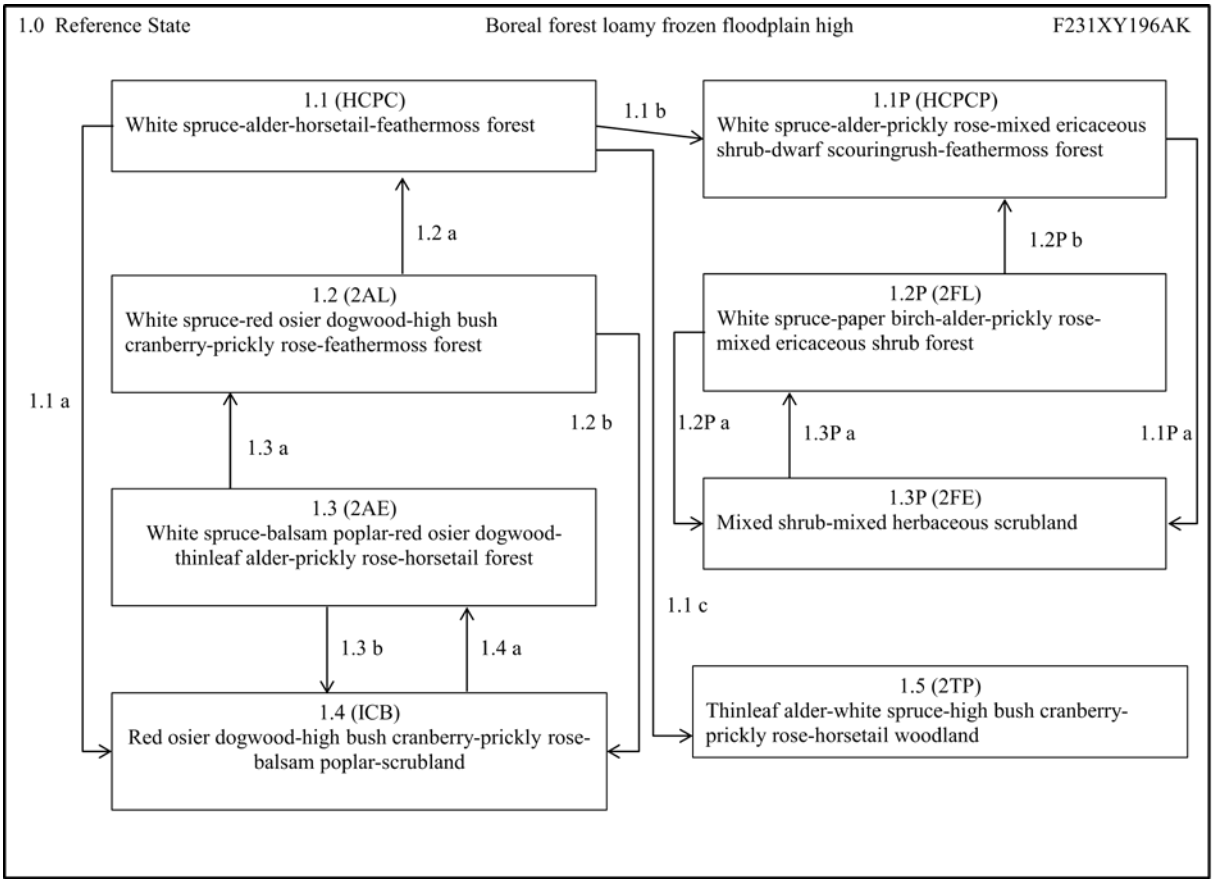
The interactions between ice bulldozing, the development of permafrost, and the flood regime lead to several unique plant community phases for this ecological site.

As a river breaks up in spring, pack ice often breaches the riverbanks and causes a disturbance referred to as ice bulldozing. This ice-related disturbance completely shears off the white spruce forest canopy. Unlike on flood plain ecological sites that consist dominantly of deciduous trees and shrubs (e.g., F231XY189AK and F231XY198AK), white spruce does not regenerate quickly after ice damning/bulldozing events (perhaps >100 years). As a result, ice bulldozing results in a unique community phase (phase 1.4).

As permafrost forms and rises in the soil profile, flood events may result in water being perched for extended periods on the permafrost. White spruce can survive flood events, but anaerobic conditions associated with ponding can stress and kill mature white spruce stands. It is presumed that a large number of standing dead or windthrown spruce trees is indicative of long-duration ponding events (community phase 1.5).

As flooding becomes very rare, this ecological site begins to shift toward that of a flood plain terrace site (e.g., F231XY169AK). Indicators for this shift are presumed to be cryoturbate material in the soil profile, a decrease in the size and density of white spruce, an increase in the abundance and density of ericaceous vegetation and black spruce, and an increase in the likelihood of fire disturbance. The sites are described as post climax for this ecological site (community phases 1.1P, 1.2P, and 1.3P).

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Community phases in the reference state were grouped on the basis of structure and dominance of white spruce and various understory species. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-alder-horsetail-feathermoss forest

Community Phase Narrative:

As compared to community phase 1.2, phase 1.1 has taller and older white spruce trees. The tree cover is primarily in the tall tree stratum and is primarily pure stands of *Picea glauca* (total mature tree cover ~50%; trees average 140 years of age). The shrub cover is evenly distributed among the tall, medium, and low shrub strata (~60% cover). Common species are *Alnus viridis ssp. fruticosa*, *Viburnum edule*, *Rosa acicularis*, *Shepherdia canadensis*, *Linnaea borealis*, and *Arctostaphylos rubra*. Forbs and graminoids form a dense understory (~80% cover). Common species include *Equisetum arvense*, *Galium boreale*, *Goodyera repens*, *Bromus inermis* ssp. *pumpellianus*, and *Elymus macrourus*. Moss forms a dense ground mat (~80% cover), and the most common species are *Hylocomium splendens* and *Rhytidiadelphus triquetrus*. Seven observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.1a	Intense flooding and/or ice shearing can remove a majority of the tree canopy. Species such as balsam poplar, alder, willow, and red osier dogwood quickly reestablish, resulting in a community that resembles that of community phase 1.4.
1.1b	Normal time and growth without flooding. White spruce forest declines in productivity, which is believed to coincide with the depth to permafrost. The abundance and density of ericaceous plants increase.

1.1c	A majority of the white spruce forest is killed, probably as a result of prolonged ponding after a flood event.

Phase 1.1p			
Community Phase Number:	1.1p	Community Phase Name:	White spruce-alder-prickly rose-mixed ericaceous shrub-dwarf scouringrush-feathermoss forest
Community Phase Narrative:			
As compared to community phase 1.1, community phase 1.1p has a less dense white spruce canopy and reduced basal area. In addition, community phase 1.1p has a higher density of ericaceous plants. The tree canopy is primarily composed of *Picea glauca* with a small number of *Picea mariana*. The tree cover is distributed between the tall and medium strata (~30% cover), and the average basal area is 65 (average basal area of community phase 1.1 is 128). The shrub cover is evenly distributed among the tall, medium, and low shrub strata (~90% total shrub cover). Common species include *Alnus sp*., *Rosa acicularis*, *Linnaea borealis*, and *Arctostaphylos rubra*. Common ericaceous species include *Ledum groenlandicum*, *Vaccinium uliginosum*, and *Chamaedaphne calyculata*. Forbs are abundant (~50% cover) and diverse. The most common forbs are *Equisetum scirpoides*, *Boschniakia rossica*, and *Mertensia paniculata*. Moss forms a dense mat (~80% cover), and the most common species are *Hylocomium splendens* and *Rhytidiadelphus triquetrus*. Five observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1Pa	Fire.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	White spruce-red osier dogwood-high bush cranberry-prickly rose-feathermoss forest
Community Phase Narrative:			
As compared to phase 1.3, *Picea glauca* is the dominant species in the tree canopy and *Populus balsamifera* is a minor component. *Populus balsamifera* commonly occurs as standing dead trees or is a component of litter on the forest floor. The tree cover is primarily in the medium and tall tree strata (total mature tree cover ~60%; *Picea glauca* averages 77 years of age). Common understory species include *Alnus viridis ssp. fruticosa*, *Rosa acicularis*, *Galium boreale*, *Mertensia paniculata*, *Hylocomium splendens*, and *Rhytidiadelphus triquetrus*. One observation of this phase was conducted, and the site had been recently disturbed.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Normal time and growth without flooding disturbance that removes the white spruce canopy. White spruce matures and completely replaces balsam poplar.
1.2b	Intense flooding and/or ice shearing can remove a majority of the tree canopy. Species such as balsam poplar, alder, willow, and red osier dogwood quickly reestablish, resulting in a community that resembles that of community phase 1.4.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	White spruce-balsam poplar-red osier dogwood-thinleaf alder-prickly rose-horsetail forest
Community Phase Narrative:			
Picea glauca and *Populus balsamifera* are dominant in community phase 1.3. The tree cover primarily is in the medium tree stratum (total mature tree cover ~30%). Shrubs primarily are in the tall and low strata (~90% cover). Common species include *Salix alaxensis*, *Alnus incana ssp. tenuifolia*, *Cornus sericea*, and *Rosa acicularis*. Forbs are also abundant (~40% cover), and common species are *Equisetum arvense*, *Galium boreale*, and *Mertensia paniculata*. One observation of this phase was conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth. White spruce matures and outcompetes balsam poplar, which begins to be replaced in the forest canopy.
1.3b	Intense flooding and/or ice shearing can remove a majority of the tree canopy. Species such as balsam poplar, alder, willow, and red osier dogwood quickly reestablish, resulting in a community that resembles that of community phase 1.4.

Phase 1.4			
			
Community Phase Number:	1.4	Community Phase Name:	Red osier dogwood-high bush cranberry-prickly rose-balsam poplar-scrubland
Community Phase Narrative:			
Phase 1.4 is in areas where large blocks of ice shear off the tree canopy, leaving an exposed forest understory. When roots remain intact, balsam poplar and several shrub species appear to quickly regenerate after ice bulldozing disturbances. The only tree species observed in these disturbed areas is *Populus balsamifera*, which are in the regeneration tree stratum (~10% cover). Shrubs primarily are in the low shrub stratum (total shrub cover ~60%). Common species include *Viburnum edule*, *Cornus sericea*, and *Rosa acicularis*. Forbs are abundant (~50% cover). Common species include *Equisetum arvense*, *Galium boreale*, *Mertensia paniculata*, and *Hedysarum alpinum*. Three observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth with flooding or ice shearing. It is believed that a white spruce and balsam poplar forest will reestablish on the disturbed site; however, no observations on the progression of the site after ice shearing were made.

Phase 1.5			
			
Community Phase Number:	1.5	Community Phase Name:	Thinleaf alder-white spruce-high bush cranberry-prickly rose-horsetail woodland
Community Phase Narrative:			
Phase 1.5 is related to the die-off of the white spruce forest and the opening of the forest understory to increased light. This phase is distinctive due to an increased density of tall shrubs and large quantities of windthrown or standing dead spruce trees. *Picea glauca* is the dominant tree species, and it is primarily in the tall tree stratum (total mature tree cover ~15%; trees average 166 years of age). The shrub cover is primarily in the tall stratum, and *Alnus sp*. forms a dense canopy (~80% cover). Other common species include *Rosa acicularis*, *Viburnum edule*, *Linnaea borealis*, and *Equisetum sp*. Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.5a	The progression of this site after white spruce die-off was not observed.

Phase 1.2p			
			
Community Phase Number:	1.2p	Community Phase Name:	White spruce-paper birch-alder-prickly rose-mixed ericaceous shrub forest
Community Phase Narrative:			
As compared to community phase 1.1p, phase 1.2p has younger *Picea glauca* trees and they are codominant with *Betula neoalaskana*. The tree cover is distributed between the tall and medium tree strata (~30% cover), and *Picea glauca* averages 76 years of age (white spruce averages 156 years of age in community phase 1.1p). Shrubs are the dominant vegetation (~100% cover), and the most common species are *Alnus viridis ssp. fruticosa*, *Vaccinium uliginosum*, *Ledum groenlandicum*, *Rosa acicularis*, and *Chamaedaphne calyculata*. Graminoids and forbs are abundant (~75% combined cover). Common species include *Calamagrostis canadensis*, *Equisetum scirpoides*, *Boschniakia rossica*, and *Mertensia paniculata*. Two observations of this phase were conducted.			

Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2Pa	Fire.		
1.2Pb	Normal time and growth without fire. Paper birch dies off and is replaced by white spruce.		
Community Phase Number:	1.3p	Community Phase Name:	Mixed shrub-mixed herbaceous scrubland
Community Phase Narrative:			
No observations of this phase were conducted. This community is conceptual and is considered an early-fire sere associated with a post-climax high flood plain forest.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3Pa	Normal time and growth without fire.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2AE

Rooting Depth (cm): Min RV Max
63 63 63

Restrictive Features: None recorded

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
3 3 3

Texture: Stratified peat, silt loam, and peat

AWC (cm/cm): Min RV Max
0.25 0.3 0.35

pH: Min RV Max
7.4 7.4 7.4

Subsurface Layer

Thickness (cm): Min RV Max
60 60 60

Texture: Silt loam

AWC (cm/cm): Min RV Max
0.06 0.16 0.25

pH: Min	RV	Max
7.3	7.7	8

Influencing Water Features

NWI Code: R2UB2

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Sand

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-1	1-1	90-90	10-10	2-2	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	1-1	---	---	---
FM (4-24 inches)	---	0.1-5	---	---
SD (<8 inches)	---	---	0.1-0.1	---
SL (8-36 inches)	---	---	1-15	---
ST (>10 feet)	---	---	10-5	---
TR (<15 feet)	---	---	---	0.1-2
TM (15-40 feet)	---	---	---	20-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BROMU	*Bromus*	1-1-1	100	10.0
CACA4	*Calamagrostis canadensis*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	20-20-20	100	44.7
MEPA	*Mertensia paniculata*	10-10-10	100	31.6
GABO2	*Galium boreale*	5-5-5	100	22.4
EUSI13	*Eurybia sibirica*	1-1-1	100	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	15-15-15	100	38.7
COSES	*Cornus sericea ssp. sericea*	15-15-15	100	38.7
VIED	*Viburnum edule*	1-1-1	100	10.0

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAR3	*Salix arbusculoides*	25-25-25	100	50.0
ALVIF	*Alnus viridis ssp. fruticosa*	10-10-10	100	31.6
SAALA	*Salix alaxensis var. alaxensis*	10-10-10	100	31.6
SAALL	*Salix alaxensis var. longistylis*	10-10-10	100	31.6
ALINT	*Alnus incana ssp. tenuifolia*	5-5-5	100	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	2-2-2	100	14.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	20-20-20	100	44.7
PIGL	*Picea glauca*	5-5-5	100	22.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	21-22-23	3-3-3.2	25-25-25	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
48-48-48	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Other woody plants	Other	Winter

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—26-26-26

Community Phase 2AL

Rooting Depth (cm): Min RV Max
89 89 89

Restrictive Features: None recorded

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
4 4 4

Texture: Stratified slightly decomposed plant material and silt loam

AWC (cm/cm): Min RV Max
0.25 0.3 0.35

pH: Min RV Max
5.7 5.7 5.7

Subsurface Layer

Thickness (cm): Min RV Max
85 85 85

Texture: Silt loam, coarse sandy loam, sandy loam

AWC (cm/cm): Min RV Max
0.14 0.16 0.25

pH: Min RV Max
7.3 7.7 8

Influencing Water Features

NWI Code: R2UB2

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Sand

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-3	55-55	35-35	15-15	2-2	0-0	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	0.1-2	---	---
FT (>24 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	1-1	---
SL (8-36 inches)	---	---	1-5	---
TR (<15 feet)	---	---	---	0.1-0.1
TM (15-40 feet)	---	---	---	25-25
TT (>40 feet)	---	---	---	30-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	2-2-2	100	14.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GABO2	*Galium boreale*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	2-2-2	100	14.1
HEAL	*Hedysarum alpinum*	1-1-1	100	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	1-1-1	100	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	5-5-5	100	22.4
VIED	*Viburnum edule*	2-2-2	100	14.1
COSES	*Cornus sericea ssp. sericea*	1-1-1	100	10.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	25-25-25	100	50.0

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	30-30-30	100	54.8
POBA2	*Populus balsamifera*	5-5-5	100	22.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	74-78-81	9.3-10-10.5	64-70-73	3	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
160-160-160	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—23-23-23

Community Phase ICB

Rooting Depth (cm): Min RV Max
62 78.7 90

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 1.7 3

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.15 0.28 0.35

pH: Min RV Max
6.2 7.2 7.7

Subsurface Layer

Thickness (cm): Min RV Max
62 77 87

Texture: Highly decomposed plant material, very fine sandy loam

AWC (cm/cm): Min RV Max
0.13 0.23 0.4

pH: Min RV Max
6.1 6.9 7.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	10-40	15-50	10-30	5-80	0-2	0-0

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	3-7	---	---	---
FD (<4 inches)	---	2-2	---	---
FM (4-24 inches)	---	0.1-7	---	---
FT (>24 inches)	---	10-15	---	---
SD (<8 inches)	---	---	0.01-0.01	---
SL (8-36 inches)	---	---	1-20	---
TR (<15 feet)	---	---	---	15-15

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	1-3.7-7	100	19.1
ELMA7	*Elymus macrourus*	3-5-7	67	18.3

Stratum—FD (<4 inches) % Cover Occurrence

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	0-1.7-3	100	12.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	15-23.3-40	100	48.3
MEPA	*Mertensia paniculata*	2-11-20	67	27.1
HEAL	*Hedysarum alpinum*	5-7.5-10	67	22.4
GABO2	*Galium boreale*	2-4-7	100	20.0
GEPR3	*Gentiana prostrata*	0-2.5-5	67	12.9
DEGL3	*Delphinium glaucum*	4-4-4	33	11.5
ARTI	*Artemisia tilesii*	3-3-3	33	10.0
SOMU	*Solidago multiradiata*	3-3-3	33	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	15-15-15	33	22.4
ARTI	*Artemisia tilesii*	10-10-10	33	18.3
ACMI2	*Achillea millefolium*	3-3-3	33	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	0-4.3-10	100	20.8
ARRU	*Arctostaphylos rubra*	5-5-5	33	12.9

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	0-15-25	100	38.7
SAAL	*Salix alaxensis*	30-30-30	33	31.6
VIED	*Viburnum edule*	1-7-10	100	26.5
RUID	*Rubus idaeus*	20-20-20	33	25.8
COSES	*Cornus sericea ssp. sericea*	8-9-10	67	24.5
ALINT	*Alnus incana ssp. tenuifolia*	5-5-5	33	12.9
SAGL	*Salix glauca*	5-5-5	33	12.9
SHCA	*Shepherdia canadensis*	1-1.5-2	67	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	3-11-15	100	33.2

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use Unknown	Willows	Moose	Spring Unknown

Notable Plant: *Symphyotrichum falcatum var. falcatum*

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—18-22.3-26

Community Phase 2FL

Rooting Depth (cm):	Min	RV	Max
	33	44.5	56

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
33 37.5 42

Texture: Peat, stratified mucky peat and muck

AWC (cm/cm): Min RV Max
0.35 0.37 0.4

pH: Min RV Max
4 4.8 5.5

Subsurface Layer

Thickness (cm): Min RV Max
0 7 14

Texture: Permanently frozen silt loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
6.7 6.7 6.7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-5	30-30	15-40	5-10	0-2	0-0	2-3

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	5-60	---	---	---
FD (<4 inches)	---	2-7	---	---
FM (4-24 inches)	---	3-8	---	---
FT (>24 inches)	---	2-3	---	---
SD (<8 inches)	---	---	40-5	---
SL (8-36 inches)	---	---	12-7	---
SM (3-10 feet)	---	---	10-10	---
ST (>10 feet)	---	---	8-8	---
TR (<15 feet)	---	---	---	10-5
TM (15-40 feet)	---	---	---	6-8
TT (>40 feet)	---	---	---	10-18

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	20-20-20	50	31.6

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-35-60	100	59.2
CAREX	*Carex*	5-5-5	50	15.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PYAS	*Pyrola asarifolia*	7-7-7	50	18.7
GELI2	*Geocaulon lividum*	7-7-7	50	18.7
ADMO	*Adoxa moschatellina*	4-4-4	50	14.1
ORSE	*Orthilia secunda*	3-3-3	50	12.2
EQSC	*Equisetum scirpoides*	3-3-3	50	12.2
PYMI	*Pyrola minor*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	8-8-8	50	20.0
BORO	*Boschniakia rossica*	3-4-5	100	20.0
EQSC	*Equisetum scirpoides*	5-5-5	50	15.8
GABO2	*Galium boreale*	3-3-3	50	12.2
GORE2	*Goodyera repens*	3-3-3	50	12.2
PYGR	*Pyrola grandiflora*	3-3-3	50	12.2
COPA28	*Comarum palustre*	2-2-2	50	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	2-2.5-3	100	15.8
ACDE2	*Aconitum delphiniifolium*	3-3-3	50	12.2
POAL11	*Polygonum alpinum*	2-2-2	50	10.0
CHAN9	*Chamerion angustifolium*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	40-40-40	50	44.7
RUAR	*Rubus arcticus*	9-9-9	50	21.2
RUCH	*Rubus chamaemorus*	5-5-5	50	15.8
LIBO3	*Linnaea borealis*	5-5-5	50	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	5-8.5-12	100	29.2
LEGR	*Ledum groenlandicum*	7-7-7	100	26.5
CHCA2	*Chamaedaphne calyculata*	4-5.5-7	100	23.5
RITR	*Ribes triste*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SABE2	*Salix bebbiana*	25-25-25	50	35.4
ROAC	*Rosa acicularis*	4-7-10	100	26.5
BETUL	*Betula*	4-4-4	50	14.1
BEGL	*Betula glandulosa*	3-3-3	50	12.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	8-53-98	100	72.8
SAIN3	*Salix interior*	15-15-15	50	27.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	10-10-10	50	22.4
PIMA	*Picea mariana*	5-5-5	50	15.8
BENE4	*Betula neoalaskana*	3-3-3	50	12.2

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-5-5	50	15.8

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	8-8-8	100	28.3
BENE4	*Betula neoalaskana*	5-5.5-6	100	23.5

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	18-18-18	50	30.0
BENE4	*Betula neoalaskana*	10-10-10	50	22.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	41-76-129	3.3-7-11.8	32-45-67	5	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
19-19-19	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—28-32.5-37

Community Phase 2TP

Rooting Depth (cm): Min 5, RV 20, Max 35

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min 5, RV 17.5, Max 30

Texture: Slightly decomposed plant material, stratified mucky peat and very fine sandy loam

AWC (cm/cm): Min 0.25, RV 0.32, Max 0.35

pH: Min 7.8, RV 7.8, Max 7.8

Subsurface Layer

Thickness (cm): Min 0, RV 2.5, Max 5

Texture: Permanently frozen sandy loam

AWC (cm/cm): Min 0.15, RV 0.15, Max 0.15

pH: Min 8.4, RV 8.4, Max 8.4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
4-4	20-40	25-30	15-15	0-5	0-0	0-5

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	3-4	---	---
FM (4-24 inches)	---	2-80	---	---
FT (>24 inches)	---	15-6	---	---
SD (<8 inches)	---	---	10-6	---
SL (8-36 inches)	---	---	4-6	---
SM (3-10 feet)	---	---	20-20	---
ST (>10 feet)	---	---	95-95	---
TT (>40 feet)	---	---	---	15-15

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	5-5-5	50	15.8
MOUN2	*Moneses uniflora*	1-2-3	100	14.1
GABO2	*Galium boreale*	4-4-4	50	14.1
PYROL	*Pyrola*	3-3-3	50	12.2
LIBO4	*Listera borealis*	3-3-3	50	12.2
GORE2	*Goodyera repens*	3-3-3	50	12.2
SOMU	*Solidago multiradiata*	2-2-2	50	10.0
PYAS	*Pyrola asarifolia*	2-2-2	50	10.0
ARTI	*Artemisia tilesii*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQUIS	*Equisetum*	80-80-80	50	63.2
EQAR	*Equisetum arvense*	50-50-50	50	50.0
MEPA	*Mertensia paniculata*	6-6-6	50	17.3
CYPA5	*Cypripedium passerinum*	4-4-4	50	14.1
BORO	*Boschniakia rossica*	1-2-3	100	14.1
THALI2	*Thalictrum*	2-2-2	50	10.0
ACDE2	*Aconitum delphiniifolium*	2-2-2	50	10.0
GABO2	*Galium boreale*	2-2-2	50	10.0
PAPA8	*Parnassia palustris*	2-2-2	50	10.0
PLHY2	*Platanthera hyperborea*	2-2-2	50	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COSE5	*Corydalis sempervirens*	15-15-15	50	27.4
MEPA	*Mertensia paniculata*	6-6-6	50	17.3
ACDE2	*Aconitum delphiniifolium*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	7-8.5-10	100	29.2
RUAR	*Rubus arcticus*	6-6-6	50	17.3
EQSC	*Equisetum scirpoides*	2-2-2	50	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	6-6-6	100	24.5
VIED	*Viburnum edule*	7-7-7	50	18.7
RIBES	*Ribes*	4-4-4	50	14.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VIED	*Viburnum edule*	20-20-20	50	31.6

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	75-85-95	100	92.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-5-5	50	15.8

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	15-27.5-40	100	52.4

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	137-166-189	11.2-15-18.3	68-88-110	6	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
9-64.5-120	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other	Other	Unknown
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—19-26-33

Community Phase HCPC

Rooting Depth (cm): Min RV Max
5 87.6 215

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 23.6 80

Texture: Peat, slightly decomposed plant material, water

AWC (cm/cm): Min RV Max
0.25 0.34 0.35

pH: Min RV Max
5.3 6.6 7.8

Subsurface Layer

Thickness (cm): Min RV Max
5 64 135

Texture: Permanently frozen silt loam, peaty silt loam, highly decomposed plant material, silt loam, mucky peat, fine sandy loam, peat, very fine sandy loam

AWC (cm/cm): Min RV Max
0.16 0.27 0.4

pH: Min RV Max
5.7 7.2 8.2

Influencing Water Features

NWI Code: PEM1

NWI Description: Palustrine, Emergent, Persistent

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	0-90	5-80	0-10	0-3	0-0	0-100

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-9	---	---	---
FD (<4 inches)	---	0.1-5	---	---
FM (4-24 inches)	---	10-5	---	---
FT (>24 inches)	---	3-3	---	---
SD (<8 inches)	---	---	10-10	---
SL (8-36 inches)	---	---	10-5	---
ST (>10 feet)	---	---	2-60	---
TR (<15 feet)	---	---	---	3-3
TM (15-40 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	25-25

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CATE5	*Carex tenuiflora*	70-70-70	8	24.2
CAAQ	*Carex aquatilis*	5-35-65	17	24.2
CACO10	*Carex concinna*	9-12-15	17	14.1
CAPO	*Carex podocarpa*	15-15-15	8	11.2

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	80-80-80	8	25.8
CAUT	*Carex utriculata*	45-45-45	8	19.4
ELMA7	*Elymus macrourus*	0.1-17.6-35	17	17.1
BRCI2	*Bromus ciliatus*	35-35-35	8	17.1
GLGR	*Glyceria grandis*	25-25-25	8	14.4
CAAQ	*Carex aquatilis*	25-25-25	8	14.4
CACA4	*Calamagrostis canadensis*	1-7.7-20	25	13.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	0.1-4.7-10	25	10.8
COPA28	*Comarum palustre*	3-6.5-10	17	10.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	3-30.8-85	33	32.0
EQPR	*Equisetum pratense*	35-37.5-40	17	25.0
HEAL	*Hedysarum alpinum*	2-12.5-40	33	20.4
GABO2	*Galium boreale*	0.1-6.7-10	50	18.3
METR3	*Menyanthes trifoliata*	35-35-35	8	17.1
COPA28	*Comarum palustre*	3-7.7-15	25	13.8
EQSC	*Equisetum scirpoides*	0.1-10.1-20	17	12.9
MEPA	*Mertensia paniculata*	1-4.8-10	33	12.6
BORO	*Boschniakia rossica*	0.1-2-3	50	10.1
GELI2	*Geocaulon lividum*	1-5.5-10	17	9.6

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	60-60-60	8	22.4
MEPA	*Mertensia paniculata*	5-5-5	25	11.2
ACDE2	*Aconitum delphiniifolium*	1-3.8-7	33	11.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LIBO3	*Linnaea borealis*	2-6-10	67	20.0
ARRU	*Arctostaphylos rubra*	1-4.4-10	58	16.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	10-11.8-15	33	19.8
VIED	*Viburnum edule*	5-7.5-10	17	11.2
SHCA	*Shepherdia canadensis*	1-3.2-5	33	10.4
LEGR	*Ledum groenlandicum*	2-4-5	25	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-27.5-45	17	21.4
VIED	*Viburnum edule*	1-7.8-15	42	18.0
ROAC	*Rosa acicularis*	7-13-20	25	18.0
COSES	*Cornus sericea ssp. sericea*	1-5.5-10	17	9.6

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-37-60	42	39.3
SABE2	*Salix bebbiana*	2-5-8	17	9.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-7.1-15	58	20.4

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	25-42.1-60	58	49.6

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	93-141-290	7-10-12.3	53-64-82	20	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
75-128.5-160	7

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other woody plants	Other	Summer
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Moose	Unknown
Slight use	Other woody plants	Other	Unknown
Slight use	Other woody plants	Other	Winter
Slight use	Willows	Moose	Unknown
Slight use	Willows	Other	Winter
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—12; plant species per stop (min-avg-max)—7-22.2-44

Community Phase HCPCP

Rooting Depth (cm):	Min	RV	Max
	0	55.2	97

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	12.4	21

Texture: Mucky peat, peat, slightly decomposed plant material

AWC (cm/cm):	Min	RV	Max
	0.25	0.32	0.35

pH:	Min	RV	Max
	5.9	7.1	8.3

Subsurface Layer

Thickness (cm):	Min	RV	Max
	0	42.8	76

Texture: Silt loam, mucky peat, fine sandy loam, very fine sandy loam

AWC (cm/cm):	Min	RV	Max
	0.15	0.27	0.4

pH:	Min	RV	Max
	6.9	7.5	8.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-3	25-95	5-20	0-10	0-3	0-0	0-25

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.01-0.01	---	---	---
FD (<4 inches)	---	1-30	---	---
FM (4-24 inches)	---	0.01-3	---	---
SD (<8 inches)	---	---	1-1	---
SL (8-36 inches)	---	---	1-8	---
ST (>10 feet)	---	---	35-35	---
TR (<15 feet)	---	---	---	0.01-0.01
TM (15-40 feet)	---	---	---	3-35
TT (>40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CATE5	*Carex tenuiflora*	40-40-40	17	25.8
CAREX	*Carex*	0-6.7-10	50	18.3
CAST10	*Carex stylosa*	15-15-15	17	15.8
ARLA2	*Arctagrostis latifolia*	5-6.5-8	33	14.7
CALAM	*Calamagrostis*	5-5-5	17	9.1
CABI5	*Carex bigelowii*	5-5-5	17	9.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAQ	*Carex aquatilis*	85-85-85	17	37.6

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	2-15.6-40	83	36.1
EQVA	*Equisetum variegatum*	10-10-10	17	12.9
ORSE	*Orthilia secunda*	2-2.3-3	50	10.8

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	2-6.8-10	67	21.2
GABO2	*Galium boreale*	3-6-10	50	17.3
EQPR	*Equisetum pratense*	15-15-15	17	15.8
ACDE2	*Aconitum delphiniifolium*	0.1-2.6-5	83	14.8
GELI2	*Geocaulon lividum*	0-3.4-10	50	13.0
EQVA	*Equisetum variegatum*	10-10-10	17	12.9
BORO	*Boschniakia rossica*	0-1.8-3	83	12.3
EQAR	*Equisetum arvense*	8-8-8	17	11.5
SAAN3	*Saussurea angustifolia*	2-2.5-3	33	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARRU	*Arctostaphylos rubra*	1-8.8-20	67	24.2
LIBO3	*Linnaea borealis*	1-5-15	67	18.3
ANPO	*Andromeda polifolia*	6-6-6	17	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	10-23.3-35	50	34.2
MYGA	*Myrica gale*	60-60-60	17	31.6
LEGR	*Ledum groenlandicum*	7-14-20	50	26.5
SHCA	*Shepherdia canadensis*	2-4.5-8	67	17.3
VAUL	*Vaccinium uliginosum*	0.1-4.7-8	50	15.3
CHCA2	*Chamaedaphne calyculata*	1-3.7-7	50	13.5
SAPU15	*Salix pulchra*	8-8-8	17	11.5
LEDUM	*Ledum*	5-5-5	17	9.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	25-40-55	50	44.7
ARRU	*Arctostaphylos rubra*	25-25-25	17	20.4
BEGL	*Betula glandulosa*	10-10-10	17	12.9
ROAC	*Rosa acicularis*	7-7-7	17	10.8

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	50-50-50	17	28.9
ALVIF	*Alnus viridis ssp. fruticosa*	10-22.5-35	33	27.4
SALIX	*Salix*	7-7-7	17	10.8
SABE2	*Salix bebbiana*	5-5-5	17	9.1
SAIN3	*Salix interior*	5-5-5	17	9.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	0-3.2-10	100	17.8

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-21.2-35	67	37.6

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-20-35	67	36.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	63-156-211	6.2-12-73.5	32-43-56	15	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
21-65.9-85	5

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use			Unknown
Slight use	Other woody plants	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—16-28.7-41

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Populus balsamifera*
Ecological Classification ID: F231XY197AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways of terraces

Slope (percent):	Min	Max
	1	15

Elevation (feet):	Min	Max
	623	984

Range of Aspect Direction: All aspects

Water Table Depth (cm) :	Min	Max
	0	0

Flooding:	Frequency	Duration
	Occasional	Brief

Ponding: None
Runoff: Low

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	16

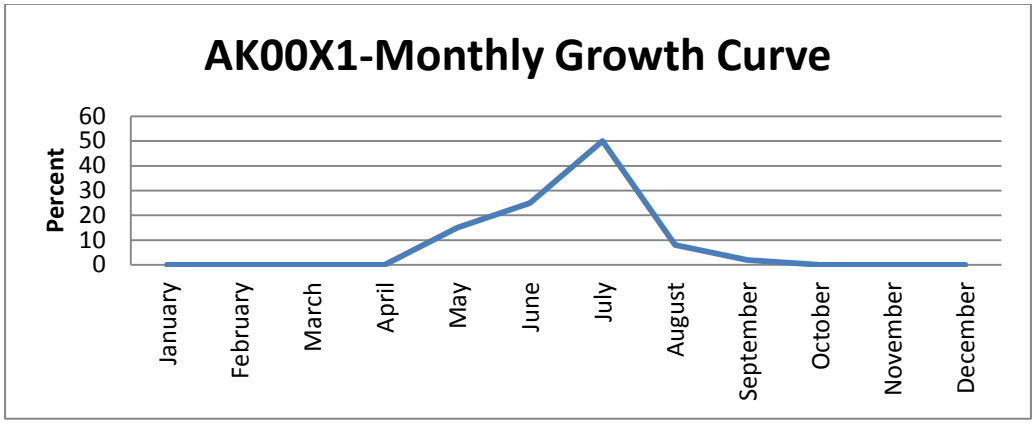
Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31YV1—D31-Boreal forest loamy mid flood plains
D31YV8—D31-Boreal forest loamy mid flood plains

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents
Dominant Parent Material: Organic material over loamy alluvium
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	15	38	65

pH:	Low	RV	High
	4	7.7	8.2

Effective CEC (me/100g):	Low	High
	22.9	52.8

CEC (me/100g):	Min	RV	Max
	2.1	22.4	62

Organic Matter (percent):	Low	RV	High
	1	27.7	80

Bulk Density (1/3-Bar):	Min	RV	Max
	1.14	1.2	1.42

Plant Community Phases

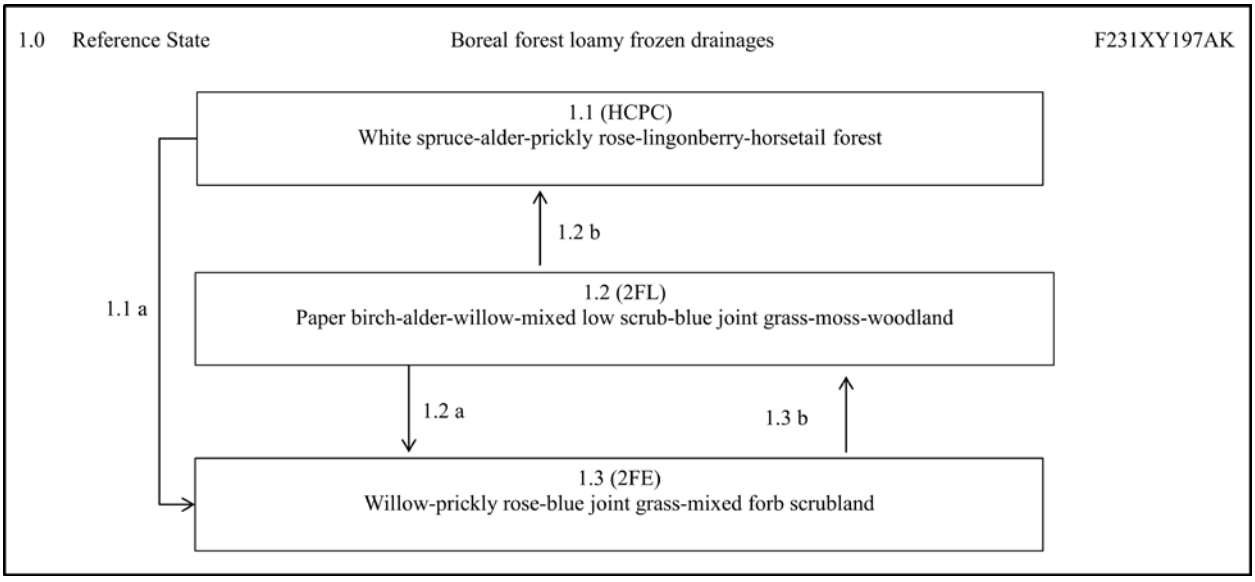
Ecological Site Description ID:	F231XY197AK

Ecological Dynamics of the Site:

This boreal ecological site is in lowland drainageways on flood plain terraces. These loamy soils have permafrost, are saturated, and generally are in less sloping areas (<10% slopes). The soils in community phase 1.1 are classified as Aquorthels and are composed of organic material over loamy alluvium. The climax phase community is characterized as a white spruce forest with dense shrub understory directly adjacent to flowing water. As the drainageways do not have unvegetated bars, flooding was not included as a disturbance regime.

Fire is an observed disturbance regime that resulted in three phases. No alternate states were observed. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. For this ecological site, high-severity fire events are considered more typical than low-severity fire events. Low-severity and high-severity fire events appear to cause differences in the depth of the organic material on the soil surface, the presence and/or depth to permafrost, and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of structure and dominance of deciduous and coniferous trees and shrubs, which are believed to be directly related to the time since the last fire event and the severity of the burn. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost often drops out of the soil profile, and the sites become drier. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White Spruce-Alder-Prickly Rose-Lingonberry-Horsetail Forest

Community Phase Narrative:
The majority of the tree cover is in the tall tree stratum (total mature tree cover ~40%). *Picea glauca* is the dominant tree species, but *Betula neoalaskana* and *Populus balsamifera* are also present. The majority of the shrub cover is in the tall and low shrub strata (total shrub cover ~60%). Common shrubs include *Alnus incana*, *Rosa acicularis*, and *Vaccinium vitis-idaea*. Forbs (~35% cover) are more abundant than graminoids (~15% cover). Common forbs and graminoids include *Equisetum arvense, Geocaulon lividum,* and *Arctagrostis latifolia.* Lichen are not present, and the moss cover is minimal (~15%). One observation of this phase was conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. White spruce is the dominant tree species. For this ecological site, this phase has the longest fire return interval.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Paper Birch-Alder-Willow-Mixed Low Scrub-Blue Joint Grass-Moss-Woodland

Community Phase Narrative:
The majority of the tree cover is in the medium tree stratum (total mature tree cover ~15%). *Betula neoalaskana* is the dominant tree species, but *Picea mariana* is also present. The majority of the shrub cover is in the tall and low shrub strata (total shrub cover ~60%). Common shrubs include *Alnus incana*, *Salix sp.*, and *Rosa acicularis*. Graminoids are abundant (~45% cover), and the most common species is *Calamagrostis canadensis*. Forbs and lichen are minor vegetative components. Moss is common (~45% cover). Three observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire. Paper birch is the dominant tree species.
1.2b	Normal time and growth without fire. Paper birch will eventually be replaced by white spruce, resulting in a community resembling that of community phase 1.1. The fire return interval is presumed to be shorter than that of community phase 1.1 but longer than that of community phase 1.3.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Willow-Blue Joint Grass-Mixed Forb Scrubland

Community Phase Narrative:	
Charred and dead trees are common. The tree cover is minimal (~2% cover), and the only tree species observed is *Betula neoalaskana*. The majority of the shrub cover is in the medium and low strata (total shrub cover 20%). The most common shrubs are *Salix sp*. Graminoids (~45% cover) and forbs are abundant (~20% cover). The most common graminoid is *Calamagrostis canadensis*, and the most common forbs are *Chamerion angustifolium* and *Equisetum arvense*. Moss and lichen are minor vegetative components. Two observations of this community phase were conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth without fire. Graminoid and forb cover decreases. Paper birch seedlings mature and overall cover increases, resulting in a community that resembles that of community phase 1.2. If this phase burns, the resulting community would likely resemble that of community phase 1.3.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm):	Min	RV	Max
	58	63.5	69

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	1	2

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.25 0.29 0.33

pH: Min RV Max
6.8 7.1 7.4

Subsurface Layer

Thickness (cm): Min RV Max
58 62.5 67

Texture: Extremely gravelly fine sandy loam, silt loam

AWC (cm/cm): Min RV Max
0.06 0.14 0.25

pH: Min RV Max
7.1 7.1 7.2

Influencing Water Features

NWI Code: PEM1

NWI Description: Palustrine, Emergent, Persistent

Rosgen Classification: Steep, entrenched, cascading step-pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	0-30	10-50	7-20	2-3	1-50	10-15

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	55-55	---	---	---
FD (<4 inches)	---	0.01-5	---	---
FM (4-24 inches)	---	0.01-2	---	---
SD (<8 inches)	---	---	0.01-0.01	---
SL (8-36 inches)	---	---	1-5	---
SM (3-10 feet)	---	---	2-7	---
TR (<15 feet)	---	---	---	0.01-2
TM (15-40 feet)	---	---	---	1-1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERAN6	*Eriophorum angustifolium*	2-2-2	50	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	35-45-55	100	67.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	5-5-5	50	15.8
EQAR	*Equisetum arvense*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	7-11-15	100	33.2
EQAR	*Equisetum arvense*	10-10-10	50	22.4
ARTI	*Artemisia tilesii*	2-2-2	50	10.0
GABO2	*Galium boreale*	2-2-2	50	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAR27	*Salix arctica*	5-5-5	50	15.8
ALINT	*Alnus incana ssp. tenuifolia*	3-3-3	50	12.2
VAUL	*Vaccinium uliginosum*	2-2-2	50	10.0
LEGR	*Ledum groenlandicum*	2-2-2	50	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	13-13-13	50	25.5
SAAR27	*Salix arctica*	7-7-7	50	18.7
PEFL15	*Pentaphylloides floribunda*	3-3-3	50	12.2
ROAC	*Rosa acicularis*	3-3-3	50	12.2
PEFL15	*Pentaphylloides floribunda*	3-3-3	50	12.2
SAIN3	*Salix interior*	3-3-3	50	12.2
SABE2	*Salix bebbiana*	2-2-2	50	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	2-2-2	50	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—9-17.5-26

Community Phase 2FL

Rooting Depth (cm): Min 20 RV 50.3 Max 87

Restrictive Feature: Permafrost

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min 0 RV 5 Max 9

Texture: Silt loam, stratified silt and peat

AWC (cm/cm): Min 0.24 RV 0.31 Max 0.35

pH: Min 5.5 RV 5.6 Max 5.7

Subsurface Layer

Thickness (cm): Min 20 RV 45.3 Max 78

Texture: Silt loam

AWC (cm/cm): Min 0.14 RV 0.22 Max 0.25

pH: Min 4.7 RV 5.6 Max 6.4

Influencing Water Features

NWI Code: R3UB3

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools; entrenched, meandering riffle/pool channel of low-gradient with high W/D ratio; steep, entrenched, cascading step-pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-1	15-75	15-85	3-10	1-3	0-0	10-10

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	55-55	---	---	---
FD (<4 inches)	---	7-7	---	---
SD (<8 inches)	---	---	0.1-5	---
SL (8-36 inches)	---	---	10-7	---
ST (>10 feet)	---	---	10-10	---
TR (<15 feet)	---	---	---	0.1-2
TM (15-40 feet)	---	---	---	15-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-43.3-60	100	65.8
ARLA2	*Arctagrostis latifolia*	10-10-10	33	18.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RANUN	*Ranunculus*	7-7-7	33	15.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	10-10-10	33	18.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANRI	*Anemone richardsonii*	10-10-10	33	18.3
VAVI	*Vaccinium vitis-idaea*	3-4-5	67	16.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	25-25-25	33	28.9
ROAC	*Rosa acicularis*	3-5-7	100	22.4
VAUL	*Vaccinium uliginosum*	2-4-5	100	20.0
RITR	*Ribes triste*	0.1-5.1-10	67	18.3
SAPU15	*Salix pulchra*	10-10-10	33	18.3
LEGR	*Ledum groenlandicum*	1-2-3	67	11.5
CHCA2	*Chamaedaphne calyculata*	1-1.5-2	67	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SABE2	*Salix bebbiana*	10-10-10	33	18.3
SAPU15	*Salix pulchra*	5-5-5	33	12.9
SAALL	*Salix alaxensis var. longistylis*	5-5-5	33	12.9

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	15-17.5-20	67	34.2
SAAR3	*Salix arbusculoides*	10-12.5-15	67	28.9
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	33	12.9
SABE2	*Salix bebbiana*	5-5-5	33	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	2-3-5	100	17.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	7-10.7-15	100	32.7
PIMA	*Picea mariana*	2-3-5	100	17.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—13-21.3-30

Community Phase HCPC

Rooting Depth (cm): Min RV Max
84 84 84

Restrictive Feature: Permafrost

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Silt loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
6.6 6.6 6.6

Subsurface Layer

Thickness (cm): Min RV Max
84 84 84

Texture: Extremely gravelly fine sandy loam, silt loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
6.4 6.5 6.5

Influencing Water Features

NWI Code: R3UB3

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Entrenched, “gully” step-pool channel on moderate gradients with low W/D ratio

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-1	15-15	35-35	10-10	35-35	0-0	10-10

Percent Canopy Cover by Height Class and Type (Min-Max):

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
GT (>24 inches)	10-5	---	---	---
FD (<4 inches)	---	0.1-1	---	---
FM (4-24 inches)	---	0.1-20	---	---
FT (>24 inches)	---	5-5	---	---
SD (<8 inches)	---	---	0.1-10	---
SL (8-36 inches)	---	---	0.1-20	---
ST (>10 feet)	---	---	10-8	---
TR (<15 feet)	---	---	---	10-3
TM (15-40 feet)	---	---	---	2-20
TT (>40 feet)	---	---	---	20-20

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POPRA6	*Poa pratensis ssp. alpigena*	2-2-2	100	14.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARLA2	*Arctagrostis latifolia*	10-10-10	100	31.6
CACA4	*Calamagrostis canadensis*	5-5-5	100	22.4

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PYGR	*Pyrola grandiflora*	1-1-1	100	10.0
HEAL	*Hedysarum alpinum*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	20-20-20	100	44.7
GELI2	*Geocaulon lividum*	10-10-10	100	31.6
ARTI	*Artemisia tilesii*	1-1-1	100	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	5-5-5	100	22.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	10-10-10	100	31.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	20-20-20	100	44.7
RITR	*Ribes triste*	2-2-2	100	14.1

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	15-15-15	100	38.7
ALVIF	*Alnus viridis ssp. fruticosa*	10-10-10	100	31.6
SAAR3	*Salix arbusculoides*	8-8-8	100	28.3
SABE2	*Salix bebbiana*	2-2-2	100	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	10-10-10	100	31.6
POBA2	*Populus balsamifera*	3-3-3	100	17.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	20-20-20	100	44.7
POBA2	*Populus balsamifera*	2-2-2	100	14.1
BENE4	*Betula neoalaskana*	2-2-2	100	14.1

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	20-20-20	100	44.7

Site Tree Measurements: Not measured

Tree Basal Area:

Min-Avg-Max	Number of Stands
80-80-80	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—30-30-30

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site

Ecological Classification Name: Alpine Dwarf Scrub- Lichen Mosaic Gravelly Hummock

Ecological Classification ID: R231XY101AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Nonsorted circles, solifluction lobes, sorted circles, stripes, and turf hummocks on mountains; turf hummocks on hills

Slope (percent):	Min	Max
	1	35

Elevation (feet):	Min	Max
	3,281	5,905

Range of Aspect Direction: East to northwest (clockwise)

Water Table Depth (cm): None recorded

Flooding: None

Ponding: None

Runoff: Very low

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	15	32

Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

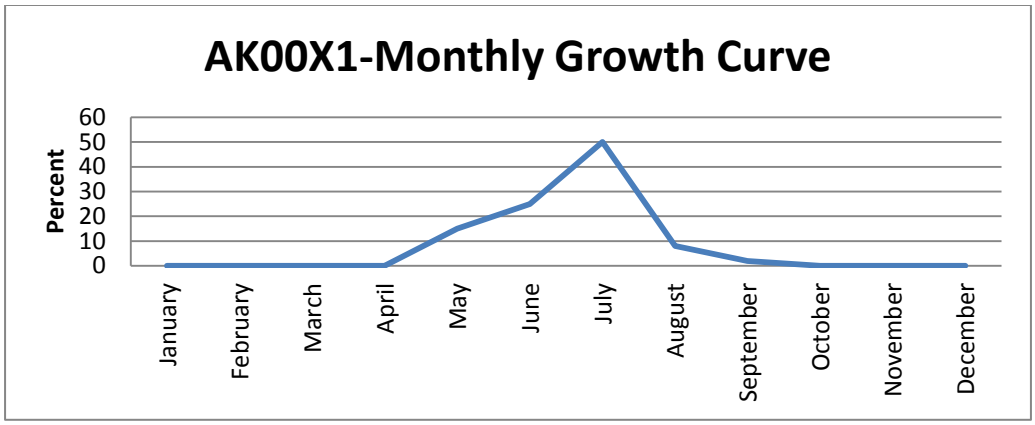
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT1—D31-Alpine scrub gravelly circles, acid
D31MT2—D31-Alpine scrub gravelly circles, acid
D31MT3—D31-Alpine scrub gravelly circles, acid
D31UC5—D31-Alpine scrub gravelly circles, acid

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts
Dominant Parent Material: Organic material over gravelly cryoturbate
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Loamy-skeletal
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	10	13	15

pH:	Low	RV	High
	4.2	5.4	6.3

Effective CEC (me/100g):	Low	High
	13.8	44.7

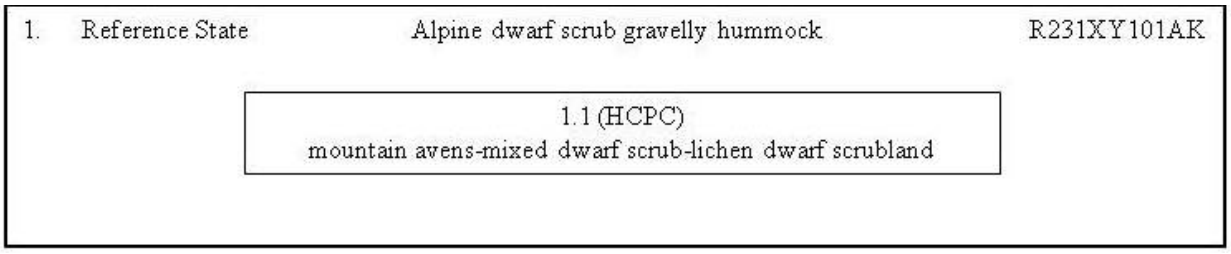
CEC (me/100g):	Min	RV	Max
	4	24	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.32

Plant Community Phases

Ecological Site Description ID:	R231XY101AK
Ecological Dynamics of the Site:	
This alpine ecological site generally is on summits and shoulders of mountains with slight slopes (<15% slopes). Earth hummocks, which are associated with cryoturbation, are common in this ecological site. Vegetated soil and surface rock generally are evenly distributed across the site. Surface rock generally is colonized by foliose and crustose lichen. Disturbance that results in other plant community phases has not been observed. This site is similar to site R231XY105AK, but site R231XY101AK has a lower pH in the parent material. The soils in community phase 1.1 are classified as Haplogelepts and are composed of organic matter over gravelly cryoturbate.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	In the climax phase, the dominant vegetation is a mixture of dwarf shrubs and lichen. Only one phase for the reference state was observed. The height of dwarf scrubs is defined as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Mountain avens-mixed dwarf scrub-lichen dwarf scrubland
Community Phase Narrative:			
The diversity and extent of the dwarf shrub cover is high (15 species; >50% cover), and common species are *Dryas octopetala*, *Salix sp*., and *Loiseleuria procumbens*. Low and medium shrubs, such as *Betula glandulosa,* are present but are not dominant vegetative components. The diversity of graminoids and forbs is high, but they are minor vegetative components. Common graminoids include *Carex bigelowii* and *Festuca altaica*. The diversity and extent of lichen is high (>20 species; >40% ground cover), but each individual species makes up a limited amount of the cover. Common lichen are *Thamnolia subliformis* and *Flavocetraria cucullata*.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	No observed pathway.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
27 54.1 106

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 2.9 5

Texture: Slightly decomposed plant material, moderately decomposed plant material, gravelly sandy loam, silt loam

AWC (cm/cm): Min RV Max
0.13 0.31 0.35

pH: Min RV Max
3.8 4.8 5.6

Subsurface Layer

Thickness (cm): Min RV Max
27 51.2 101

Texture: Cobbly loam, cobbly silt loam, gravelly sandy loam, very cobbly coarse sandy loam, very cobbly loamy coarse sand, very cobbly silt loam, very gravelly loamy coarse sand, very cobbly sandy loam, very gravelly silt loam, extremely cobbly silt loam, extremely cobbly sandy loam, very gravelly sandy loam, extremely gravelly sandy loam, silt loam, flagstones, very stony sandy loam, extremely flaggy sandy loam

AWC (cm/cm):	Min	RV	Max
	0.04	0.15	0.25

pH:	Min	RV	Max
	4.8	5.5	6.4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
20-80	5-40	3-30	0-2	0-5	5-75	0-5

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GD (<4 inches)	5-5	---	---	---
GM (4-24 inches)	10-10	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	0.01-0.01	---	---
SD (<8 inches)	---	---	0.01-25	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	2-5.5-10	33	13.5
LUCO5	*Luzula confusa*	10-10-10	8	9.1

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
FEBR	*Festuca brachyphylla*	0.1-10.3-25	67	26.2
CABI5	*Carex bigelowii*	5-6.2-12	50	17.6
FEAL	*Festuca altaica*	7-10.7-15	25	16.3
CAPO	*Carex podocarpa*	5-6-7	17	10.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANTEN	*Antennaria*	1-3-5	33	10.0
OXNI	*Oxytropis nigrescens*	1-2.2-7	42	9.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANNA	*Anemone narcissiflora*	10-10-10	8	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
DROC	*Dryas octopetala*	2-13.1-25	100	36.2
SAPH	*Salix phlebophylla*	2-12.4-25	67	28.7
LOPR	*Loiseleuria procumbens*	0-8.2-20	83	26.2
ARAL2	*Arctostaphylos alpina*	5-10.8-20	50	23.3
EMNI	*Empetrum nigrum*	1-8.6-15	58	22.4
VAVI	*Vaccinium vitis-idaea*	0-5.9-10	67	19.8
VAUL	*Vaccinium uliginosum*	0-5.6-10	58	18.0
SAAR27	*Salix arctica*	1-7.8-15	33	16.1
CATE11	*Cassiope tetragona*	0-5-15	50	15.8
DILA	*Diapensia lapponica*	6-7-8	17	10.8
LEPAD	*Ledum palustre ssp. decumbens*	6-6.5-7	17	10.4
BEGL	*Betula glandulosa*	10-10-10	8	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	1-4.4-10	42	13.5
VAUL	*Vaccinium uliginosum*	10-10-10	8	9.1

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use		Caribou	Summer
Slight use	Grasses and sedges	Caribou	Summer
Slight use	Grasses and sedges	Dall sheep	Unknown
Slight use	Other	Caribou	Spring

Notable Plants: *Stellaria alaskana, Poa porsildii*

Species Richness: Number of stops—12; plant species per stop (min-avg-max)—22-28.7-33

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site

Ecological Classification Name: Alpine Dwarf Scrub- Lichen Mosaic Gravelly Slopes, Basic

Ecological Classification ID: R231XY105AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Nonsorted circles on mountains, mountains

Slope (percent):	Min	Max
	25	75

Elevation (feet):	Min	Max
	2,953	4,921

Range of Aspect Direction: Southeast to northwest (clockwise)

Water Table Depth (cm): None recorded

Flooding: None

Ponding: None

Runoff: High

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	15	20

Mean Annual Air Temperature (°F):	Low	High
	21	25

Monthly Data:

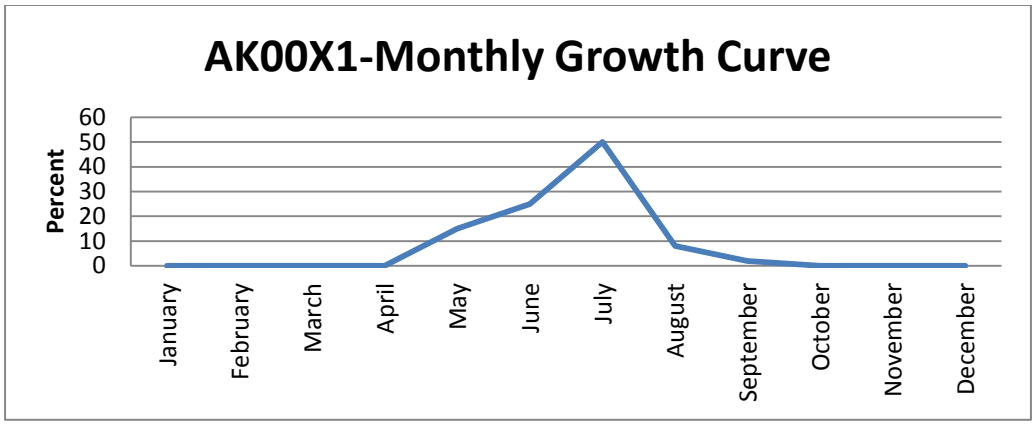
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31OM1—D31-Alpine scrub silty circles
D31OM2—D31-Alpine scrub silty circles

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, calcareous, subgelic Typic Haplogelolls

Dominant Parent Material: Loess over gravelly cryoturbate

Representative Surface Texture: Silt loam

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	10	13	16

pH:	Low	RV	High
	5.6	6.9	8.2

Effective CEC (me/100g):	Low	High
	5.7	9

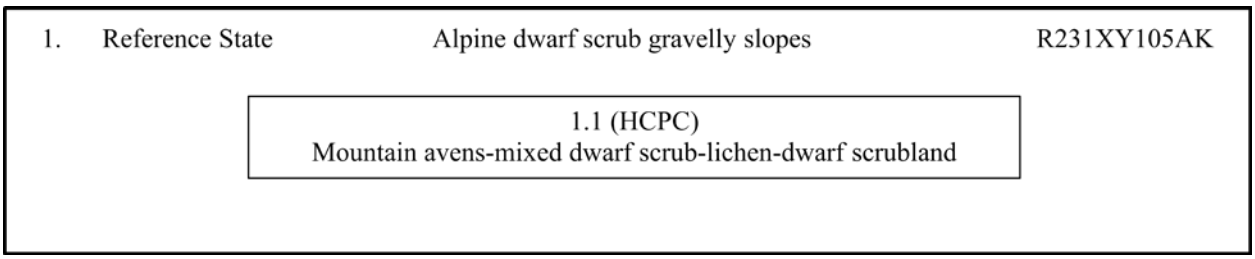
CEC (me/100g):	Min	RV	Max
	3.2	4.7	6

Organic Matter (percent):	Low	RV	High
	2	4.7	6

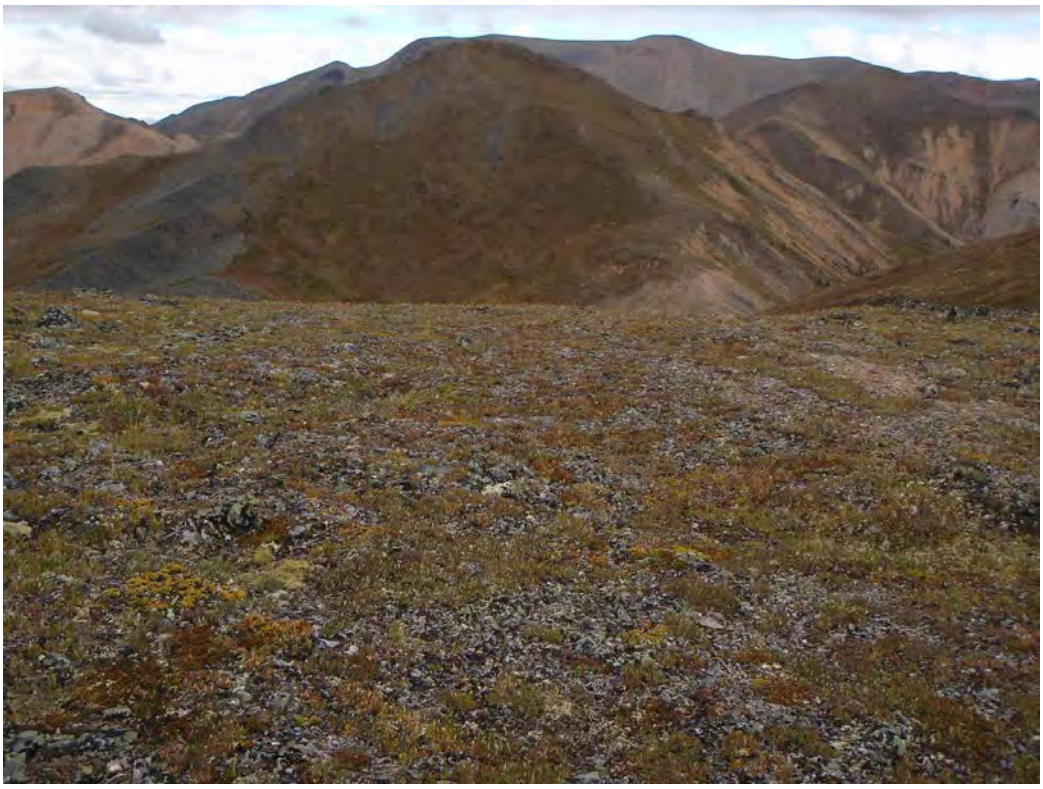
Bulk Density (1/3-Bar):	Min	RV	Max
	0.94	1.2	1.32

Plant Community Phases

Ecological Site Description ID:	R231XY105AK
Ecological Dynamics of the Site:	
This alpine ecological site is on summits, shoulders, and backslopes underlain by limestone in the Ogilvie Mountains of eastern Alaska. Earth hummocks, which are associated with cryoturbation, are common. The soils are rocky, and exposed rock fragments are common. Dwarf shrubs and fruticose lichen are the dominant vegetation. Crustose and foliose lichen generally colonize on bare surfaces or surface rocks. Disturbance resulting in additional phases of this reference state were not identified. The site is similar to site R231XY101AK, but site R231XY105AK has higher pH in the parent material. The soils in community phase 1.1 are classified as Haplogelolls and are composed of organic matter over loess and gravelly colluvium.	
State and Transition Diagram:	

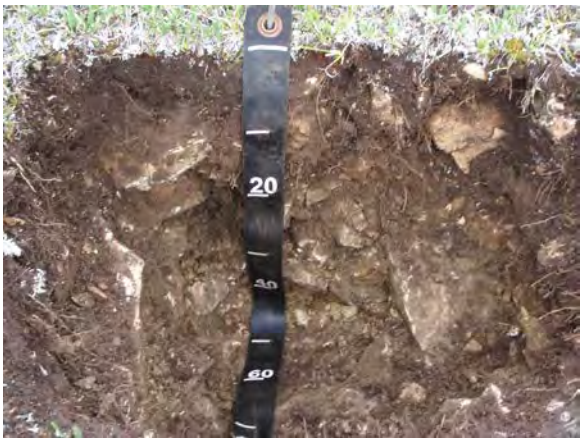


State and Transition Diagram:	1	State Name:	Reference
State Narrative:	For the climax phase, the dominant vegetation is a mixture of dwarf shrubs and lichen. The height of dwarf scrubs is defined as less than 8 inches. The reference state has one community phase.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Mountain avens-mixed dwarf scrub-lichen-dwarf scrubland
Community Phase Narrative:			
The diversity of dwarf shrubs is high (13 species), and the most abundant and common species are *Dryas octopetala*, *Cassiope tetragona*, and *Salix reticulata*. The lichen cover generally is more than 50%. The diversity of lichen is high (20 species), and the most abundant and common species are *Thamnolia subliformis, Flavocetraria cucullata, Cladina sp*., and *Dactylina arctica*. Although the diversity of graminoids and forbs is high, they are minor vegetative components. Common forbs and graminoids are *Silene acaulis* and *Carex scirpoidea.*			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	No pathways observed.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC



Rooting Depth (cm): Min RV Max
12 49.6 93

Restrictive Feature: Lithic bedrock

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
0 1.9 11

Texture: Gravelly silt loam, silt loam, sandy loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.14 0.28 0.35

pH: Min RV Max
5 6.7 8.2

Subsurface Layer

Thickness (cm): Min RV Max
12 47.7 82

Texture: Bedrock, gravelly fine sandy loam, cobbles, gravelly loam, cobbly fine sandy loam, cobbly silt loam, cobbly sandy loam, gravelly silt loam, gravelly sandy loam, very gravelly coarse sandy loam, very gravelly fine sandy loam, very cobbly silt loam, very cobbly sandy loam, extremely cobbly fine sandy loam, very gravelly silt loam, extremely cobbly silt loam, extremely cobbly sandy loam, very gravelly sandy loam, very gravelly very fine sandy loam, extremely gravelly coarse sand, extremely gravelly sandy loam, silt loam, extremely channery sandy loam, stony silt loam, very stony fine sandy loam, very stony silt loam, gravel, extremely stony sandy loam

AWC (cm/cm): Min RV Max
0.02 0.17 0.25

pH: Min RV Max
5.6 7.2 8.4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-90	2-65	2-55	0-0	0-5	1-95	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GD (<4 inches)	2-2	---	---	---
FD (<4 inches)	---	0.01-2	---	---
SD (<8 inches)	---	---	0.01-7	---
ST (>10 feet)	---	---	1-1	---
TS (<15 feet)	---	---	---	0.01-0.01

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CASC10	*Carex scirpoidea*	1-5.8-15	69	20.1
CAPO	*Carex podocarpa*	1-7.9-15	31	15.6
FEAL	*Festuca altaica*	1-6.4-10	27	13.2
FEBR	*Festuca brachyphylla*	1-3.2-5	35	10.6

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SIAC	*Silene acaulis*	0-3-10	81	15.4
OXNI	*Oxytropis nigrescens*	1-4.1-10	54	14.8
TOCO	*Tofieldia coccinea*	0-2.6-5	62	12.6
POVI3	*Polygonum viviparum*	0-2.1-5	58	11.1
SAOP	*Saxifraga oppositifolia*	0-1.9-8	50	9.7
MIYU	*Minuartia yukonensis*	0.1-3.3-15	27	9.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LUAR2	*Lupinus arcticus*	1-6.4-10	31	14.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
DROC	*Dryas octopetala*	2-40.1-65	100	63.3
CATE11	*Cassiope tetragona*	0-7.9-45	69	23.5
SARE2	*Salix reticulata*	0-9.7-25	50	22.0
SAAR27	*Salix arctica*	1-8.1-35	46	19.3
SAPH	*Salix phlebophylla*	2-7.6-15	27	14.3
RHLA2	*Rhododendron lapponicum*	1-5.6-10	27	12.2
VAUL	*Vaccinium uliginosum*	1-5-10	27	11.6
LOPR	*Loiseleuria procumbens*	1-6.2-15	19	10.9
EMNI	*Empetrum nigrum*	0-4.8-15	23	10.6
ARAL2	*Arctostaphylos alpina*	0-2.9-7	35	10.0
VAVI	*Vaccinium vitis-idaea*	1-2.4-7	35	9.2

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Lichen	Dall sheep	Summer
No observed use			Not grazed/browsed
Slight use	Forbs, ferns, and	Dall sheep	Summer
Slight use	Grasses and sedges	Other	Unknown
Slight use	Lichen	Dall sheep	Summer
Unknown			Unknown

Notable Plants: *Minuartia yukonensis*

Species Richness: Number of stops—26; plant species per stop (min-avg-max)—20-32.2-44

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Scrub Gravelly Slopes, Dry
Ecological Classification ID: R231XY109AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Escarpments

Slope (percent):	Min	Max
	50	100

Elevation (feet):	Min	Max
	643	1,332

Range of Aspect Direction: Southeast to west (clockwise)
Water Table Depth (cm): None recorded
Flooding: None
Ponding: None
Runoff: High

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	20

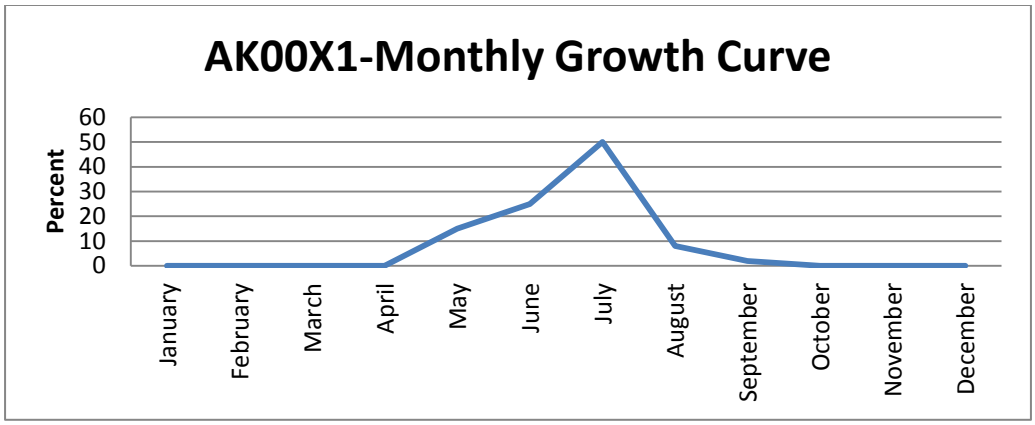
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH2—D31-Boreal scrub rocky colluvial escarpments
D31LB2—D31-Boreal scrub rocky colluvial escarpments

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive Ustic Calcicryepts

Dominant Parent Material: Gravelly colluvium

Representative Surface Texture: Silt loam

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	6	13	19

pH:	Low	RV	High
	6.5	7.8	9.6

Effective CEC (me/100g):	Low	High
	5.7	9

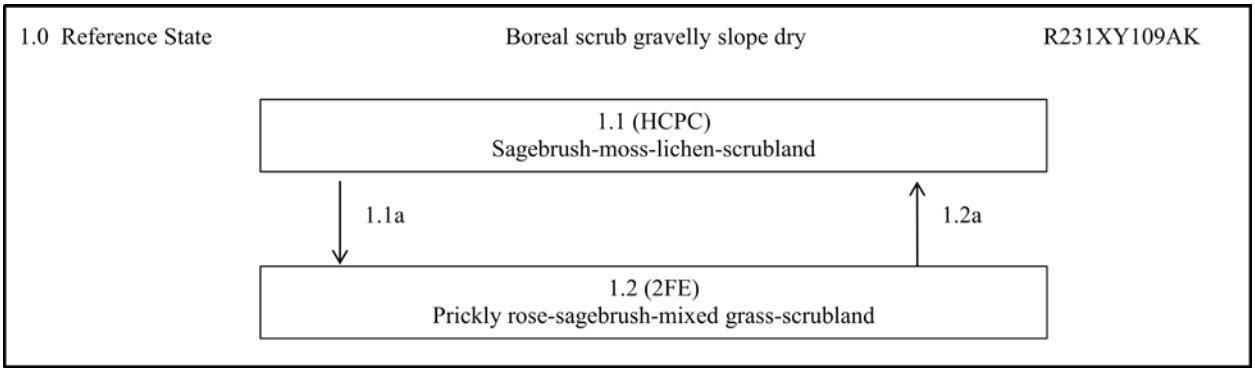
CEC (me/100g):	Min	RV	Max
	5.1	6.9	9.1

Organic Matter (percent):	Low	RV	High
	2	3.3	6

Bulk Density (1/3-Bar):	Min	RV	Max
	1.08	1.1	1.26

Plant Community Phases

Ecological Site Description ID:	R231XY109AK
Ecological Dynamics of the Site:	
This boreal ecological site is on very steep, south-facing slopes of escarpments (slopes average 80%). The soils have an argillite lithology and are unstable. The soils in community phase 1.1 are classified as Calcicryepts and are composed of gravelly colluvium. Fire resulted in two documented phases. Fire is a natural and typically unmanaged disturbance regime.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Phases in the reference state were grouped according to the time since the last disturbance. As the time since the last fire increases, grasses become less dominant and sagebrush becomes more dominant. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Sagebrush-Moss-Lichen-Scrubland
Community Phase Narrative:			
The dominant vegetation is sagebrush. The tree cover is present in trace amounts, and the only species observed is *Populus tremuloides*. Shrubs make up ~60% cover and are primarily in the dwarf and medium shrub strata. The most common species is *Artemisia frigida*. Graminoids and forbs are minor vegetative components. Moss and lichen are evenly distributed, covering ~50% of the ground surface.			
Community Pathways			

Pathway Number:	Pathway Name & Description:
1.1a	Fire. The soils are well drained, and fire appears to consume the organic matter. Due to the steepness slope and loss of vegetation, fire might increase the likelihood of landslides.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Prickly Rose-Sagebrush-Mixed grass-Scrubland
Community Phase Narrative:			
The dominant vegetation is a mixture of shrubs and grasses. The tree cover is present in trace amounts, and the only species observed is *Populus tremuloides*. Shrubs make up ~30% cover and are primarily in the dwarf and low shrub strata. The most common low shrub is *Rosa acicularis*, and the most common dwarf shrub is *Artemisia frigida*. Grass makes up ~30% cover. The most common grass species are *Calamagrostis purpurascens* and *Elymus trachycaulus.* The diversity of forbs is high (14 species), but the overall cover is limited. Lichen and moss cover is limited as compared to phase 1.1.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Normal time and growth without fire. The plant community becomes dominantly sagebrush.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm):	Min	RV	Max
	34	63.3	87

Restrictive Feature: Paralithic bedrock

Drainage Class: Excessively drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	0	0

Texture: Silt loam, sandy loam

AWC (cm/cm):	Min	RV	Max
	0.15	0.25	0.25

pH:	Min	RV	Max
	6.9	7.4	7.9

Subsurface Layer

Thickness (cm):	Min	RV	Max
	34	63.3	87

Texture: Gravelly silt loam, very gravelly silt loam, channers, very channery silt loam, loam, extremely channery coarse sandy loam, extremely channery silt loam, flagstones, extremely parachannery sandy loam

AWC (cm/cm):	Min	RV	Max
	0.02	0.17	0.24

pH:	Min	RV	Max
	5.2	7	8.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-10	0-30	1-60	0-3	5-60	10-70	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-10	---	---	---
GT (>24 inches)	15-15	---	---	---
FM (4-24 inches)	---	1-5	---	---
SL (8-36 inches)	---	---	2-4	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ELTRS	*Elymus trachycaulus ssp. subsecundus*	40-40-40	17	25.8
ELYMU	*Elymus*	40-40-40	17	25.8
CAPU	*Calamagrostis purpurascens*	0.1-8.4-15	50	20.5

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAPU	*Calamagrostis purpurascens*	15-25-35	33	28.9
ELTRS	*Elymus trachycaulus ssp. subsecundus*	15-25-35	33	28.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GABO2	*Galium boreale*	0.1-1.5-3	100	12.4
SOMU	*Solidago multiradiata*	1-3-5	50	12.2
ACMI2	*Achillea millefolium*	1-3-5	50	12.2
PUPA5	*Pulsatilla patens*	1-1.4-2	83	10.8
SIRE3	*Silene repens*	5-5-5	17	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARFR4	*Artemisia frigida*	20-28.3-40	50	37.6
ROAC	*Rosa acicularis*	5-5-5	17	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	4-12.2-15	67	28.6
ARFR4	*Artemisia frigida*	10-10-10	17	12.9
AMAL2	*Amelanchier alnifolia*	10-10-10	17	12.9

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	10-10-10	17	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	5-5-5	17	9.1

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Unknown			Unknown

Notable Plants: *Draba densifolia, Apocynum androsaemifolium*

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—11-13.5-17

Community Phase HCPC

Rooting Depth (cm): Min RV Max
27 83.3 117

Restrictive Features: None recorded

Drainage Class: Excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Silt loam, loam, very gravelly sandy loam, very gravelly coarse sandy loam

AWC (cm/cm): Min RV Max
0.08 0.15 0.24

pH: Min RV Max
7.4 8 8.3

Subsurface Layer

Thickness (cm): Min RV Max
27 83.3 117

Texture: Gravelly loam, gravelly silt loam, very gravelly coarse sandy loam, very gravelly loam, very gravelly sandy loam

AWC (cm/cm): Min RV Max
0.09 0.17 0.24

pH: Min RV Max
5.6 7.3 8.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-40	3-45	20-30	0-7	5-35	5-8	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	4-4	---	---	---
FD (<4 inches)	---	6-6	---	---
FM (4-24 inches)	---	1-5	---	---
FT (>24 inches)	---	4-4	---	---
SM (3-10 feet)	---	---	2-60	---
TR (<15 feet)	---	---	---	2-2

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PSSPS	*Pseudoroegneria spicata ssp. spicata*	4-4-4	33	11.5
BRINP5	*Bromus inermis ssp. pumpellianus var. pumpellianus*	4-4-4	33	11.5

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERCA2	*Erigeron caespitosus*	6-6-6	33	14.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PUPA5	*Pulsatilla patens*	5-5-5	33	12.9

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POPE8	*Potentilla pensylvanica*	4-4-4	33	11.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARFR4	*Artemisia frigida*	60-60-60	33	44.7

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARFR4	*Artemisia frigida*	60-65-70	67	65.8

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—8-8.7-10

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Alpine Dwarf Scrub-Graminoid Mosaic Loamy Mound
Ecological Classification ID: R231XY113AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Solifluction lobes on mountains

Slope (percent):	Min	Max
	20	55

Elevation (feet):	Min	Max
	3,281	4,921

Range of Aspect Direction: East to west (clockwise)
Water Table Depth (cm): None recorded
Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	15	32

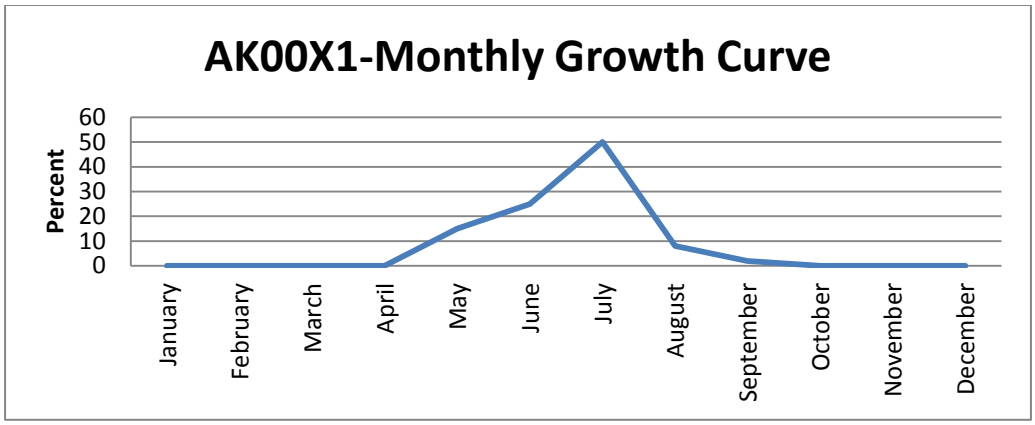
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT3—D31-Alpine low scrub loamy solifluction lobes

Characteristics of Representative Soil Components

Soil Classification: Sandy or sandy-skeletal, mixed, subgelic Oxyaquic Gelorthents

Dominant Parent Material: Organic material over gravelly cryoturbate

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Sandy or sandy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	13	20	27

pH:	Low	RV	High
	4	5.8	6.7

Effective CEC (me/100g):	Low	High
	21	50

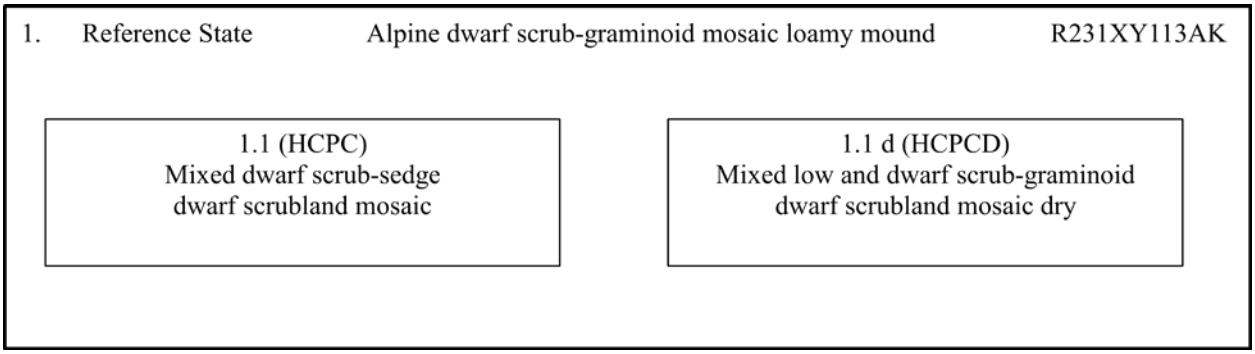
CEC (me/100g):	Min	RV	Max
	3.5	23.2	62

Organic Matter (percent):	Low	RV	High
	0.9	29	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.58

Plant Community Phases

Ecological Site Description ID:	R231XY113AK
Ecological Dynamics of the Site:	
This alpine ecological site generally is on steeper backslopes of mountains (>20% slopes). In this ecological site, cryoturbation resulted in patterned ground features known as solifluction lobes. The soils in community phase 1.1 are classified as Gelorthents and are composed of organic matter over sandy and gravelly cryoturbate. The sites are characterized by large areas of scalloped terrain. Two plant communities are associated with the solifluction lobes, occurring separately on the interlobes (community 1.1) and lobe fronts (community 1.1d). Lobe fronts are the steep faces on the downhill side of the solifluction lobes, and interlobes are the large, relatively smooth areas between the lobe fronts. Disturbances resulting in other community phases were not observed.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Interlobe vegetation is dominantly a mixture of dwarf shrubs and sedges, and lobe front vegetation is dominantly a mixture of low shrubs and graminoids. The height of dwarf scrubs is defined as less than 8 inches and the height of low scrubs is defined as 8 inches to 3 feet. The gently sloping areas associated with the interlobes have limited drainage and moister soils as compared to the areas on the lobe fronts. Ponded water generally is in interlobe communities.		

<table>
<tr><td>Phase 1.1</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.1</td><td>Community Phase Name:</td><td>Mixed dwarf scrub-sedge dwarf scrubland mosaic</td></tr>
<tr><td colspan="4">Community Phase Narrative:</td></tr>
<tr><td colspan="4">Graminoids generally exceed 30% cover. Sedges make up the majority of graminoid cover, and a common species is Carex bigelowii. The diversity and cover of dwarf shrubs is high (17 species; more than 40% cover), but the majority of the individual species makes up limited cover. The most abundant dwarf shrub species are Dryas octopetala and Empetrum nigrum. The diversity of forbs is high, but they are a minor vegetative component. Lichen and moss ground cover is limited. Three observations of this phase were conducted.</td></tr>
<tr><td colspan="4">Community Pathways</td></tr>
<tr><td>Pathway Number:</td><td colspan="3">Pathway Name & Description:</td></tr>
<tr><td>1.1a</td><td colspan="3">No pathway observed.</td></tr>
</table>

<table>
<tr><td>Phase 1.1d</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.1d</td><td>Community Phase Name:</td><td>Mixed low and dwarf scrub-graminoid dwarf scrubland mosaic dry</td></tr>
<tr><td colspan="4">Community Phase Narrative:</td></tr>
<tr><td colspan="4">Shrubs on the lobe front commonly reach a height of 1 meter. The shrub cover of the lobe front community is almost double that of the interlobe community. The diversity of the shrubs is high (12 species), and the dominant species are Betula glandulosa, Dryas octopetala, and Salix sp. The graminoid cover is more abundant than the forb cover, and it consists of a mixture of sedges and grasses. Lichen and feathermoss are abundant components of the ground cover. Two observations of this phase were conducted.</td></tr>
<tr><td colspan="4">Community Pathways</td></tr>
<tr><td>Pathway Number:</td><td colspan="3">Pathway Name & Description:</td></tr>
<tr><td>1.1a</td><td colspan="3">No pathway observed</td></tr>
</table>

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
67 67 67

Restrictive Features: None recorded

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
5 5 5

Texture: Mucky peat, slightly decomposed plant material, stony muck

AWC (cm/cm): Min RV Max
0.32 0.33 0.35

pH: Min RV Max
5.4 5.4 5.4

Subsurface Layer

Thickness (cm): Min RV Max
62 62 62

Texture: Very gravelly loamy coarse sand, very stony coarse sandy loam

AWC (cm/cm): Min RV Max
0.04 0.08 0.13

pH: Min RV Max
5.4 5.5 5.6

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
10-25	15-30	5-10	0-2	0-20	2-15	0-20

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	12-2	---	---	---
GT (>24 inches)	2-2	---	---	---
FD (<4 inches)	---	2-5	---	---
FM (4-24 inches)	---	2-7	---	---
FT (>24 inches)	---	3-3	---	---
SD (<8 inches)	---	---	18-9	---
SL (8-36 inches)	---	---	7-8	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	45-45-45	33	38.7
CAREX	*Carex*	2-11.3-20	100	33.7
ERAN6	*Eriophorum angustifolium*	10-10-10	33	18.3
HIAL3	*Hierochloe alpina*	5-5-5	33	12.9

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POVI3	*Polygonum viviparum*	5-5-5	33	12.9
PYGR	*Pyrola grandiflora*	1-1.5-2	67	10.0
TOCO	*Tofieldia coccinea*	3-3-3	33	10.0
ASUM2	*Astragalus umbellatus*	3-3-3	33	10.0
PELA14	*Pedicularis lanata*	3-3-3	33	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAN3	*Saussurea angustifolia*	7-7-7	33	15.3
POBI5	*Polygonum bistorta*	1-2.5-4	67	12.9
ACDE2	*Aconitum delphiniifolium*	3-3-3	33	10.0
SAANA3	*Saussurea angustifolia var. angustifolia*	3-3-3	33	10.0
SANEP2	*Saxifraga nelsoniana ssp. porsildiana*	3-3-3	33	10.0
ANNA	*Anemone narcissiflora*	3-3-3	33	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VACA3	*Valeriana capitata*	3-3-3	33	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	2-8.3-18	100	28.9
DRYAS	*Dryas*	25-25-25	33	28.9
DROC	*Dryas octopetala*	1-8-15	67	23.1
VAVI	*Vaccinium vitis-idaea*	2-4.3-9	100	20.8
RHLA2	*Rhododendron lapponicum*	9-9-9	33	17.3
ARAL2	*Arctostaphylos alpina*	9-9-9	33	17.3
CATE11	*Cassiope tetragona*	1-2.5-4	67	12.9
LEPAD	*Ledum palustre ssp. decumbens*	5-5-5	33	12.9
SALIX	*Salix*	5-5-5	33	12.9
LOPR	*Loiseleuria procumbens*	5-5-5	33	12.9
SAAR27	*Salix arctica*	5-5-5	33	12.9
SAPU15	*Salix pulchra*	5-5-5	33	12.9
SARE2	*Salix reticulata*	4-4-4	33	11.5

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	5-6-7	67	20.0
VAUL	*Vaccinium uliginosum*	1-4.5-8	67	17.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use			Spring
Unknown			Unknown
Unknown	Other	Caribou	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—27-29.3-31

Community Phase HCPCD

Rooting Depth (cm): Min RV Max
65 65 65

Restrictive Features: None recorded

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
7 7 7

Texture: Slightly decomposed plant material, stony slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.27 0.31 0.35

pH: Min RV Max
4.7 4.7 4.7

Subsurface Layer

Thickness (cm): Min RV Max
58 58 58

Texture: Extremely stony silt loam

AWC (cm/cm): Min RV Max
0.08 0.19 0.24

pH: Min RV Max
5.2 5.2 5.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
25-30	37-40	5-43	0-5	1-2	5-5	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-4	---	---	---
FD (<4 inches)	---	1-4	---	---
FM (4-24 inches)	---	1-4	---	---
SD (<8 inches)	---	---	10-6	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA12	*Carex capillaris*	20-20-20	50	31.6
CASC10	*Carex scirpoidea*	15-15-15	50	27.4
CABI5	*Carex bigelowii*	4-4-4	50	14.1
HIAL3	*Hierochloe alpina*	4-4-4	50	14.1
CAREX	*Carex*	1-1.5-2	100	12.2
FEBR	*Festuca brachyphylla*	2-2-2	50	10.0

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POVI3	*Polygonum viviparum*	1-2-3	100	14.1
POBI5	*Polygonum bistorta*	4-4-4	50	14.1
PELA	*Pedicularis labradorica*	3-3-3	50	12.2
CALA7	*Campanula lasiocarpa*	3-3-3	50	12.2
HUSES	*Huperzia selago var. selago*	3-3-3	50	12.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ACDE2	*Aconitum delphiniifolium*	2-3-4	100	17.3
ANNA	*Anemone narcissiflora*	3-3-3	50	12.2
SANE3	*Saxifraga nelsoniana*	2-2-2	50	10.0
ARLE2	*Arnica lessingii*	2-2-2	50	10.0
PELA14	*Pedicularis lanata*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
DROC	*Dryas octopetala*	40-40-40	50	44.7
BEGL	*Betula glandulosa*	35-35-35	50	41.8
EMNI	*Empetrum nigrum*	1-8-15	100	28.3
VAVI	*Vaccinium vitis-idaea*	0-7.5-15	100	27.4
LEPAD	*Ledum palustre ssp. decumbens*	15-15-15	50	27.4
VAUL	*Vaccinium uliginosum*	3-6.5-10	100	25.5
SAPU15	*Salix pulchra*	10-10-10	50	22.4
SANI10	*Salix niphoclada*	10-10-10	50	22.4
CATE11	*Cassiope tetragona*	2-3-4	100	17.3
DILA	*Diapensia lapponica*	6-6-6	50	17.3
SALIX	*Salix*	5-5-5	50	15.8
ARAL2	*Arctostaphylos alpina*	2-2-2	50	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use			Spring

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—28-34.5-41

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Alpine Dwarf Scrub-Lichen Mosaic Peat Hummock
Ecological Classification ID: R231XY114AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Rounded mountains, turf hummocks on mountains

Slope (percent):	Min	Max
	1	30

Elevation (feet):	Min	Max
	3,281	4,921

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	2	40

Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	15	32

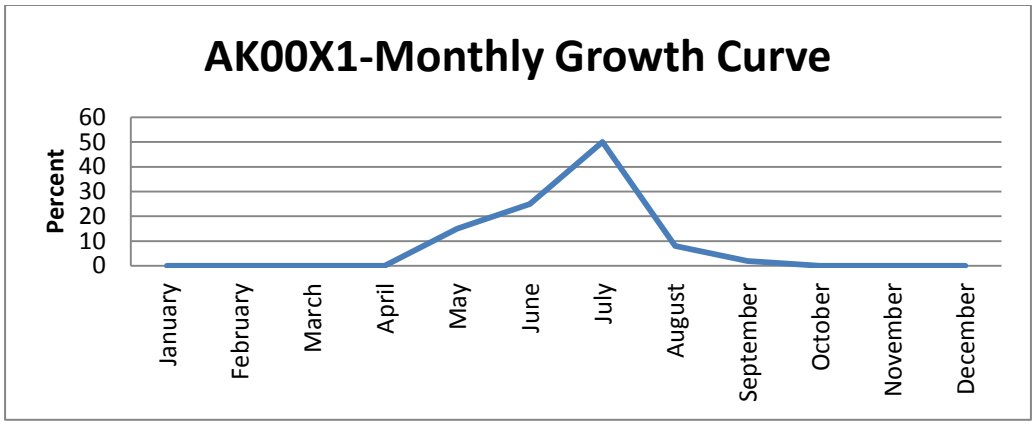
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT2—D31-Alpine scrub loamy hummocks, frozen
D31MT3—D31-Alpine scrub loamy hummocks, frozen
D31UC5—D31-Alpine scrub loamy hummocks, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haploturbels

Dominant Parent Material: Organic material over loamy cryoturbate

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	8	17	31

pH:	Low	RV	High
	3.4	5.5	6.6

Effective CEC (me/100g):	Low	High
	14.6	35.8

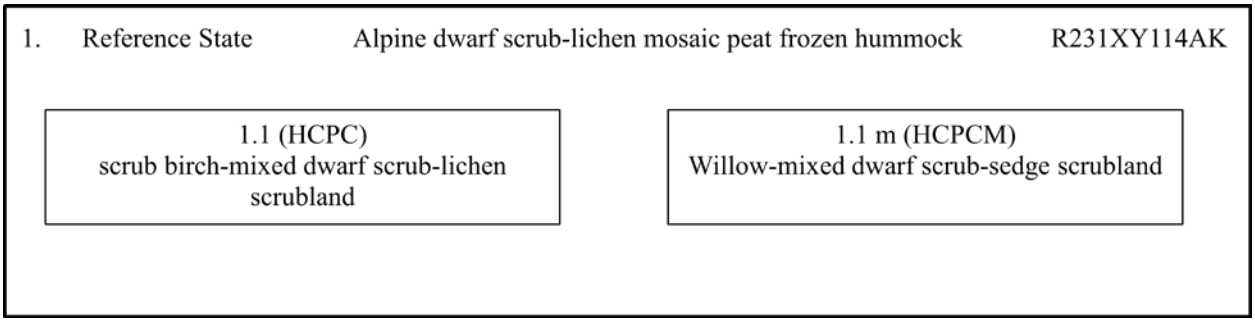
CEC (me/100g):	Min	RV	Max
	4.8	23.9	62

Organic Matter (percent):	Low	RV	High
	1	27.7	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.45

Plant Community Phases

Ecological Site Description ID:	R231XY114AK
Ecological Dynamics of the Site:	
This alpine ecological site is on footslopes and/or toeslopes of mountains (<15% slopes). Cryoturbation resulted in patterned ground features known as turf hummocks. Hummocks range in size, but they are as much as 15 feet in diameter. Two plant communities associated with turf hummocks were observed. They are referred to as a hummocks community (community 1.1) and a moist depressions community (community 1.1m). Pooled water is common in the moist depressions. The soils in community phase 1.1 are classified as Haploturbels and are composed of organic matter over loamy cryoturbate. Disturbances resulting in other community phases were not observed.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	For the climax phases, the hummocks communities are a mixture of shrubs and graminoids and the moist depressions communities are primarily graminoids. The height of low shrubs is defined as 8 inches to 3 feet, and the height of dwarf scrubs is defined as less than 8 inches. The turf hummocks are convex and are better drained than the concave depressions. These differences in microrelief and moisture likely resulted in the different plant communities.		

Phase 1.1	

Community Phase Number:	1.1	Community Phase Name:	Scrub birch-mixed dwarf scrub-lichen scrubland

Community Phase Narrative:

The hummocks tended to have a more abundant cover of low and dwarf shrubs, moss, and lichen than the moist depressions. The most abundant low shrub is *Betula glandulosa*, and the most abundant dwarf scrubs are *Betula nana* and *Vaccinium uliginosum*. Graminoids are less dominant on the hummocks than in the moist depression, and a common species is *Carex bigelowii*. Forbs are a minor vegetative component. Lichen and moss cover are equally distributed on the hummocks. The diversity of lichen is high (12 species), but the abundance of individual species is limited.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.1a	No pathway observed.

Phase 1.1 m	See above.		
Community Phase Number:	1.1m	Community Phase Name:	Willow-mixed dwarf scrub-sedge scrubland
Community Phase Narrative:			
The moist depressions have a more abundant graminoid cover and less shrub and lichen cover than the hummocks. Sedges make up most of the graminoid cover, and common species include *Carex bigelowii*, *Eriophorum vaginatum*, and *Carex membranacea*. Shrubs are common and are primarily in the low and dwarf strata. Common shrubs are *Salix sp*. Forbs and lichen are minor vegetative components.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	No pathway observed.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
-3 38 78

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
15 25 31

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.3 4 4.7

Subsurface Layer

Thickness (cm): Min RV Max
-18 13 47

Texture: Silt loam, muck

AWC (cm/cm): Min RV Max
0.24 0.29 0.4

pH: Min RV Max
4.9 5.4 5.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
15-40	30-70	5-45	0-2	0-8	0-1	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-20	---	---	---
SD (<8 inches)	---	---	0.01-5	---
SL (8-36 inches)	---	---	10-7	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—D (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	30-30-30	25	27.4
CAREX	*Carex*	25-25-25	25	25.0
POPO9	*Poa porsildii*	4-4-4	25	10.0

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	10-15-20	50	27.4
CABI5	*Carex bigelowii*	10-15-20	50	27.4
ERVA4	*Eriophorum vaginatum*	15-15-15	25	19.4
POARA2	Poa *arctica* ssp. *arctica*	10-10-10	25	15.8
FEBR	*Festuca brachyphylla*	10-10-10	25	15.8
JUARA	*Juncus arcticus ssp. alaskanus*	5-5-5	25	11.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBI5	*Polygonum bistorta*	1-2-3	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	20-20-20	50	31.6
BENA	*Betula nana*	35-35-35	25	29.6
VAVI	*Vaccinium vitis-idaea*	7-8-10	75	24.5
LEPAD	*Ledum palustre ssp. decumbens*	2-11-20	50	23.5
EMNI	*Empetrum nigrum*	2-2.5-3	50	11.2
DRYAS	*Dryas*	5-5-5	25	11.2
SARE2	*Salix reticulata*	5-5-5	25	11.2
SAPO	*Salix polaris*	5-5-5	25	11.2
CATE11	*Cassiope tetragona*	5-5-5	25	11.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	5-15-30	75	33.5
LEPAD	*Ledum palustre ssp. decumbens*	10-10-10	50	22.4
SAPU15	*Salix pulchra*	7-8.5-10	50	20.6
VAUL	*Vaccinium uliginosum*	2-6-10	50	17.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Caribou	Summer

Notable Plants: *Poa porsildii*

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—12-22.5-31

Community Phase HCPCM

Rooting Depth (cm): Min RV Max
41 50.5 60

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
37 39.5 42

Texture: Mucky peat, peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.4 5 5.9

Subsurface Layer

Thickness (cm): Min RV Max
4 11 18

Texture: Muck, silt loam

AWC (cm/cm): None recorded

pH: None recorded

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-8	5-30	8-75	0-2	0-17	0-7	5-70

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	30-5	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	0.1-2	---
SL (8-36 inches)	---	---	1-1	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	10-21.7-30	60	36.1
CABI5	*Carex bigelowii*	5-16.2-30	80	36.1
ERVA4	*Eriophorum vaginatum*	30-30-30	20	24.5
CAME4	*Carex membranacea*	30-30-30	20	24.5
ERIOP	*Eriophorum*	5-7.5-10	40	17.3
CARO7	*Carex rotundata*	15-15-15	20	17.3
CAAQ	*Carex aquatilis*	10-10-10	20	14.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	20-20-20	20	20.0
ERIOP	*Eriophorum*	10-10-10	20	14.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POVI3	*Polygonum viviparum*	4-4.5-5	40	13.4
POBI5	*Polygonum bistorta*	3-4.5-6	40	13.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAXIF	*Saxifraga*	5-5-5	20	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	0.1-4.4-8	60	16.2
CATE11	*Cassiope tetragona*	5-6-7	40	15.5
SARE2	*Salix reticulata*	5-6-7	40	15.5
VAUL	*Vaccinium uliginosum*	1-3.7-8	60	14.8
ANPO	*Andromeda polifol*ia	2-5-8	40	14.1
DROC	*Dryas octopetala*	8-8-8	20	12.6
EMNI	*Empetrum nigrum*	0.1-3.6-7	40	11.9
LOPR	*Loiseleuria procumbens*	7-7-7	20	11.8
LEPAD	*Ledum palustre ssp. decumbens*	2-3-4	40	11.0
BEGL	*Betula glandulosa*	6-6-6	20	11.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	5-13.3-25	60	28.3
VAUL	*Vaccinium uliginosum*	1-3-5	40	11.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: *Stellaria alaskana*

Species Richness: Number of stops—5; plant species per stop (min-avg-max)—10-15.6-23

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Alpine Lichen Loamy Polygon
Ecological Classification ID: R231XY115AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Polygons on rounded mountains

Slope (percent):	Min	Max
	1	10

Elevation (feet):	Min	Max
	2,625	3,937

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	2	40

Flooding: None
Ponding: None
Runoff: Low

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	19	21

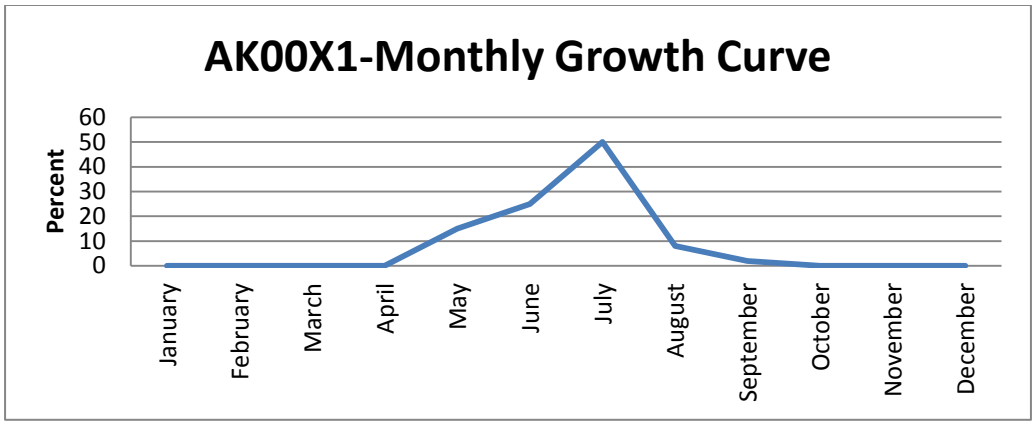
Mean Annual Air Temperature (°F):	Low	High
	27	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31SD1—D31-Alpine tussock-scrub silty polygons, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-silty, mixed, superactive, acid, subgelic Typic Histoturbels

Dominant Parent Material: Organic material over loamy cryoturbate

Representative Surface Texture: Peat

Subsurface Texture Group: Coarse-silty

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	53

pH:	Low	RV	High
	3.4	5.4	6.2

Effective CEC (me/100g):	Low	High
	12.5	32

CEC (me/100g):	Min	RV	Max
	5.8	30.9	62

Organic Matter (percent):	Low	RV	High
	2	29.3	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.8	1.15

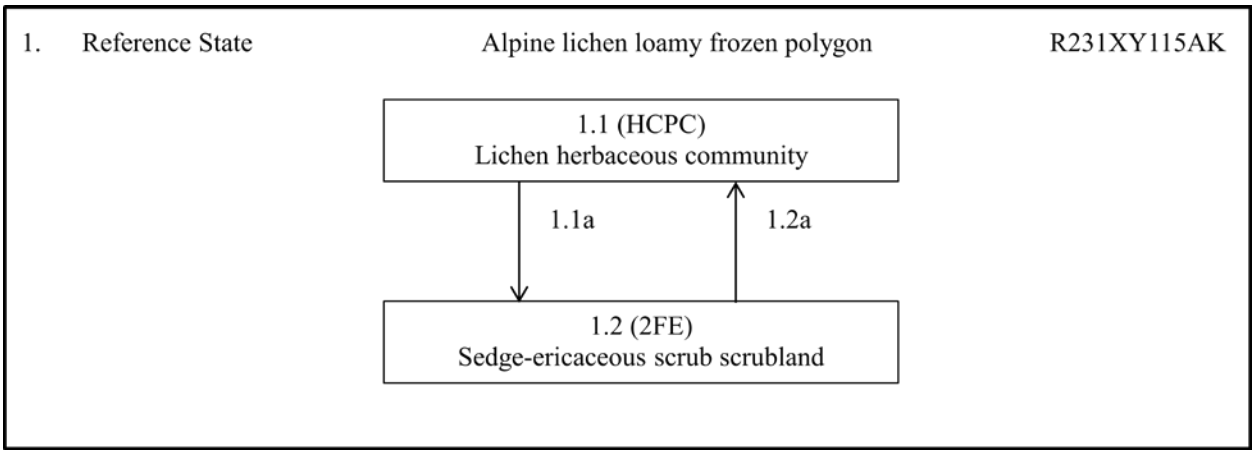
Plant Community Phases

Ecological Site Description ID:	R231XY115AK

Ecological Dynamics of the Site:

This alpine ecological site generally is on the summits and shoulders of mountains (<10% slopes). Cryoturbation resulted in patterned ground features known as polygons. The polygons have two associated climax plant communities, and the vegetation likely is dependent on the degree of soil saturation. The two plant communities are polygon face (communities 1.1 and 1.2) and moist interspace. The soils associated with the moist interspace plant community are wetter than those associated with the polygon face plant community. The soils in community phase 1.1 are classified as Histoturbels and are composed of organic matter over loamy cryoturbate. The polygon face plant community is described in this report, and the moist interspace is described in the report for site R231XY102AK. Fire is a documented disturbance resulting in one additional observed phase.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	For the climax phase, the dominant vegetation is lichen. The soils associated with the polygon face community are drier than those associated with the moist interspace community.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Lichen herbaceous community
Community Phase Narrative:			
This community is covered extensively by an assortment of lichen species, resulting in a creamy white appearance. The lichen cover generally is more than 60%, and the most common species is *Flavocetraria cucullata*. Shrubs, graminoids, forbs, and moss are minor components. As compared to the early fire phase, a relatively low abundance of shrubs and graminoids is present.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Fire. A lack of exposed mineral soil in recently burned areas is indicative of a low-intensity fire regime for this ecological site.		

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Sedge-ericaceous scrub scrubland
Community Phase Narrative:			
As compared to the unburned community, this early fire sere has less lichen cover and more shrub and graminoid cover. A common low shrub is *Ledum palustre,* and a common dwarf shrub is *Vaccinium vitis-idaea*. Graminoids are the most abundant vegetation, totaling about 60% cover, and are primarily *Carex sp.* and *Eriophorum sp*. Lichen is present in this burn sere, but their abundance likely decreases as a result of fire. Fire produces channelized patterns across the surface of the polygon face, which could be the result of a low-intensity burn.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	With time and no fire.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm):	Min	RV	Max
	31	31	31

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	28	28	28

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	3.8	3.8	3.8

Subsurface Layer

Thickness (cm):	Min	RV	Max
	3	3	3

Texture: Permanently frozen silt loam

AWC (cm/cm):	Min	RV	Max
	0.23	0.24	0.24

pH:	Min	RV	Max
	4.8	4.8	4.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
25-40	25-60	2-15	0-2	1-2	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-25	---	---	---
FD (<4 inches)	---	10-10	---	---
SD (<8 inches)	---	---	10-8	---
SL (8-36 inches)	---	---	10-5	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERIOP	*Eriophorum*	15-21.7-25	100	46.5
CAREX	*Carex*	25-25-25	67	40.8
FEAL	*Festuca altaica*	5-8.3-10	100	28.9
LUZUL	*Luzula*	10-10-10	67	25.8
ARLA2	*Arctagrostis latifolia*	15-15-15	33	22.4
HIAL3	*Hierochloe alpina*	5-5-5	33	12.9

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYCOP2	*Lycopodium*	5-7.5-10	67	22.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-8.3-10	100	28.9
ANPO	*Andromeda polifol*ia	2-5-8	67	18.3
ARAL2	*Arctostaphylos alpina*	1-2.7-5	100	16.3
RUCH	*Rubus chamaemorus*	2-2-2	67	11.5

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	10-11.7-15	100	34.2
BEGL	*Betula glandulosa*	15-15-15	33	22.4
VAUL	*Vaccinium uliginosum*	5-5-5	33	12.9

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—14-16.3-19

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	47	47	47

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	30	30	30

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	3.8	3.8	3.8

Subsurface Layer

Thickness (cm):	Min	RV	Max
	17	17	17

Texture: Permanently frozen silt loam

AWC (cm/cm): Not measured

pH: Not measured

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
60-90	5-25	5-10	0-1	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	4-4	---	---	---
SD (<8 inches)	---	---	1-3	---
SL (8-36 inches)	---	---	2-5	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	7-7-7	50	18.7
ERIOP	*Eriophorum*	4-4-4	50	14.1
CAREX	*Carex*	4-4-4	50	14.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-2-3	100	14.1
RUCH	*Rubus chamaemorus*	4-4-4	50	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	2-3.5-5	100	18.7
VAUL	*Vaccinium uliginosum*	2-2.5-3	100	15.8
BEGL	*Betula glandulosa*	5-5-5	50	15.8

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use Not grazed/browsed			

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—12-14.5-17

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Alpine Dwarf Scrub-Graminoid Mosaic Organic Frozen Mound
Ecological Classification ID: R231XY116AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Rounded mountains, solifluction lobes on rounded mountains

Slope (percent):	Min	Max
	5	25

Elevation (feet):	Min	Max
	2,625	3,937

Range of Aspect Direction: Southwest to northeast (clockwise)

Water Table Depth (cm):	Min	Max
	2	40

Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	15	32

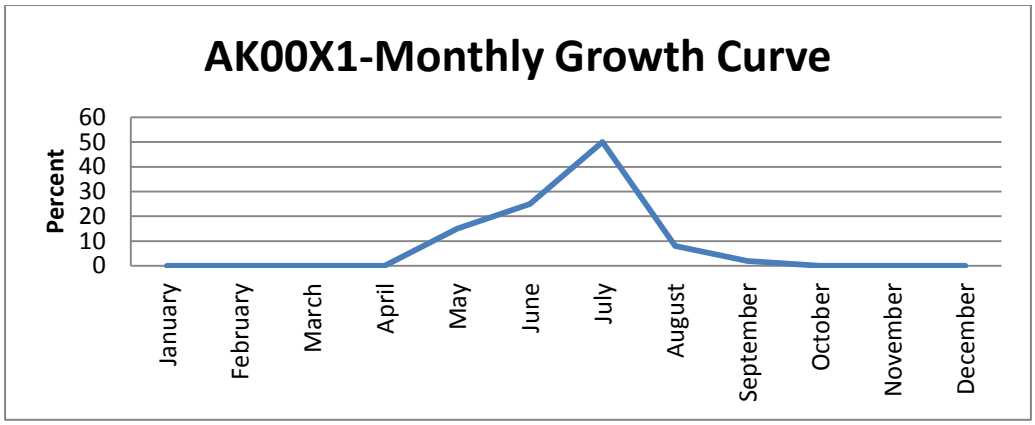
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT3—D31-Alpine low scrub organic hummocks, frozen
D31SD1—D31-Alpine low scrub organic hummocks, frozen

Characteristics of Representative Soil Components

Soil Classification: Loamy, mixed, euic, subgelic Terric Fibristels

Dominant Parent Material: Organic material over loamy colluvium

Representative Surface Texture: Peat

Subsurface Texture Group: Loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	27	46

pH:	Low	RV	High
	4.1	5.8	6.8

Effective CEC (me/100g):	Low	High
	26.1	47.3

CEC (me/100g):	Min	RV	Max
	12	34.5	57

Organic Matter (percent):	Low	RV	High
	2	41	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.36	0.8	1.21

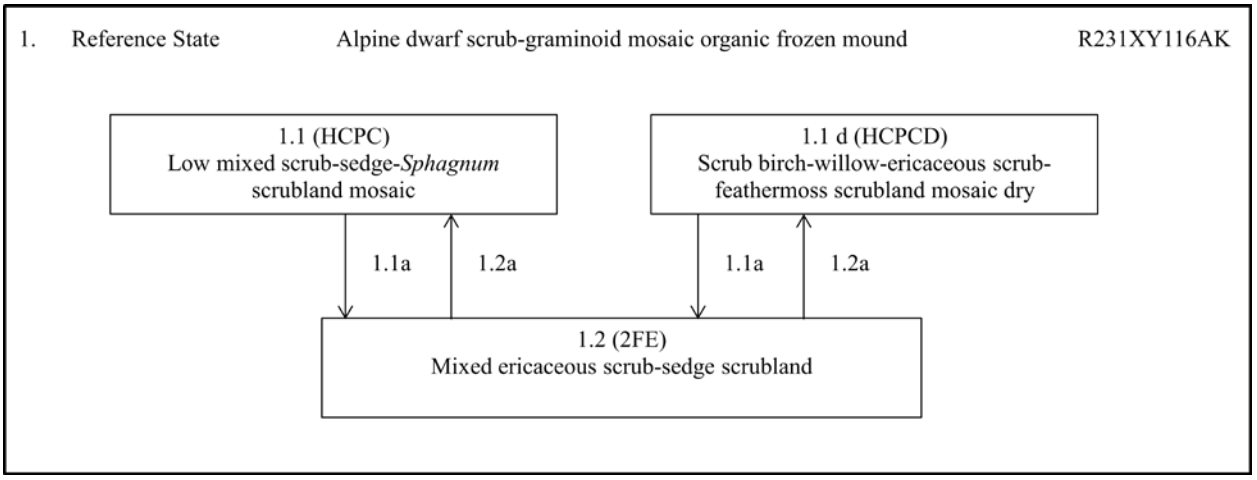
Plant Community Phases

Ecological Site Description ID:	R231XY116AK

Ecological Dynamics of the Site:

This alpine ecological site is on the steeper backslopes of mountains (>10% slopes). Cryoturbation resulted in patterned ground features known as solifluction lobes. The soils in community phase 1.1 are classified as Fibristels and are composed of organic matter over loamy cryoturbate. Some lobes are distinct, and others are indistinct. The distinct lobes are identified by scalloped terrain. Two plant communities are associated with solifluction lobes, occurring separately on interlobes and lobe fronts. The lobe fronts (community 1.1d) are the steep faces on the downhill side of the solifluction lobe, and the interlobes (community 1.1) are the large, relatively smooth areas between the lobe fronts. Fire resulted in one additional community phase.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	For the climax phase, the interlobe vegetation is dominantly a mixture of low shrubs and graminoids and the lobe front vegetation is a mixture of medium shrubs and moss. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches. The gently sloping areas associated with the interlobes have limited drainage and moister soils than the areas associated with the lobe fronts.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Low mixed scrub-sedge-Sphagnum scrubland mosaic
Community Phase Narrative:			
Shrubs and graminoids are abundant components of the vegetation (commonly >50% cover). Shrubs are primarily in the low and dwarf strata. Common low shrubs are *Ledum palustre* and *Salix pulchra*, and common dwarf shrubs are *Betula nana*, *Vaccinium vitis-idaea*, and *Empetrum nigrum*. Most of the graminoid cover is sedges, and common species are *Carex bigelowii* and *Eriophorum vaginatum*. Sphagnum moss species are abundant in the ground cover.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Fire.		

Phase 1.1d			
Community Phase Number:	1.1d	Community Phase Name:	Scrub birch-willow-ericaceous scrub-feathermoss scrubland mosaic dry
Community Phase Narrative:			
Shrubs are an abundant component of the vegetation (>100% cover), and they are in the medium, low, and dwarf strata. A common medium shrub is *Betula glandulosa,* common low shrubs are *Salix pulchra* and *Vaccinium uliginosum*, and common dwarf shrubs are *Ledum palustre* and *Rubus chamaemorus*. Graminoid cover is nearly half that of the interlobe communities, and it is a mixture of grass and sedge species such as *Calamagrostis canadensis* and *Carex bigelowii*. Forbs and lichen are minor components of the vegetative community. Feathermoss species, such as *Hylocomium splendens and Pleurozium schreberi,* are an abundant component of the ground cover.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Fire. It is unclear if the fire regime differs between community phases 1.1 and 1.1d.		

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Mixed ericaceous scrub-sedge scrubland
Community Phase Narrative:			
The vegetation in this early fire phase is similar to that of the unburned interspace community (community 1.1), but dwarf scrub and Sphagnum moss are not present in the early fire phase. The overall scrub and feathermoss cover is lower in this early fire phase than in the unburned lobe front community (community 1.1d). Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Time without fire and normal growth.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
31 57 83

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
31 49.5 68

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4 4.4 4.8

Subsurface Layer

Thickness (cm): Min RV Max
0 7.5 15

Texture: Permanently frozen silt loam, highly organic silt loam, silt loam, gravelly sandy loam

AWC (cm/cm): Min RV Max
0.12 0.22 0.35

pH: Min RV Max
5.2 5.5 5.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-45	10-35	10-15	0-7	2-10	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-7	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	0.1-3	---
SL (8-36 inches)	---	---	1-8	---
TR (<15 feet)	---	---	---	0.1-0.1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	40-40-40	33	36.5
CABI5	*Carex bigelowii*	7-11-15	67	27.1
ERIOP	*Eriophorum*	20-20-20	33	25.8
ERVA4	*Eriophorum vaginatum*	2-8.5-15	67	23.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LYCOP2	*Lycopodium*	5-5-5	33	12.9

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	1-4.7-10	100	21.6
ARAL2	*Arctostaphylos alpina*	1-2-3	100	14.1
EMNI	*Empetrum nigrum*	1-2-3	67	11.5

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	15-20-25	100	44.7
BENA	*Betula nana*	8-9-10	67	24.5
VAUL	*Vaccinium uliginosum*	3-4.3-5	100	20.8
BEGL	*Betula glandulosa*	1-2.3-5	100	15.3
SALIX	*Salix*	5-5-5	33	12.9

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—19-19.3-20

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	22	57.8	82

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
13 34 49

Texture: Slightly decomposed plant material, peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.3 4 5

Subsurface Layer

Thickness (cm): Min RV Max
9 23.8 33

Texture: Gravelly sandy loam, highly organic silt loam, silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.12 0.22 0.35

pH: Min RV Max
5.2 5.5 5.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-40	27-65	15-69	0-2	0-0	0-0	0-1

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	25-25	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	0.01-0.01	---	---
SD (<8 inches)	---	---	0.01-3	---
SL (8-36 inches)	---	---	10-7	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	10-27-60	83	47.4
CABI5	*Carex bigelowii*	25-32.5-40	67	46.5
CAPO	*Carex podocarpa*	20-35-50	33	34.2
ERBR6	*Eriophorum brachyantherum*	10-10-10	17	12.9
CAREX	*Carex*	5-5-5	17	9.1
CAAQ	*Carex aquatilis*	5-5-5	17	9.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	10-10-10	17	12.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	5-5-5	17	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	2-6.7-15	100	25.8
VAVI	*Vaccinium vitis-idaea*	1-5-10	83	20.4
BENA	*Betula nana*	25-25-25	17	20.4
SABE2	*Salix bebbiana*	15-15-15	17	15.8
LEPAD	*Ledum palustre ssp. decumbens*	5-7.5-10	33	15.8
RUCH	*Rubus chamaemorus*	1-3.5-5	67	15.3
VAUL	*Vaccinium uliginosum*	10-10-10	17	12.9
ANPO	*Andromeda polifol*ia	0-1-3	83	9.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	4-14.8-20	67	31.4
SAPU15	*Salix pulchra*	10-20-30	33	25.8
VAUL	*Vaccinium uliginosum*	2-7-10	83	24.2
BEGL	*Betula glandulosa*	5-9-15	50	21.2
BENA	*Betula nana*	2-4.5-7	33	12.2
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	17	9.1

Site Tree Measurements: Not measured

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-0-0	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Caribou	Spring

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—19-22.5-30

Community Phase HCPCD

Rooting Depth (cm): Min RV Max
37 73 109

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
16 49 82

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.3 3.6 3.9

Subsurface Layer

Thickness (cm): Min RV Max
21 24 27

Texture: Very stony silt loam

AWC (cm/cm): Min RV Max
0.17 0.2 0.23

pH: Min RV Max
5.5 5.5 5.5

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	0-83	0-0	0-10	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-3	---	---	---
FD (<4 inches)	---	2-5	---	---
FM (4-24 inches)	---	0.01-5	---	---
SD (<8 inches)	---	---	2-5	---
SL (8-36 inches)	---	---	25-5	---
SM (3-10 feet)	---	---	40-40	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	15-15-15	50	27.4
CACA4	*Calamagrostis canadensis*	15-15-15	50	27.4
CAPO	*Carex podocarpa*	10-10-10	50	22.4
CARO7	*Carex rotundata*	3-3-3	50	12.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	5-5-5	50	15.8
SANE3	*Saxifraga nelsoniana*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	10-10-10	50	22.4
ANNA	*Anemone narcissiflora*	5-5-5	50	15.8
DOFR	*Dodecatheon frigidum*	3-3-3	50	12.2
POVI3	*Polygonum viviparum*	0-1-2	100	10.0
ARARA2	Artemisia *arctica* ssp. *arctica*	2-2-2	50	10.0
SOMU	*Solidago multiradiata*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	30-30-30	50	38.7
RUCH	*Rubus chamaemorus*	2-11-20	100	33.2
EMNI	*Empetrum nigrum*	5-10-15	100	31.6
VAVI	*Vaccinium vitis-idaea*	2-3.5-5	100	18.7
SARE2	*Salix reticulata*	3-3-3	50	12.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	40-40-40	50	44.7
VAUL	*Vaccinium uliginosum*	5-17.5-30	100	41.8
SAPU15	*Salix pulchra*	25-25-25	50	35.4
LEPAD	*Ledum palustre ssp. decumbens*	5-5-5	50	15.8

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	40-40-40	50	44.7

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Caribou	Spring

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—17-22.5-28

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site

Ecological Classification Name: Boreal Lichen Rock Outcrops Slopes

Ecological Classification ID: R231XY120AK

Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Escarpments

Slope (percent):	Min	Max
	0	100

Elevation (feet):	Min	Max
	492	2,789

Range of Aspect Direction: Northwest to east (clockwise), southeast to northwest (clockwise)

Water Table Depth (cm): Not recorded

Flooding: None

Ponding: None

Runoff: Very high

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	10	20

Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

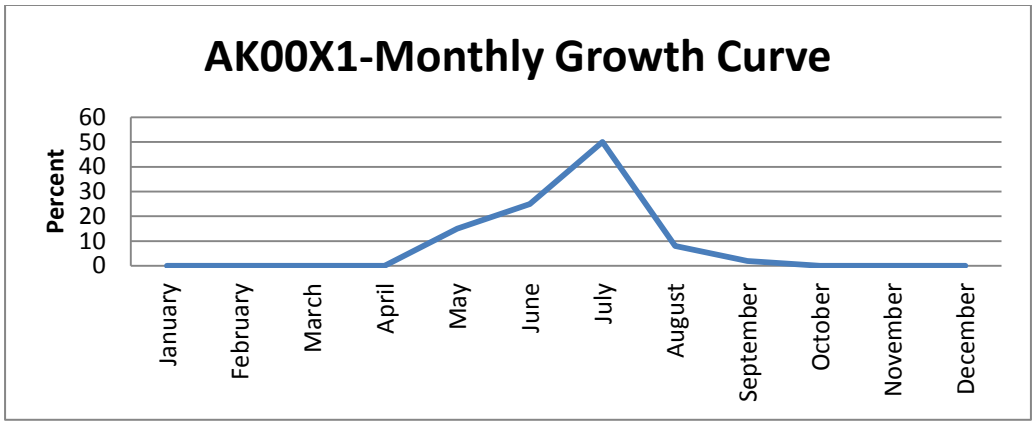
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Features

MLRA Map Unit Symbols and Components (Soil Names):

D31BH2—D31-Boreal bedrock
D31BH6—D31-Boreal rubble land

Characteristics of Representative Components

Dominant Parent Material: Gravelly colluvium over residuum, residuum
Representative Surface Texture: Bedrock
Subsurface Texture Group: Not applicable
Saturated Hydraulic Conductivity: Low to high

AWC Total (cm):	Low	RV	High
	1	1	2

pH:	Low	RV	High
	5.5	6.2	6.8

Effective CEC (me/100g):	Low	High
	4	4

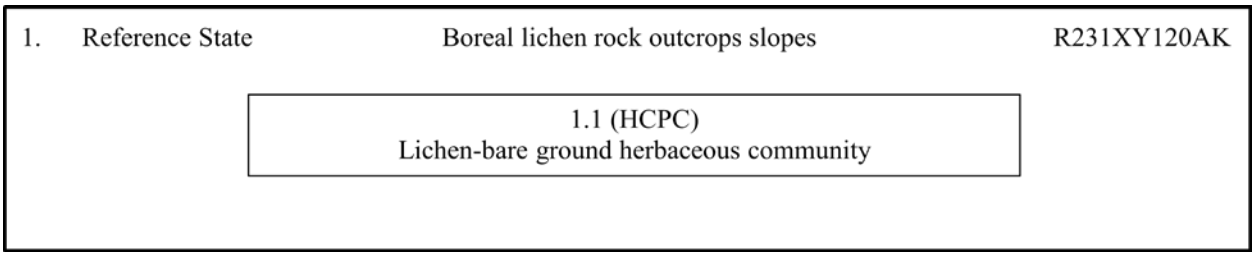
CEC (me/100g):	Min	RV	Max
	5	5	5

Organic Matter (percent):	Low	RV	High
	0	0.3	1

Bulk Density (1/3-Bar):	Min	RV	Max
	1.47	1.5	1.47

Plant Community Phases

Ecological Site Description ID:	R231XY120AK
Ecological Dynamics of the Site:	
This boreal ecological site is on bedrock outcroppings and scree fields. The dominant plants are crustose and foliose lichen that cover exposed rock. Trace amounts of vascular and nonvascular plants grow in small cracks and crevasses. The soils in community phase 1.1 are classified as Cryorthents and are composed of gravelly residuum. Disturbances resulting in other plant community phases were not observed. No alternate states were observed.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Vegetation is similar on the outcroppings and scree fields. It is dominantly an assortment of lichen species.		

<table>
<tr><td>Phase 1.1</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.1</td><td>Community Phase Name:</td><td>Lichen-bare ground herbaceous community</td></tr>
<tr><td colspan="4">Community Phase Narrative:</td></tr>
<tr><td colspan="4">Crustose and foliose lichen are the most abundant types of vegetation, commonly covering >50% of the rock in scree fields and/or outcroppings.</td></tr>
<tr><td colspan="4">Community Pathways</td></tr>
<tr><td>Pathway Number:</td><td colspan="3">Pathway Name & Description:</td></tr>
<tr><td>1.1a</td><td colspan="3">No observed pathway.</td></tr>
</table>

Dynamic Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
1 1 1

Restrictive Feature: Lithic bedrock

Drainage Class: Excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Gravelly sandy loam, channers

AWC (cm/cm): Min RV Max
0.11 0.11 0.11

pH: Min RV Max
7.5 7.5 7.5

Subsurface Layer

Thickness (cm): Min RV Max
1 1 1

Texture: Bedrock

AWC (cm/cm): Not recorded

pH: Not recorded

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-50	0-40	0-5	0-1	0-5	0-99	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
FM (4-24 inches)	---	1-2	---	---
SL (8-36 inches)	---	---	5-5	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAPU	*Calamagrostis purpurascens*	1-4.7-10	38	13.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTEN	*Potentilla*	25-25-25	13	17.7

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—8; plant species per stop (min-avg-max)—4-6.8-9

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Gravelly Floodplain, Non-Vegetated
Ecological Classification ID: R231XY126AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Very low flood plains

Slope (percent):	Min	Max
	0	5

Elevation (feet):	Min	Max
	492	2,034

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	0

Flooding:	Frequency	Duration
	Frequent	Long

Ponding: None
Runoff: Low

Frost-Free Days:	Min	Max
	50	110

Mean Annual Precipitation (inches):	Low	High
	9	21

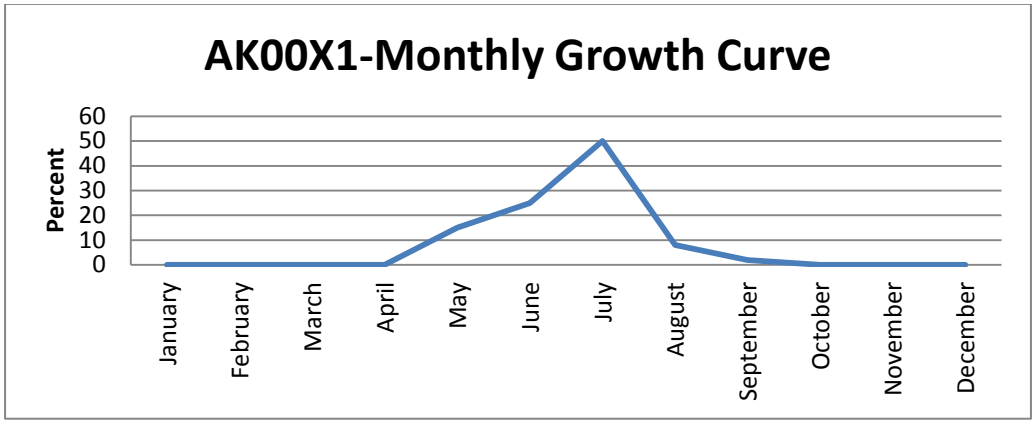
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Features

MLRA Map Unit Symbols and Components (Soil Names):

D31UC4—D31-Boreal riverwash
D31YV1—D31-Boreal riverwash
D31YV8—D31-Boreal riverwash

Characteristics of Representative Components

Dominant Parent Material: Sandy and gravelly alluvium
Representative Surface Texture: Stratified extremely gravelly coarse sand to gravelly sandy loam
Subsurface Texture Group: Not applicable
Saturated Hydraulic Conductivity: High

AWC Total (cm):	Low	RV	High
	3	5	6

pH:	Low	RV	High
	6.4	7.5	8.2

Effective CEC (me/100g):	Low	High
	4	4

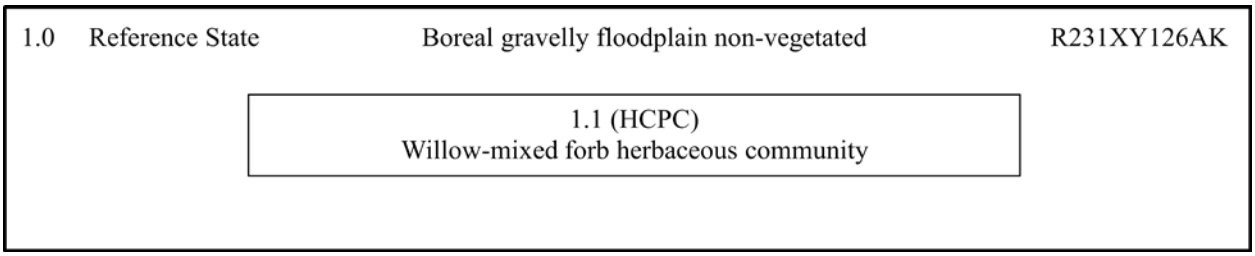
CEC (me/100g):	Min	RV	Max
	10	10	10

Organic Matter (percent):	Low	RV	High
	0.9	0.9	0.9

Bulk Density (1/3-Bar):	Min	RV	Max
	1.56	1.6	1.57

Plant Community Phases

Ecological Site Description ID:	R231XY126AK
Ecological Dynamics of the Site:	
This boreal ecological site is on alluvial bars directly adjacent to rivers that are subject to intense and frequent flooding. This ecological site is directly adjacent to the Yukon River and many of its secondary tributaries. The majority of the site has minimal vegetation and an abundance of exposed soil and gravel. The soils in community phase 1.1 are classified as Cryorthents and are composed of sandy and/or gravelly alluvium.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Willow-Mixed Forb Herbaceous Community

Community Phase Narrative:
The total vegetative cover is ~10% on alluvial bars and is primarily composed of a mixture of willow and forb species. Scrubs primarily are in the low and dwarf strata (total cover ~5%), and common species include *Salix interior* and *Salix alaxensis*. Forb cover is minimal (~5%), but the diversity of the species is high (commonly >10 species per plot). Common forbs include *Chamerion latifolium*, *Equisetum pratense*, *Eurybia sibirica*, *Artemisia tilesii*, *Achillea millefolium*, and *Hedysarum alpinum*.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	No observed pathway.

Dynamic Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
5 27.4 50

Restrictive Features: None recorded

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Extremely bouldery coarse sand, extremely gravelly coarse sand, extremely gravelly coarse sandy loam, extremely gravelly fine sandy loam, extremely gravelly loamy sand, extremely gravelly sand, loamy sand

AWC (cm/cm): Min RV Max
0.01 0.03 0.08

pH: Min RV Max
6.5 7.4 8

Subsurface Layer

Thickness (cm): Min RV Max
5 27.4 50

Texture: Extremely gravelly coarse sand, extremely gravelly loamy sand, extremely gravelly sand

AWC (cm/cm): Min RV Max
0.02 0.04 0.08

pH: Min RV Max
6.4 7.3 7.7

Influencing Water Features

NWI Code: R2UB1, R2UB2, R2US2, R2UB3

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Lower Perennial, Unconsolidated Bottom, Sand; Riverine, Lower Perennial, Unconsolidated Shore, Sand; Riverine, Upper Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars; moderate gradient, riffle-dominant channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-2	0-4	0-7	0-5	5-99	1-75	0-12

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	0.1-0.1	---	---
SL (8-36 inches)	---	---	2-2	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAL	*Salix alaxensis*	15-15-15	11	12.9

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAL	*Salix alaxensis*	7-8.5-10	22	13.7
SAIN3	*Salix interior*	2-3.5-5	44	12.5

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Other	Spring
Slight use	Willows	Moose	Summer
Slight use	Willows	Other	Winter
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—9; plant species per stop (min-avg-max)—2-8.6-21

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Alpine and Subalpine Lichen Rock Outcrops Slopes
Ecological Classification ID: R231XY127AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Escarpments, mountains

Slope (percent):	Min	Max
	25	100

Elevation (feet):	Min	Max
	3,281	7,546

Range of Aspect Direction: West to southeast (clockwise)
Water Table Depth (cm): None recorded
Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	11	32

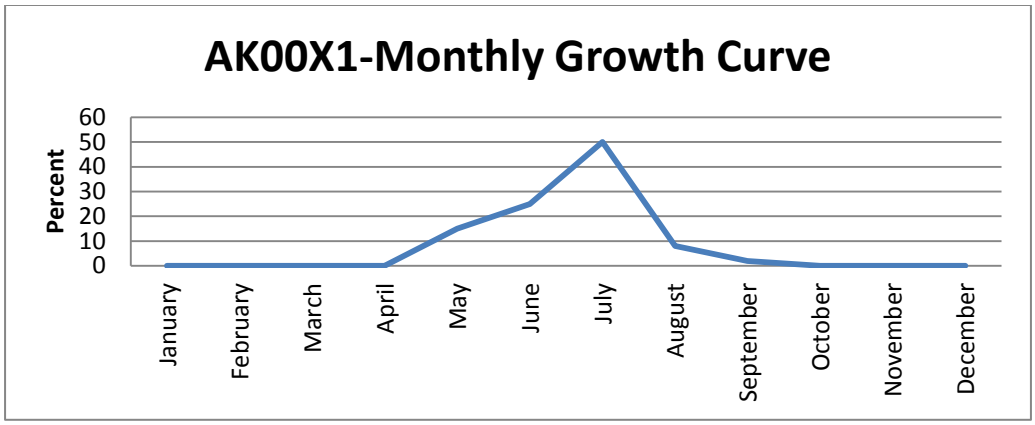
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT1—D31-Alpine rubble land
D31MT2—D31-Alpine rubble land
D31OM1—D31-Alpine bedrock
D31OM1—D31-Alpine rubble land
D31OM2—D31-Alpine bedrock
D31SD1—D31-Alpine rubble land

Characteristics of Representative Components

Dominant Parent Material: Gravelly colluvium, residuum

Representative Surface Texture: Bedrock

Subsurface Texture Group: Not applicable

Saturated Hydraulic Conductivity: Moderately low to high

AWC Total (cm):	Low	RV	High
	0	0	15

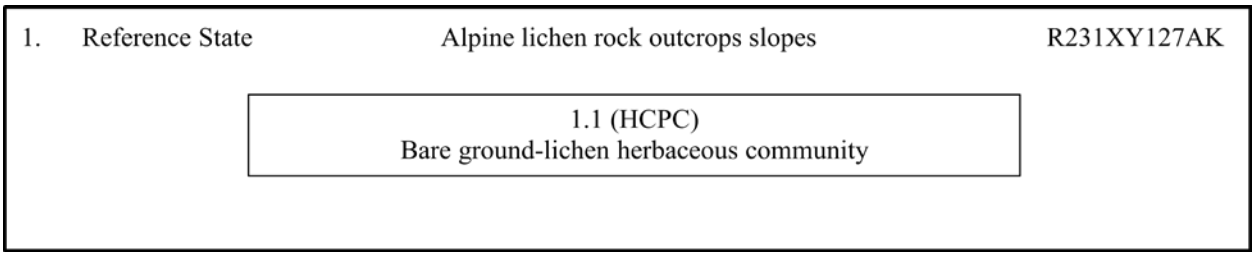
Effective CEC (me/100g):	Low	High
	4	4

CEC (me/100g):	Min	RV	Max
	1	1	1

Organic Matter (percent):	Low	RV	High
	1	1	1

Plant Community Phases

Ecological Site Description ID:	R231XY127AK
Ecological Dynamics of the Site:	
This alpine and/or subalpine ecological site is at high elevations on bedrock outcroppings and in scree fields. The dominant plants are crustose and foliose lichen that cover the exposed rock. Trace amounts of vascular and nonvascular plants grow in small cracks and crevasses. The soils in community phase 1.1 are classified as Gelorthents and are composed of gravelly colluvium. Disturbances resulting in other plant community phases were not observed. No alternate states were observed.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Vegetation is similar on the outcroppings and in the scree fields. It is dominantly an assortment of lichen species.		

<table>
<tr><td>Phase 1.1</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.1</td><td>Community Phase Name:</td><td>Bare ground-lichen herbaceous community</td></tr>
<tr><td colspan="4">Community Phase Narrative:</td></tr>
<tr><td colspan="4">Crustose and foliose lichen are the most abundant types of vegetation, commonly covering >50% of the rock in the scree fields and/or the outcroppings.</td></tr>
<tr><td colspan="4">Community Pathways</td></tr>
<tr><td>Pathway Number:</td><td colspan="3">Pathway Name & Description:</td></tr>
<tr><td>1.1a</td><td colspan="3">No observed pathway.</td></tr>
</table>

Dynamic Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	0	92.5	185

Restrictive Features: Densic bedrock, lithic bedrock

Drainage Class: Excessively drained, somewhat excessively drained

Surface Layer

Thickness (cm):	Min	RV	Max
	0	1	2

Texture: Bedrock, boulders, cobbles, gravel, slightly decomposed plant material

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	2.9	4.6	7.1

Subsurface Layer

Thickness (cm):	Min	RV	Max
	0	91.5	183

Texture: Boulders, cobbles, gravel

AWC (cm/cm): Not recorded

pH: Not recorded

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-90	1-30	0-3	0-0	0-1	0-100	0-1

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.01-0.01	---	---	---
FD (<4 inches)	---	0.01-0.1	---	---
FM (4-24 inches)	---	0.01-0.01	---	---

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Lichen	Dall sheep	Summer
Unknown			Unknown

Notable Plants: *Minuartia yukonensis*

Species Richness: Number of stops—19; plant species per stop (min-avg-max)—3-15-27

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Tussock Peat Plains
Ecological Classification ID: R231XY128AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills, mountains, plains, terraces

Slope (percent):	Min	Max
	1	20

Elevation (feet):	Min	Max
	1,804	3,445

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	25

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Medium

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	16	31

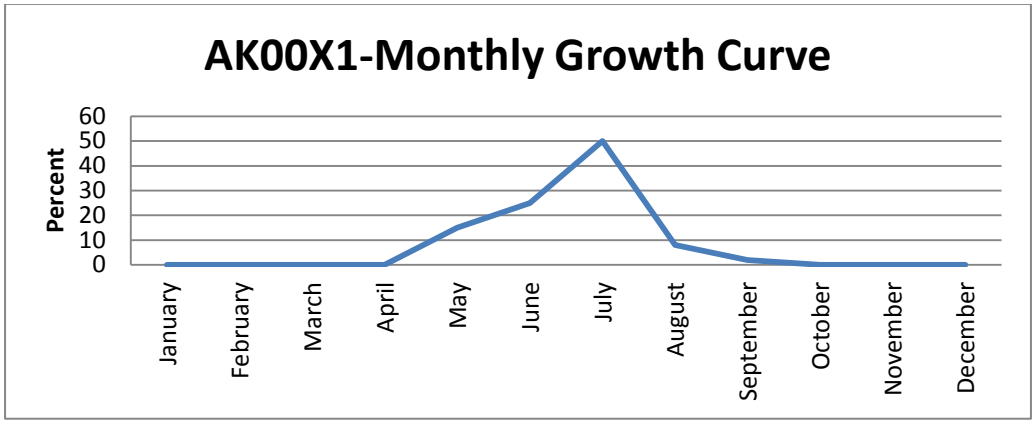
Mean Annual Air Temperature (°F):	Low	High
	21	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31UC1—D31-Boreal tussock organic plains, frozen
D31UC3—D31-Boreal tussock organic plains, frozen

Characteristics of Representative Soil Components

Soil Classification: Loamy, mixed, dysic, subgelic Terric Fibristels
Dominant Parent Material: Organic material over loess over loamy cryoturbate
Representative Surface Texture: Peat
Subsurface Texture Group: Loamy
Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	35	61

pH:	Low	RV	High
	3.4	4.9	6.5

Effective CEC (me/100g):	Low	High
	14.5	40

CEC (me/100g):	Min	RV	Max
	10	26.8	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.36	1.1	1.4

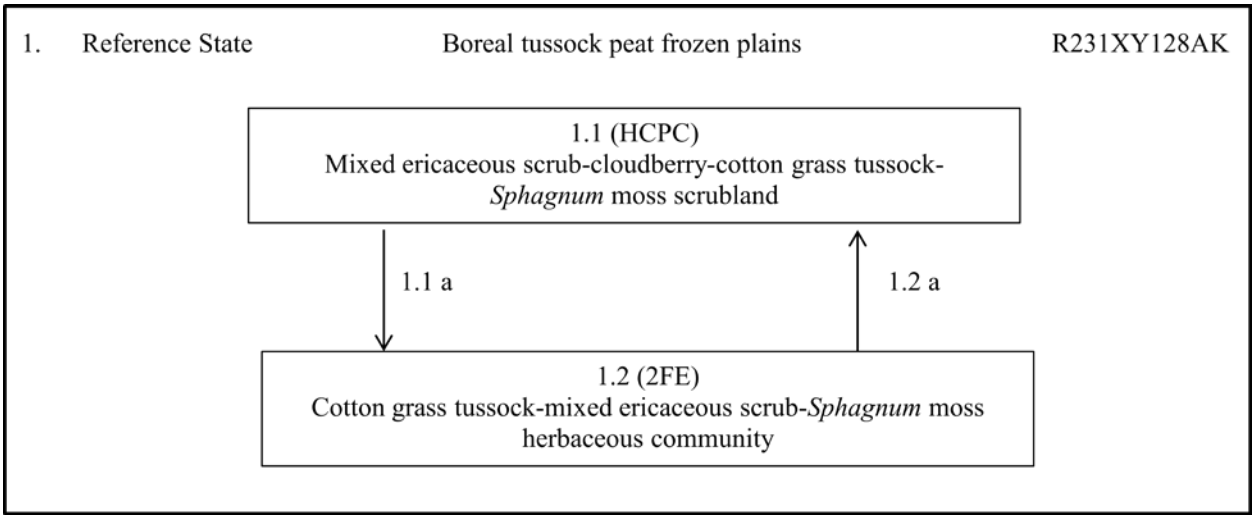
Plant Community Phases

Ecological Site Description ID:	R231XY128AK

Ecological Dynamics of the Site:

This boreal ecological site is in broad, gently sloping areas that are considered plains (slope ranges from 1 to 9%). The soils are wet due to the thick organic mat, shallow depth to permafrost, and gentle slope. Tree growth is limited. The soils in community phase 1.1 are classified as Fibristels and are composed of organic material over loess and/or loamy cryoturbate. As slope increases, the soils support black spruce, which is likely related to the soil drainage. Charcoal is in soil profile; therefore, fire is a disturbance regime. The sites have not burned recently, however, and documentation is available only for the climax phase. No alternate states were observed.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	The soils are wet, have permafrost, and generally have a thick organic mat (>15 cm.). Site conditions favor low-severity burns. During a low-severity burn, some shrubs and graminoids quickly recolonize and become dominant as a result of below-ground root reserves that were not consumed in the fire event. The height of stunted and regenerative trees is defined as less than 15 feet. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Mixed ericaceous scrub-cloudberry-cotton grass tussock-Sphagnum moss scrubland
Community Phase Narrative:			
The dominant vegetation is a mixture of tussock-forming sedges, dwarf scrubs, and low scrubs. Stunted and regenerative *Picea mariana* is present, but the tree cover is a minor vegetative component. The most common low shrubs are *Ledum palustre* and *Betula nana*. The most common dwarf shrubs are *Rubus chamaemorus* and *Vaccinium vitis-idaea*. Tussock-forming sedges are a dominant component of the vegetation, and the most common species are *Eriophorum vaginatum* and *Carex bigelowii*. Forbs and lichen are minor vegetative components. Sphagnum moss is abundant (estimated >40% cover).			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Fire.		

Phase 1.2	No data.		
Community Phase Number:	1.2	Community Phase Name:	Cotton grass tussock-mixed ericaceous scrub-Sphagnum moss herbaceous community

Community Phase Narrative:	
No data. Phase 1.2 is undocumented, but this phase was observed in the field. As compared to phase 1.1, the scrub cover is less abundant and the cottongrass cover is more abundant.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Normal time and growth without fire.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min 20, RV 48.1, Max 65

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min 20, RV 37.1, Max 45

Texture: Peat, mucky peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.2 3.7 4.2

Subsurface Layer

Thickness (cm): Min RV Max
0 11 20

Texture: Gravelly silt loam, permanently frozen silt loam, stony coarse sandy loam, sandy loam, permanently frozen coarse sandy loam

AWC (cm/cm): Min RV Max
0.12 0.17 0.25

pH: Min RV Max
4.5 5.1 5.8

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-20	25-85	10-50	0-3	0-5	0-0	0-3

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	20-20	---	---	---
SD (<8 inches)	---	---	10-3	---
SL (8-36 inches)	---	---	6-6	---
TR (<15 feet)	---	---	---	0.1-0.1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	12-37.9-60	92	58.9
CABI5	*Carex bigelowii*	0.1-15.1-35	67	31.8
CAREX	*Carex*	10-10-10	8	9.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	75-75-75	8	25.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUCH	*Rubus chamaemorus*	1-7.5-10	100	27.4
LEPAD	*Ledum palustre ssp. decumbens*	5-12.3-25	58	26.8
VAVI	*Vaccinium vitis-idaea*	1-6.2-20	108	25.8
VAUL	*Vaccinium uliginosum*	3-7.5-15	50	19.4
BENA	*Betula nana*	2-5.7-10	25	11.9
VAOX	*Vaccinium oxycoccos*	0.1-1.3-5	83	10.6
EMNI	*Empetrum nigrum*	1-2.8-5	33	9.6
ANPO	*Andromeda polifol*ia	0.1-1.2-3	75	9.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENA	*Betula nana*	3-8-18	75	24.5
LEPAD	*Ledum palustre ssp. decumbens*	5-12-20	42	22.4
VAUL	*Vaccinium uliginosum*	3-8-15	50	20.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	44-54-65	0.96-1-1.8	4-4-5	2	G

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Caribou	Summer
Slight use	Grasses and sedges	Caribou	Unknown
Unknown			Unknown

Notable Plants: *Pedicularis groenlandica*

Species Richness: Number of stops—12; plant species per stop (min-avg-max)—12-19.5-26

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Subalpine Scrub Loamy Frozen Circles
Ecological Classification ID: R231XY129AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Mountains, nonsorted circles on hills and mountains

Slope (percent):	Min	Max
	5	25

Elevation (feet):	Min	Max
	2,461	4,265

Range of Aspect Direction: South to north (clockwise)

Water Table Depth (cm):	Min	Max
	2	25

Flooding: None
Ponding: None
Runoff: High

Frost-Free Days:	Min	Max
	20	110

Mean Annual Precipitation (inches):	Low	High
	13	32

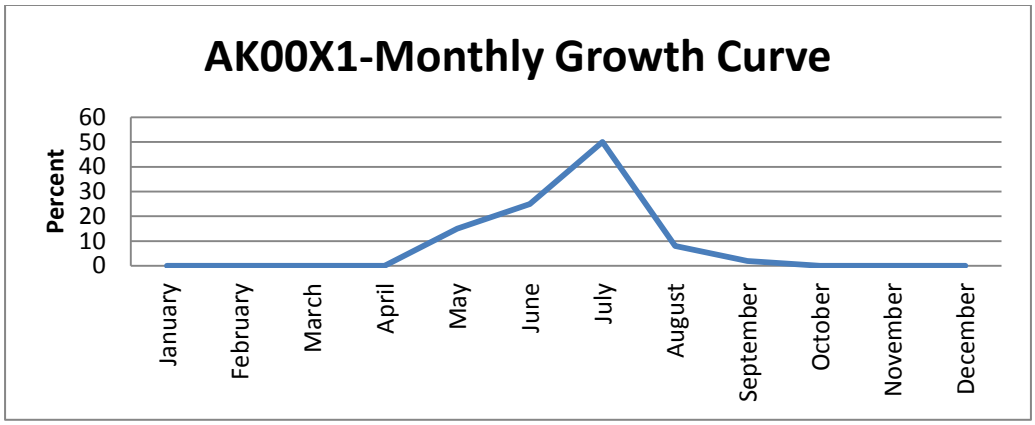
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31SD1—D31-Subalpine scrub loamy colluvial slopes, frozen
D31UC2—D31-Subalpine scrub loamy colluvial slopes, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Typic Histoturbels
Dominant Parent Material: Organic material over loamy cryoturbate
Representative Surface Texture: Slightly decomposed plant material
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	9	17	30

pH:	Low	RV	High
	3.5	5.8	6.7

Effective CEC (me/100g):	Low	High
	17.6	44.7

CEC (me/100g):	Min	RV	Max
	5.6	24.5	62

Organic Matter (percent):	Low	RV	High
	1	27.7	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.23

Plant Community Phases

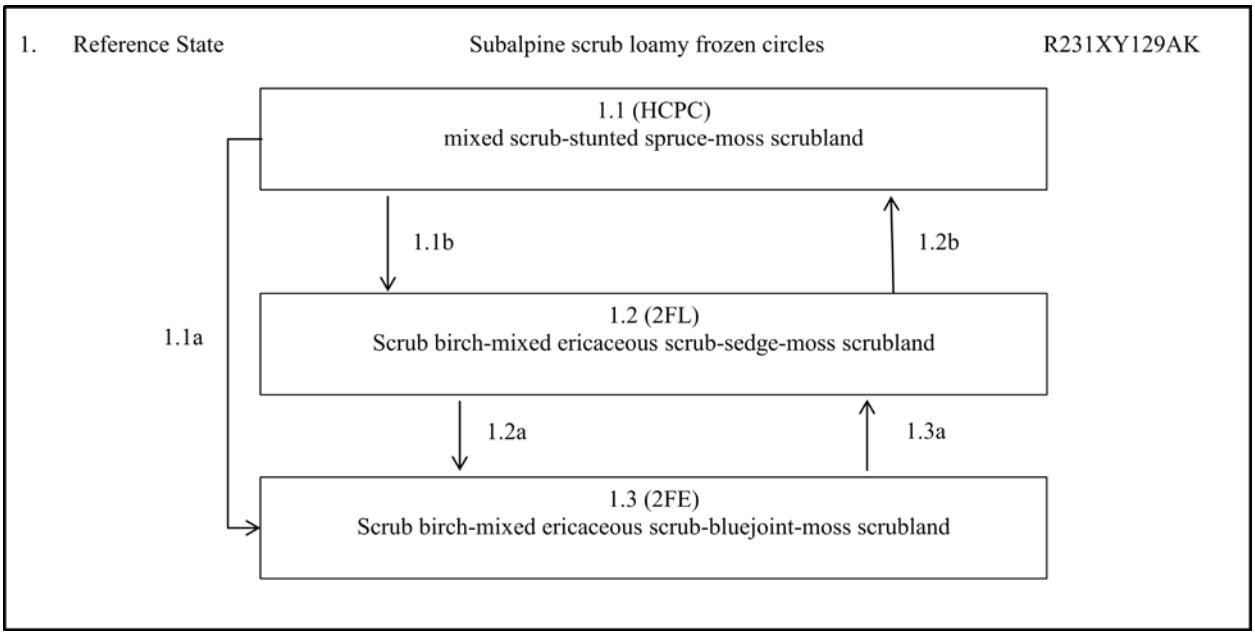
Ecological Site Description ID:	R231XY129AK

Ecological Dynamics of the Site:

This subalpine ecological site is at high elevations on backslopes of mountains (<25% slopes; 850 to 1,050 meters elevation). Cryoturbation resulted in patterned ground features known as circles. No obvious rock sorting is present. The soils in community phase 1.1 are classified as Histoturbels and are composed of organic matter over loess over loamy cryoturbate. This site is in landscape positions similar to those of site F231XY124AK, but the soils associated with site R231XY129AK have less rock fragments, have permafrost, and generally are moister.

Fire resulted in three observed phases. Fire is a natural and typically unmanaged disturbance regime. High- and low-severity fire events occur. Low-severity and high-severity fires appear to cause differences in the depth of the organic material on the soil surface, the presence and/or depth of permafrost, and the present and potential vegetation.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	For the climax phase, the dominant vegetation is a mixture of shrubs in the medium, low, and dwarf strata. The tree cover is sporadic and is in the medium, stunted, and regenerative strata. During a low-severity fire, minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Permafrost typically remains in the soil profile, and water commonly perches above it. Graminoids and scrubs quickly recolonize and become dominant as a result of below-ground root reserves that were not consumed in the fire event. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost often drops out of the soil profile, and the sites become drier. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). Graminoids and moss are more prevalent than forbs and lichen. The height of medium shrubs is defined as 3 to10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches. The height of medium trees is defined as 15 to 40 feet, and the height of stunted and regenerative trees is defined as less than 15 feet.		

Phase 1.1			
			
Community Phase Number:	1.1	Community Phase Name:	Mixed scrub-stunted spruce-moss scrubland

Community Phase Narrative:
Picea mariana and *Picea glauca* primarily are in the medium tree stratum, but neither species is abundant (total mature tree cover ~7%). This phase has abundant shrub cover that is evenly distributed among the medium, low, and dwarf shrub strata (total shrub cover ~90% cover). Common shrub species include *Betula glandulosa, Salix pulchra*, *Vaccinium uliginosum, Ledum palustre*, *Empetrum nigrum,* and *Vaccinium vitis-idaea*. Graminoids are abundant (~25% cover) and are primarily *Carex bigelowii*. Moss (~50% cover), leaf litter (~35% cover), and lichen (~20% cover) are abundant in the ground cover. The most common moss species are *Hylocomium splendens, Pleurozium schreberi,* and *Sphagnum sp*., and the most common lichen species are *Cladina* and *Cladonia*. Five observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	High-intensity fire. Fire completely removes the tree canopy and likely reduces the depth of the surface organic matter, exposing mineral soils.
1.1b	Low-intensity fire or spot fire. The soils have a wet, thick organic mat (>15 cm.), which may hinder high-severity fires. It is unclear if this disturbance pathway is typical for this ecological site. A low-intensity or spot fire in the climax phase would likely result in a community resembling a late fire phase community.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Scrub birch-mixed ericaceous scrub-sedge-moss scrubland

Community Phase Narrative:
Picea mariana and *Picea glauca* primarily are in the regenerative tree stratum, but neither species is abundant (~5% cover). This phase has abundant shrub cover that is mainly in the low shrub stratum (~75% total shrub cover). The most common species are *Alnus viridis*, *Betula glandulosa*, *Vaccinium uliginosum*, *Ledum palustre*, and *Rubus chamaemorus*. Graminoids are abundant (~15% cover), and the most common species are *Eriophorum* and *Carex sp*. Moss (~30% cover) and lichen (~25% cover) are abundant in the ground cover. The most common moss species are *Hylocomium splendens* and *Sphagnum sp*., and the most common lichen is *Flavocetraria cucullata*. Three observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire.
1.2b	Normal time and growth without fire. Overall, late and climax phase plant communities are very similar. The phases were divided in large part due to the size and amount of trees, which could be related to many factors, including elevation. In general, climax phase communities have a higher diversity of forbs and lichen. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Scrub birch-mixed ericaceous scrub-bluejoint-moss scrubland

Community Phase Narrative:	
The tree canopy is minimal and consists of regenerating *Picea mariana* (~1% cover). This phase has abundant shrub cover (~180% cover) that is mainly in the medium shrub stratum. The most common species include *Betula glandulosa*, *Vaccinium uliginosum*, and *Vaccinium vitis-idaea*. Graminoids, forbs, and lichen are minor vegetative components. *Calamagrostis canadensis* is the most common species. Moss (~40% cover) and woody debris (~10% cover) are abundant in the ground cover. The most common species of moss is *Polytrichum sp.* One observation of this phase was conducted.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3b	Normal time and growth without fire. Trees become established and the surface organic matter content increases with time since disturbance.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min 100 RV 100 Max 100

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	7	7	7

Texture: Highly decomposed plant material

AWC (cm/cm):	Min	RV	Max
	0.4	0.4	0.4

pH:	Min	RV	Max
	4.8	4.8	4.8

Subsurface Layer

Thickness (cm):	Min	RV	Max
	93	93	93

Texture: Cobbly silt loam, silt loam

AWC (cm/cm):	Min	RV	Max
	0.22	0.23	0.25

pH:	Min	RV	Max
	4.1	4.7	5.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
12-12	40-40	5-5	10-10	0-0	4-4	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-0.1	---	---	---
GT (>24 inches)	12-12	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1-1	---	---
SD (<8 inches)	---	---	50-50	---
SL (8-36 inches)	---	---	2-4	---
SM (3-10 feet)	---	---	3-85	---
TR (<15 feet)	---	---	---	0.1-0.1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	12-12-12	100	34.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	1-1-1	100	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	50-50-50	100	70.7

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	25-25-25	100	50.0
LEGR	*Ledum groenlandicum*	4-4-4	100	20.0
LEPAD	*Ledum palustre ssp. decumbens*	2-2-2	100	14.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	85-85-85	100	92.2
SAPU15	*Salix pulchra*	5-5-5	100	22.4
BENA	*Betula nana*	4-4-4	100	20.0
ALVIF	*Alnus viridis ssp. fruticosa*	3-3-3	100	17.3
SABE2	*Salix bebbiana*	3-3-3	100	17.3

Site Tree Measurements: Not measured

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-0-0	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—23-23-23

Community Phase 2FL

Rooting Depth (cm): Min RV Max
48 48 48

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
18 18 18

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.6 3.6 3.6

Subsurface Layer

Thickness (cm): Min RV Max
30 30 30

Texture: Silt loam

AWC (cm/cm): Min RV Max
0.24 0.25 0.25

pH: Min RV Max
5.9 6.1 6.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
15-40	30-35	5-20	3-10	0-0	0-0	0-1

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	2-2	---	---	---
FM (4-24 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	5-5	---
SL (8-36 inches)	---	---	10-20	---
SM (3-10 feet)	---	---	15-15	---
TS (<15 feet)	---	---	---	2-3

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	20-20-20	50	31.6
CABI5	*Carex bigelowii*	10-10-10	50	22.4
CAREX	*Carex*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	20-20-20	50	31.6
RUCH	*Rubus chamaemorus*	12-12-12	50	24.5
VAVI	*Vaccinium vitis-idaea*	4-4.5-5	100	21.2
EMNI	*Empetrum nigrum*	8-8-8	50	20.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENA	*Betula nana*	10-15-20	100	38.7
BEGL	*Betula glandulosa*	20-20-20	50	31.6
VAUL	*Vaccinium uliginosum*	10-10-10	100	31.6
LEGR	*Ledum groenlandicum*	15-15-15	50	27.4
SAGL	*Salix glauca*	10-10-10	50	22.4
SAPU15	*Salix pulchra*	2-2-2	50	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	6-10.5-15	100	32.4

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-3-3	100	17.3
PIGL	*Picea glauca*	2-2-2	50	10.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	40-40-40	3-3-3	17-17-17	1	G

Tree Basal Area:

Min-Avg-Max	Number of Stands
4-4-4	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use			Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—21-22-23

Community Phase HCPC

Rooting Depth (cm): Min RV Max
26 61.8 97

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
15 18.8 21

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.2 4.8 6.5

Subsurface Layer

Thickness (cm): Min RV Max
11 43 76

Texture: Gravelly silt loam, gravelly sandy loam, permanently frozen silt loam, channery loam, channery silt loam, silt loam, sandy loam, muck

AWC (cm/cm): Min RV Max
0.12 0.22 0.4

pH: Min RV Max
4.9 6.1 7.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-40	45-60	10-70	1-5	0-2	0-1	0-3

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	---	---	---	---
FM (4-24 inches)	---	1-5	---	---
SD (<8 inches)	---	---	0.1-5	---
SL (8-36 inches)	---	---	10-20	---
TR (<15 feet)	---	---	---	1-2
TS (<15 feet)	---	---	---	10-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	15-20-35	80	40.0
CACA4	*Calamagrostis canadensis*	5-15-25	40	24.5
POPA2	*Poa palustris*	15-15-15	20	17.3
CAREX	*Carex*	10-10-10	20	14.1
ERIOP	*Eriophorum*	10-10-10	20	14.1
ERAN6	*Eriophorum angustifolium*	10-10-10	20	14.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	0.1-2-3	60	11.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	15-15-15	20	17.3
POBI5	*Polygonum bistorta*	1-2.7-5	60	12.6
PEFR5	*Petasites frigidus*	3-3-3	40	11.0
SAAN3	*Saussurea angustifolia*	5-5-5	20	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-8-20	100	28.3
EMNI	*Empetrum nigrum*	2-8-20	100	28.3
ARAL2	*Arctostaphylos alpina*	1-3-5	40	11.0
RUCH	*Rubus chamaemorus*	1-3-5	40	11.0
DROC	*Dryas octopetala*	5-5-5	20	10.0
ARRU	*Arctostaphylos rubra*	5-5-5	20	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	5-15-25	100	38.7
BEGL	*Betula glandulosa*	15-17.5-20	40	26.5
LEPAD	*Ledum palustre ssp. decumbens*	3-11-15	60	25.7
LEGR	*Ledum groenlandicum*	30-30-30	20	24.5
SAPU15	*Salix pulchra*	5-10-15	60	24.5
SAGL	*Salix glauca*	2-13.5-25	40	23.2
BENA	*Betula nana*	5-7.5-10	40	17.3
SARI4	*Salix richardsonii*	5-5-5	20	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	10-17.5-25	40	26.5
BEGL	*Betula glandulosa*	10-15-20	40	24.5
ALVIF	*Alnus viridis ssp. fruticosa*	20-20-20	20	20.0
SAGL	*Salix glauca*	5-10-15	40	20.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	0.1-3-5	80	15.6
PIMA	*Picea mariana*	1-3-5	40	11.0

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-10-10	20	14.1
PIGL	*Picea glauca*	5-5-5	40	14.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	15-15-15	20	17.3
PIGL	*Picea glauca*	5-6.5-8	40	16.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	23-48-72	1.8-2-2.4	6-8-9	2	G

Tree Basal Area:

Min-Avg-Max	Number of Stands
5-5-5	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—5; plant species per stop (min-avg-max)—24-30.4-43

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Alpine Dwarf Scrub- Lichen Mosaic Gravelly, Circles
Ecological Classification ID: R231XY134AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Sorted circles on mountains

Slope (percent):	Min	Max
	4	55

Elevation (feet):	Min	Max
	3,281	7,546

Range of Aspect Direction: All aspects
Water Table Depth (cm): None recorded
Flooding: None
Ponding: None
Runoff: Very low

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	15	32

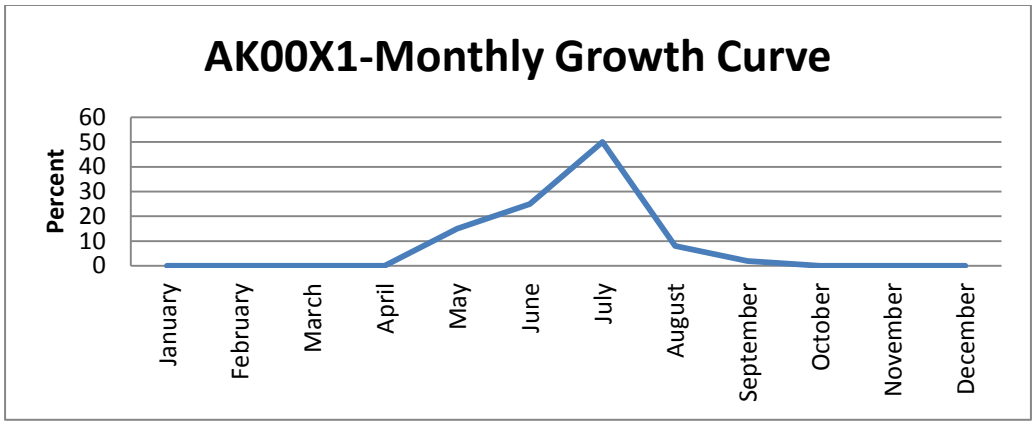
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-26	5
February	0	2	-26	14
March	0	2	-17	25
April	0	1	0	45
May	0	3	21	59
June	1	7	32	68
July	2	5	36	72
August	2	6	32	66
September	1	5	19	50
October	1	4	1	28
November	1	4	-15	14
December	1	3	-24	10

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT1—D31-Alpine scrub gravelly circles
D31MT2—D31-Alpine scrub gravelly circles

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, nonacid, subgelic Typic Haplogelepts

Dominant Parent Material: Gravelly cryoturbate

Representative Surface Texture: Gravelly silt loam

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	9	13	17

pH:	Low	RV	High
	4.2	5.5	6.2

Effective CEC (me/100g):	Low	High
	3.5	4

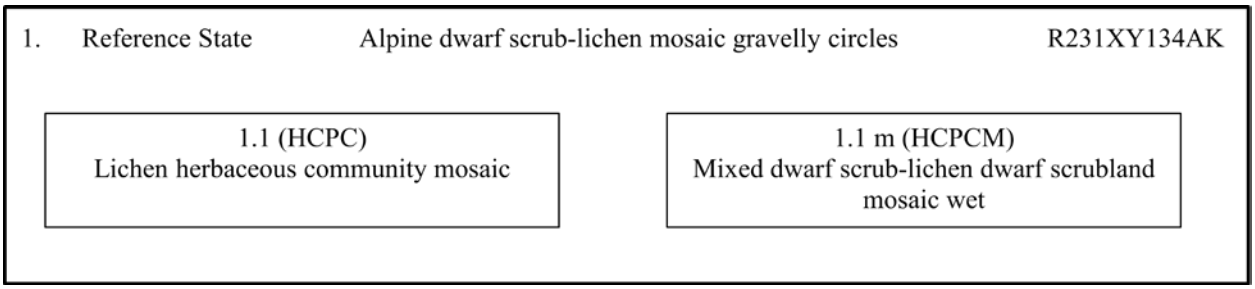
CEC (me/100g):	Min	RV	Max
	4	12.4	25

Organic Matter (percent):	Low	RV	High
	2	3.3	6

Bulk Density (1/3-Bar):	Min	RV	Max
	1.05	1.3	1.45

Plant Community Phases

Ecological Site Description ID:	R231XY134AK
Ecological Dynamics of the Site:	
This alpine ecological site is on summits, shoulders, and backslopes of mountains. Cryoturbation resulted in patterned ground features known as circles and stripes. Circles are in areas that have slopes of <5%, and stripes are in areas that have slopes of >5%. The vegetative communities and soils associated with circles and stripes are similar. The soils in community phase 1.1m are classified as Haplogelepts and are composed of thin organic matter over gravelly cryoturbate. Disturbances resulting in other community phases were not observed.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	This site supports a mosaic of vegetative communities. For the climax phases, the dominant vegetation on rock piles is lichen and that on moist interspaces is dwarf shrubs. The height of dwarf shrubs is defined as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Lichen herbaceous community mosaic
Community Phase Narrative:			
This community consists primarily of crustose and foliose lichen that grow directly on exposed rock or in rock crevices. Common species include *Brodoa sp., Rhizocarpon sp., and Bryoria* sp. Shrubs, graminoids, forbs, and moss are minor vegetative components of this phase that grow in rock crevices.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	No pathways observed.		

Phase 1.1m	See above.		
Community Phase Number:	1.1m	Community Phase Name:	Mixed dwarf scrub-lichen dwarf scrubland mosaic wet
Community Phase Narrative:			
The dwarf shrub cover generally is more than 40% and diversity is high (13 observed species). Common dwarf shrubs include *Dryas octopetala*, *Cassiope tetragona*, *Salix sp.,* and *Loiseleuria procumbens.* Low and medium shrubs, such as *Betula glandulosa,* are present but are not a dominant component. The diversity of graminoids and forbs is high, but they are minor vegetative components. A common graminoid is *Carex bigelowii*. The diversity and abundance of lichen is high (>20 species; >30% ground cover), but individual species make up limited cover. Common species include *Flavocetraria cucullata* and *Cladina sp*.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1A	No pathways observed.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
48 57.2 66

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Very gravelly loam, very gravelly sandy loam, silt loam, stony silt loam

AWC (cm/cm): Min RV Max
0.1 0.16 0.24

pH: Min RV Max
4.9 5.5 6.1

Subsurface Layer

Thickness (cm): Min RV Max
48 57.2 66

Texture: Very gravelly coarse sand, very gravelly sandy loam, extremely gravelly coarse sandy loam, very stony fine sandy loam, fine sandy loam, extremely stony fine sandy loam, extremely stony silt loam

AWC (cm/cm): Min RV Max
0.02 0.15 0.24

pH: Min RV Max
5.3 5.7 6.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
6-63	1-40	1-35	0-3	0-5	20-92	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GD (<4 inches)	0.1-2	---	---	---
FD (<4 inches)	---	0.1-3	---	---
SD (<8 inches)	---	---	0.1-0.1	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—D (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	10-10-10	25	15.8

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POPA2	*Poa palustris*	8-8-8	25	14.1
CABI5	*Carex bigelowii*	0.1-2-5	75	12.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAR27	*Salix arctica*	12-12-12	25	17.3
DILA	*Diapensia lapponica*	12-12-12	25	17.3
VAVI	*Vaccinium vitis-idaea*	0-5-10	50	15.8
DROC	*Dryas octopetala*	3-4-5	50	14.1

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges		Spring

Notable Plants: None observed

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—14-22.2-29

Community Phase HCPCM

Rooting Depth (cm):	Min	RV	Max
	46	51	56

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min 0 Avg 3 Max 6

Texture: Cobbly silt loam, channery silt loam, gravelly sandy loam, moderately decomposed plant material, silt loam, sandy loam, slightly decomposed plant material, stony moderately decomposed plant material, stony silt loam

AWC (cm/cm): Min 0.12 RV 0.3 Max 0.35

pH: Min 3.5 RV 4.1 Max 4.7

Subsurface Layer

Thickness (cm): Min 46 RV 48 Max 50

Texture: Very gravelly sandy loam, extremely gravelly silt loam, extremely stony loam, very fine sandy loam

AWC (cm/cm): Min 0.1 RV 0.18 Max 0.24

pH: Min 4.5 RV 5.3 Max 5.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-90	0-35	0-53	0-3	0-10	0-70	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	1-2	---
SL (8-36 inches)	---	---	0.1-0.1	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	2-5.5-10	21	10.8

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	0.1-10.3-25	63	25.6
HIAL3	*Hierochloe alpina*	3-6.7-15	37	15.7
FEBR	*Festuca brachyphylla*	1-6.5-20	21	11.7

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANNA	*Anemone narcissiflora*	2-5.2-10	26	11.7
BORI2	*Boykinia richardsonii*	1-5.3-10	16	9.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
DROC	*Dryas octopetala*	0-18.6-60	58	32.9
CATE11	*Cassiope tetragona*	1-14.3-70	63	30.1
LOPR	*Loiseleuria procumbens*	1-14.4-30	37	23.1
SAPH	*Salix phlebophylla*	1-9.3-40	47	21.0
DRYAS	*Dryas*	10-30-50	11	17.8
VAVI	*Vaccinium vitis-idaea*	0.1-3.4-10	68	15.3
EMNI	*Empetrum nigrum*	0-5.1-15	42	14.7
SAPO	*Salix polaris*	1-4-10	32	11.2
DILA	*Diapensia lapponica*	0.1-2.3-7	42	9.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	50-50-50	5	16.2

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use		Caribou	Summer
Slight use		Dall sheep	Summer
Slight use	Grasses and sedges		Spring
Slight use	Grasses and sedges	Caribou	Summer
Slight use	Grasses and sedges	Dall sheep	Unknown
Slight use	Grasses and sedges	Other	Spring
Slight use	Lichen	Caribou	Unknown
Slight use	Lichen	Dall sheep	Unknown
Slight use	Willows	Caribou	Unknown

Notable Plants: *Draba densifolia*

Species Richness: Number of stops—19; plant species per stop (min-avg-max)—14-25.7-40

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Scrub Peat Floodplain
Ecological Classification ID: R231XY137AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Depressions of terraces, terraces, thermokarst depressions of loess plains

Slope (percent):	Min	Max
	0	5

Elevation (feet):	Min	Max
	492	1,968

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	20

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Negligible

Frost-Free Days:	Min	Max
	50	110

Mean Annual Precipitation (inches):	Low	High
	9	21

Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

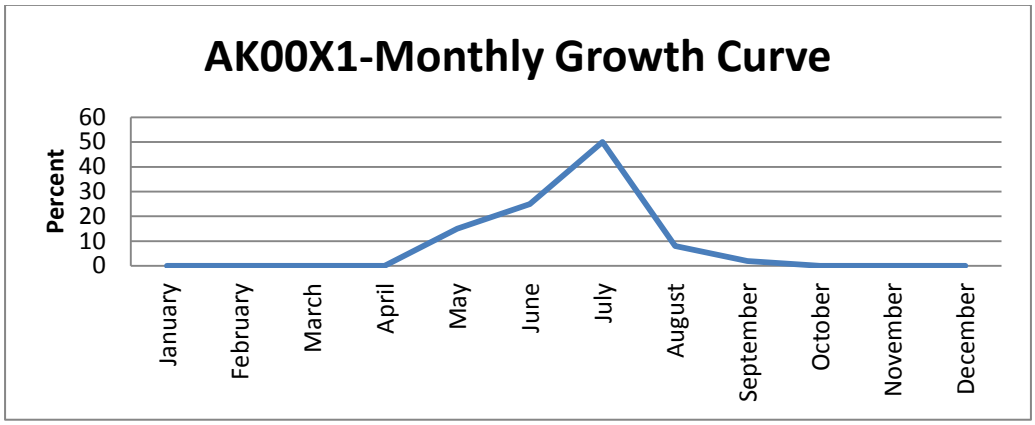
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31UC4—D31-Boreal scrub organic depressions
D31YV2—D31-Boreal scrub organic depressions
D31YV9—D31-Boreal scrub organic depressions

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid Typic Cryaquents

Dominant Parent Material: Mossy organic material over loamy alluvium

Representative Surface Texture: Peat

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately high

AWC Total (cm):	Low	RV	High
	15	30	56

pH:	Low	RV	High
	3.4	6.7	7

Effective CEC (me/100g):	Low	High
	22	40

CEC (me/100g):	Min	RV	Max
	4	33	62

Organic Matter (percent):	Low	RV	High
	2	41	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.6	1.02

Plant Community Phases

Ecological Site Description ID:	R231XY137AK

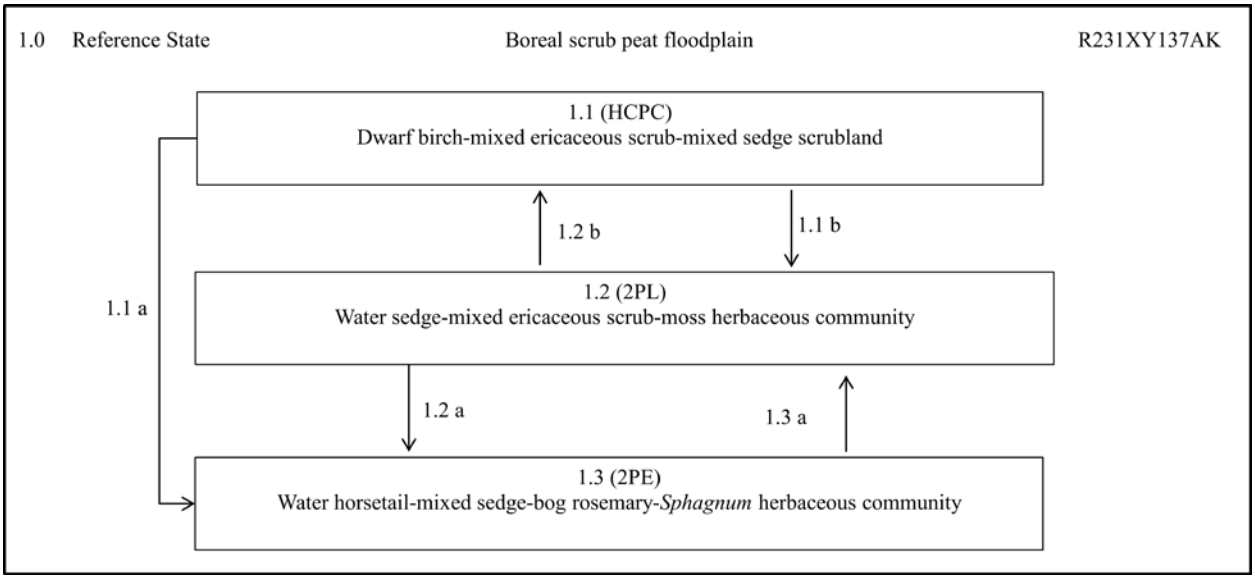
Ecological Dynamics of the Site:

This boreal ecological site is in linear depressions adjacent to river flood plains. The depressions tend to have some standing water but are cut off from the main river channel. The soils in community phase 1.1 are classified as Cryaquents and are composed of organic matter over loamy alluvium. The organic mat ranges from 54 to 158 centimeters thick. The thick organic mat and lack of flood plain depositional material near the soil surface suggests that these linear depressions are stable and not frequently flooded.

The degree of ponding is believed to result in three distinct phases. The most saturated areas tend to be phase 1.3 and the least saturated areas tend to be phase 1.1. Ponded water is common on the soil surface in phases 1.2 and 1.3. Phase 1.3 tends to have a thicker organic mat (averages 142 cm. thick) as compared to phase 1.2 (averages 69.5 cm. thick) or phase 1.1 (61 cm. thick).

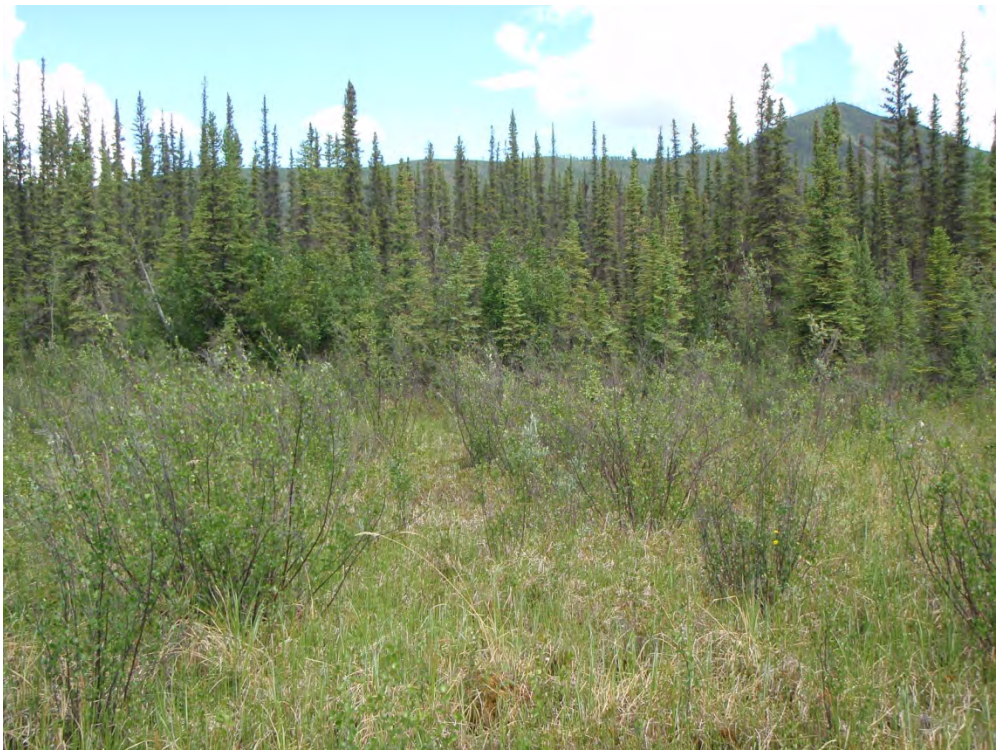
Other disturbance regimes were not observed, and no alternate states were documented.

State and Transition Diagram:

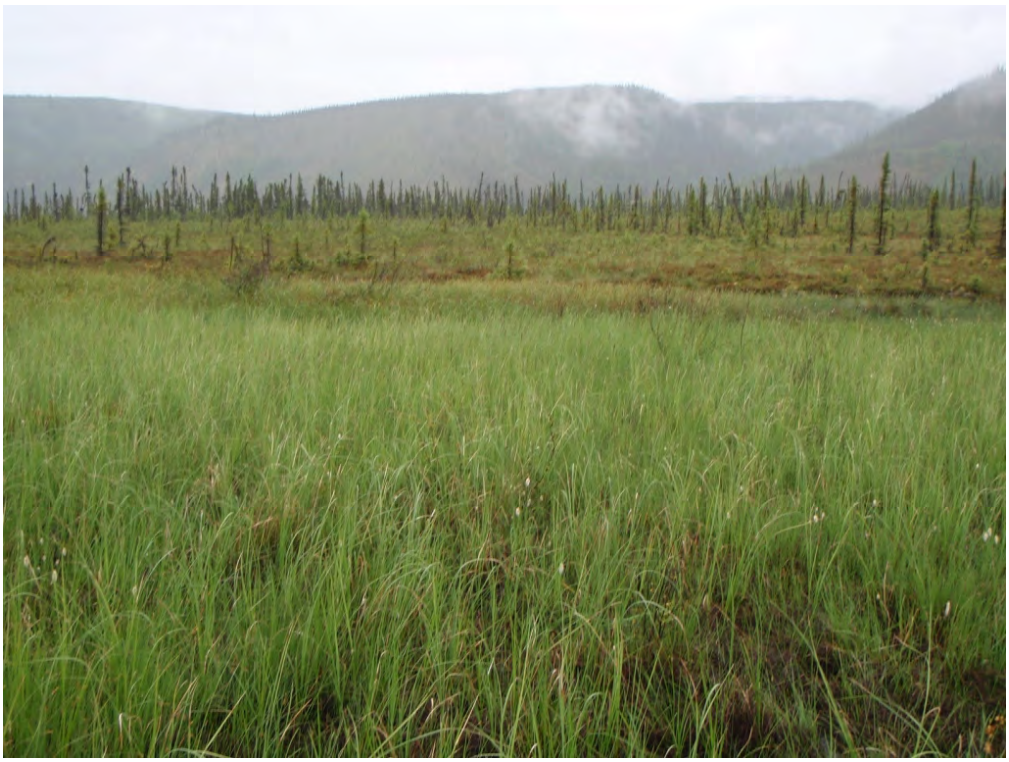


State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of the structure and dominance of forb, graminoid, and shrub species, which are believed to be directly related to the degree of ponding in the linear depressions. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Dwarf Birch-Mixed Ericaceous Scrub-Mixed Sedge Scrubland
Community Phase Narrative:			
This phase is primarily a mixture of shrub and sedge species. A tree cover is not present. The majority of the shrub cover is in the medium and dwarf shrub strata (total shrub cover ~40%). Common shrub species include *Betula glandulosa*, *Andromeda polifolia*, and *Chamaedaphne calyculata*. Graminoids are prevalent (~50% cover), and common species include *Carex aquatilis*, *Carex microchaeta, Carex tenuiflora, and Carex bigelowii.* Forbs are *Equisetum fluviatile* and *Comarum palustre,* and they make up ~10% cover. Moss and lichen are not present. One observation of this phase was conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Increased ponding may convert this scrub-dominant phase into a forb-dominant phase.
1.1b	Increased ponding may convert this scrub-dominant phase into a sedge-dominant phase.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Water Sedge-Mixed Ericaceous Scrub-Moss Herbaceous Community
Community Phase Narrative:			
This phase dominantly consists of an assortment of sedges. Trees and shrubs are minor vegetative components. *Chamaedaphne calyculata* and *Andromeda polifolia* are common (total shrub cover ~10%). Sedges are prevalent (~60% cover), and the most common species is *Carex aquatilis*. Forbs and lichen are minor vegetative components. Moss forms an abundant ground cover (40% cover). Sphagnum moss is most common (~15% cover). Four observations of this phase were conducted.			
Community Pathways			

Pathway Number:	Pathway Name & Description:
1.2a	Normal time and growth transition this sedge community into a scrub community. As the community shifts, the water table appears to move lower into the soil profile.
1.2b	Increased ponding might convert this sedge-dominant phase into a forb-dominant phase.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Water Horsetail-Mixed Sedge-Bog Rosemary-Sphagnum Herbaceous Community
Community Phase Narrative:			
This phase consists dominantly of an assortment of forbs and sedges. Trees and shrubs are minor vegetative components. *Andromeda polifolia* is common (total shrub cover ~10%). Graminoids (~50% cover) and forbs (~50% cover) are abundant. Common graminoids are *Carex aquatilis*, *Carex limosa*, and *Carex vaginata*. Common forbs include *Equisetum fluviatile*, *Menyanthes trifoliate*, and *Comarum palustre*. Lichen is not present. Moss forms an abundant ground cover (20%). Sphagnum moss is prevalent (~15% cover). Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	Normal time and growth transition this forb community to a sedge community. As the community shifts, the water table appears to move lower into the soil profile.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2PE

Rooting Depth (cm):	Min	RV	Max
	20	55	79

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	20	40	60

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4.2	6	7.4

Subsurface Layer

Thickness (cm):	Min	RV	Max
	40	60	79

Texture: Mucky peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	5.5	5.6	5.8

Influencing Water Features

NWI Code: PEM1

NWI Description: Palustrine, Emergent, Persistent

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-1	50-95	10-35	0-2	0-1	0-0	5-30

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	45-45	---	---	---
GT (>24 inches)	0.1-8	---	---	---
FD (<4 inches)	---	5-5	---	---
FM (4-24 inches)	---	1-7	---	---
FT (>24 inches)	---	55-55	---	---
SD (<8 inches)	---	---	10-10	---
SL (8-36 inches)	---	---	0.1-3	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CALI7	*Carex limosa*	45-45-45	33	38.7
CAVA2	*Carex vaginata*	40-40-40	33	36.5
CAREX	*Carex*	2-13.5-25	67	30.0
CAAQ	*Carex aquatilis*	25-25-25	33	28.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAQ	*Carex aquatilis*	8-8-8	33	16.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
METR3	*Menyanthes trifoliata*	10-10-10	33	18.3
GATR2	*Galium trifidum*	5-5-5	33	12.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQFL	*Equisetum fluviatile*	35-35-35	33	34.2
COPA28	*Comarum palustre*	3-5-7	100	22.4
METR3	*Menyanthes trifoliata*	5-6-7	67	20.0
PAPA8	*Parnassia palustris*	1-3-5	67	14.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQFL	*Equisetum fluviatile*	50-52.5-55	67	59.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANPO	*Andromeda polifol*ia	8-9-10	67	24.5

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	7-7-7	33	15.3
ANPO	*Andromeda polifol*ia	3-3-3	33	10.0
SALIX	*Salix*	3-3-3	33	10.0
CHCA2	*Chamaedaphne calyculata*	3-3-3	33	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—11-12.7-15

Community Phase 2PL

Rooting Depth (cm):	Min	RV	Max
	17	103	190

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	17	42	64

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4.9	6.3	7.6

Subsurface Layer

Thickness (cm):	Min	RV	Max
	77	102	124

Texture: Mucky peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4.9	6.3	7.6

Influencing Water Features

NWI Code: L2EM2, PEM1, PLM1

NWI Description: Lacustrine, Littoral, Emergent, Nonpersistent; Palustrine, Emergent, Persistent; Palustrine, Moss-Lichen, Moss

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	5-95	15-40	0-1	0-5	0-0	0-30

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-30	---	---	---
FD (<4 inches)	---	0.1-1	---	---
FM (4-24 inches)	---	15-15	---	---
SD (<8 inches)	---	---	0.1-2	---
SL (8-36 inches)	---	---	0.1-7	---
TR (<15 feet)	---	---	---	0.1-0.1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAQ	*Carex aquatilis*	15-42.5-80	100	65.2
ERSC2	*Eriophorum scheuchzeri*	20-20-20	25	22.4
CATE5	*Carex tenuiflora*	20-20-20	25	22.4
ERVA4	*Eriophorum vaginatum*	15-15-15	25	19.4
CAPO	*Carex podocarpa*	10-10-10	25	15.8
CAMIM	*Carex microchaeta ssp. microchaeta*	10-10-10	25	15.8
CACA4	*Calamagrostis canadensis*	5-5-5	25	11.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
METR3	*Menyanthes trifoliata*	0-2.5-5	50	11.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	15-15-15	25	19.4
COPA28	*Comarum palustre*	1-2-3	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANPO	*Andromeda polifol*ia	1-4.3-10	75	18.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	1-5.7-15	75	20.6
BENA	*Betula nana*	0.1-4-7	75	17.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Caribou	Unknown
Slight use	Grasses and sedges	Moose	

Notable Plants: None observed

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—7-12.2-17

Community Phase HCPC

Rooting Depth (cm): Min RV Max
18 40 61

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
18 18 18

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
7.1 7.1 7.1

Subsurface Layer

Thickness (cm): Min RV Max
43 43 43

Texture: Mucky peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.9 6.3 7.6

Influencing Water Features

NWI Code: PSS6

NWI Description: Palustrine, Scrub-Shrub, Indeterminate Deciduous

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	50-50	50-50	0-0	0-0	0-0	5-5

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-2	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	10-2	---	---
SD (<8 inches)	---	---	3-5	---
SM (3-10 feet)	---	---	0.1-3	---
TR (<15 feet)	---	---	---	0.1-0.1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAQ	*Carex aquatilis*	15-15-15	100	38.7
CATE5	*Carex tenuiflora*	10-10-10	100	31.6
CABI5	*Carex bigelowii*	10-10-10	100	31.6
CAMI4	*Carex microchaeta*	10-10-10	100	31.6
CACA4	*Calamagrostis canadensis*	2-2-2	100	14.1
CADI4	*Carex diandra*	2-2-2	100	14.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQFL	*Equisetum fluviatile*	10-10-10	100	31.6
COPA28	*Comarum palustre*	2-2-2	100	14.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	5-5-5	100	22.4
ANPO	*Andromeda polifol*ia	5-5-5	100	22.4
RUAR	*Rubus arcticus*	3-3-3	100	17.3

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	25-25-25	100	50.0
SACA4	*Salix candida*	3-3-3	100	17.3
SAGL	*Salix glauca*	2-2-2	100	14.1
PEFL15	*Pentaphylloides floribunda*	1-1-1	100	10.0
PEFL15	*Pentaphylloides floribunda*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: *Salix candida*

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—20-20-20

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Scrub Loamy Depression
Ecological Classification ID: R231XY138AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Mountains, turf hummocks on hills

Slope (percent):	Min	Max
	0	3

Elevation (feet):	Min	Max
	656	2,133

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	2	40

Flooding: None

Ponding:	Frequency	Duration
	Rare	Brief

Runoff: Negligible

Frost-Free Days:	Min	Max
	50	110

Mean Annual Precipitation (inches):	Low	High
	9	21

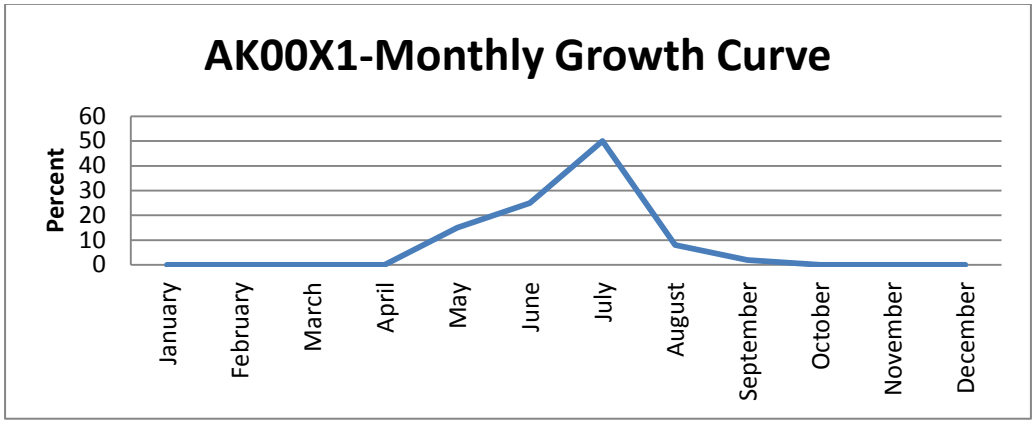
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31YV9—D31-Boreal scrub loamy depressions

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid Typic Cryaquents
Dominant Parent Material: Organic material over loamy alluvium
Representative Surface Texture: Peat
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	15	37	65

pH:	Low	RV	High
	3.4	6.3	7.5

Effective CEC (me/100g):	Low	High
	22	40

CEC (me/100g):	Min	RV	Max
	5.8	33.9	62

Organic Matter (percent):	Low	RV	High
	2	41	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.7	1.25

Plant Community Phases

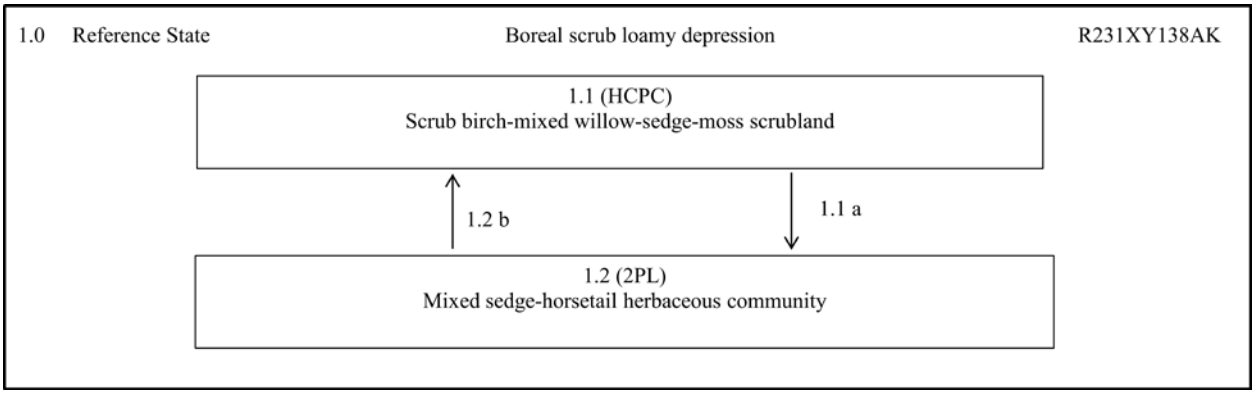
Ecological Site Description ID:	R231XY138AK

Ecological Dynamics of the Site:

This boreal ecological site is on linear depressions adjacent to river flood plains. The depressions tend to have some standing water, but they appear to be cut off from the main river channel. Indicators of seasonal flooding are common (i.e., freshly deposited alluvial material). The soils in community phase 1.1 are classified as Cryaquents and are composed of organic matter over loamy alluvium. The thickness of the organic material is 0 to 35 centimeters in phase 1.2 and 24 centimeters in phase 1.1.

Two phases were observed. Other disturbance regimes were not observed, and no alternate states were documented.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Phases in the reference state were grouped on the basis of the structure and dominance of graminoid and shrub species, which are believed to relate to flood events. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Scrub Birch-Mixed Willow-Sedge-Moss Scrubland

Community Phase Narrative:

This phase is characterized by a dominance of scrub species. Seedlings of *Betula neoalaskana* and *Picea mariana* are present but not in abundance. The majority of the shrub cover is in the medium stratum (total scrub cover ~70%), and the most common species were *Betula glandulosa*, *Salix interior*, and *Salix pulchra*. Graminoids make up ~15% cover, and the species include *Carex bigelowii*, *Carex aquatilis*, and *Calamagrostis canadensis*. Forbs and lichen are minor vegetative components. Moss forms an extensive ground cover (~80%). One observation of this phase was conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.1a	Increased flood activity might convert this scrub-dominant phase into a sedge-dominant phase.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Mixed Sedge-Horsetail Herbaceous Community
Community Phase Narrative:			
This phase is characterized by a dominance of sedge and horsetail species. Trees and shrubs are minor vegetative components. The diversity and abundance of graminoids is high (~80% cover), and common species include *Carex aquatilis*, *Carex atherodes*, and *Carex utriculata.* Forbs make up ~20% cover, and the most common species is *Equisetum fluviatile*. Moss and lichen are minor vegetative components. Five observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Normal time and growth transition this sedge community into a scrub community. This shift may be due to the flood regime in the depressions.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2PL

Rooting Depth (cm): Min RV Max
57 91.5 126

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 1.5 3

Texture: Muck, silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.25 0.3 0.4

pH: Min RV Max
5.1 5.5 5.8

Subsurface Layer

Thickness (cm): Min RV Max
57 90 123

Texture: Loam, silt loam, fine sand

AWC (cm/cm): Min RV Max
0.06 0.17 0.25

pH: Min RV Max
5.5 6 6.5

Influencing Water Features

NWI Code: L2EM2, PEM1, PUB2, PSS1

NWI Description: Lacustrine, Littoral, Emergent, Nonpersistent; Palustrine, Emergent, Persistent; Palustrine, Unconsolidated Bottom, Sand; Palustrine, Scrub-Shrub, Broad-Leaved Deciduous

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	0-40	3-100	0-85	0-15	0-0	0-3

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	10-45	---	---	---
FT (>24 inches)	---	45-45	---	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum: GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALAE	*Alopecurus aequalis*	5-5-5	20	10.0

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERAN6	*Eriophorum angustifolium*	65-65-65	20	36.1
CAAQ	*Carex aquatilis*	15-15-15	20	17.3
BESY	*Beckmannia syzigachne*	15-15-15	20	17.3
GLGR	*Glyceria grandis*	10-10-10	20	14.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAT2	*Carex atherodes*	99-99-99	20	44.5
CAUT	*Carex utriculata*	65-65-65	20	36.1
CABI5	*Carex bigelowii*	45-45-45	20	30.0
CAAQ	*Carex aquatilis*	45-45-45	20	30.0
CACA4	*Calamagrostis canadensis*	40-40-40	20	28.3
GLGR	*Glyceria grandis*	10-10-10	20	14.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQFL	*Equisetum fluviatile*	25-35-45	40	37.4
EQHY	*Equisetum hyemale*	25-25-25	20	22.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAAL	*Salix alaxensis*	6-6-6	20	11.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Moose	Summer

Notable Plants: *Carex atherodes*

Species Richness: Number of stops—5; plant species per stop (min-avg-max)—2-6-11

Community Phase HCPC

Rooting Depth (cm): Min RV Max
26 64 115

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 19.7 35

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
6.3 6.5 6.6

Subsurface Layer

Thickness (cm): Min RV Max
26 44.3 80

Texture: Silt loam

AWC (cm/cm): Min RV Max
0.08 0.22 0.25

pH: Min RV Max
5.5 6.3 6.7

Influencing Water Features

NWI Code: PSS1

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-2	80-80	40-40	0-0	0-0	0-0	1-1

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	5-5	---	---	---
FM (4-24 inches)	---	0.01-3	---	---
SD (<8 inches)	---	---	3-3	---
SL (8-36 inches)	---	---	1-2	---
SM (3-10 feet)	---	---	10-30	---
TR (<15 feet)	---	---	---	1-1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	5-5-5	100	22.4
CAAQ	*Carex aquatilis*	5-5-5	100	22.4
CACA4	*Calamagrostis canadensis*	5-5-5	100	22.4

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQFL	*Equisetum fluviatile*	3-3-3	100	17.3
COPA28	*Comarum palustre*	2-2-2	100	14.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	3-3-3	100	17.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	2-2-2	100	14.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	30-30-30	100	54.8
SAPU15	*Salix pulchra*	20-20-20	100	44.7
SAIN3	*Salix interior*	10-10-10	100	31.6
ALVIF	*Alnus viridis ssp. fruticosa*	2-2-2	100	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	1-1-1	100	10.0
PIMA	*Picea mariana*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—19-19-19

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Subalpine Scrub Loamy Slopes
Ecological Classification ID: R231XY139AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Hills, nonsorted circles on hills, turf hummocks on hills

Slope (percent):	Min	Max
	1	5

Elevation (feet):	Min	Max
	3,117	4,183

Range of Aspect Direction: All aspects
Water Table Depth (cm): None recorded
Flooding: None
Ponding: None
Runoff: Low

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	16	26

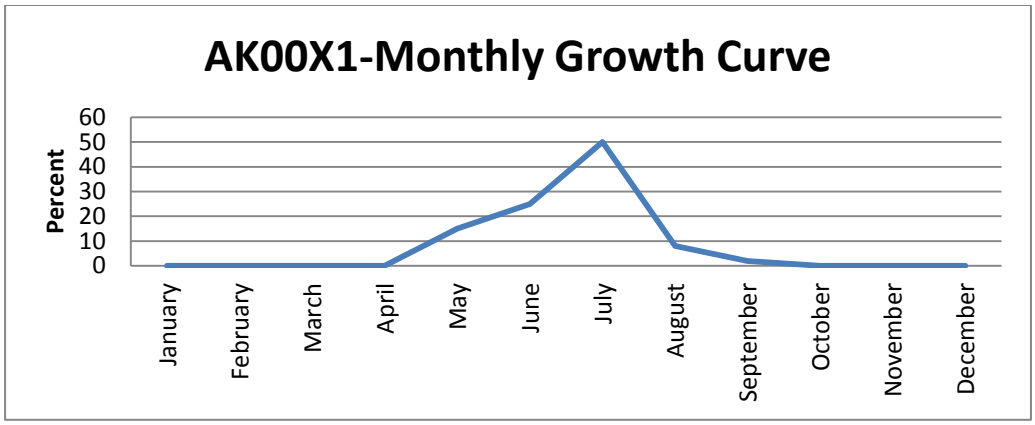
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TF1—D31-Subalpine scrub loamy residual slopes

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive Typic Haplocryepts

Dominant Parent Material: Organic material over gravelly residuum

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	5	8	13

pH:	Low	RV	High
	3.4	5.1	6.2

Effective CEC (me/100g):	Low	High
	11	30.3

CEC (me/100g):	Min	RV	Max
	4	25.8	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.38

Plant Community Phases

Ecological Site Description ID:	R231XY139AK		
Ecological Dynamics of the Site:			
This subalpine ecological site is on broad, rounded summits/shoulders of hills at high elevations (<10% slopes, 1,050 to 1,200 meters elevation). Sporadic white spruce is present, but the tree cover generally is <5% and limited in large part due to the cold microclimate. The plant communities are similar to those of site R231XY164AK, but they differ because of a lack of fire disturbance. This ecological site was observed specifically in the Three-Fingers Basin. The soils in community phase 1.1 are classified as Haplocryepts and are composed of organic matter over gravelly residuum. Disturbances resulting in other plant community phases were not observed.			
State and Transition Diagram:			
1. Reference State subalpine scrub loamy slopes R231XY139AK 1.1 (HCPC) Scrub birch-mixed ericaceous scrub-lichen scrubland			
State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Vegetation is primarily a mixture of medium shrubs, low shrubs, dwarf shrubs, and lichen. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches. Only one phase for this reference state was observed. Due to the regional specificity and remoteness of this ecological site, only three observations were conducted.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Scrub birch-mixed ericaceous scrub-lichen scrubland
Community Phase Narrative:			
Picea glauca is present, but it generally makes up <5% cover. Mature trees average 85 years of age. The shrub cover is distributed among the medium, low, and dwarf strata (total shrub cover ~95%), and the most common species are *Betula glandulosa*, *Vaccinium uliginosum,* and *Empetrum nigrum*. The forb and graminoid cover is limited, but *Carex bigelowii* is common. The diversity of lichen is high (12 species), but individual species make up limited cover. The most abundant lichen are *Masonhalea richardsonii and Stereocaulon tomentosum.*			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	No observed pathways.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
33 41 52

Restrictive Features: None recorded

Drainage Class: Somewhat excessively drained

Surface Layer

Thickness (cm): Min RV Max
10 12.3 15

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.6 3.9 4.2

Subsurface Layer

Thickness (cm): Min RV Max
23 28.7 37

Texture: Gravelly sandy loam, very gravelly coarse sandy loam, very gravelly sandy loam, extremely gravelly sandy loam, silt loam, sandy loam

AWC (cm/cm): Min RV Max
0.08 0.12 0.25

pH: Min RV Max
4 5 6.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
45-65	35-40	5-20	0-5	1-1	1-5	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-3	---	---	---
GT (>24 inches)	2-2	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	1-5	---
SL (8-36 inches)	---	---	15-3	---
SM (3-10 feet)	---	---	30-30	---
TR (<15 feet)	---	---	---	2-2
TS (<15 feet)	---	---	---	2-2
TM (15-40 feet)	---	---	---	3-3

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	10-10-10	100	31.6
CAREX	*Carex*	3-3-3	33	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	10-11.7-15	100	34.2
VAVI	*Vaccinium vitis-idaea*	5-6.7-10	100	25.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	15-25-40	100	50.0
BEGL	*Betula glandulosa*	60-60-60	33	44.7
SAPU15	*Salix pulchra*	3-6.5-10	67	20.8
LEPAD	*Ledum palustre ssp. decumbens*	1-1.5-2	67	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	30-35-40	67	48.3
SAPU15	*Salix pulchra*	10-10-10	33	18.3

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	2-2-2	67	11.5

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-2.7-5	100	16.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-3-3	33	10.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	77-85-93	6.3-7-7.6	18-20-23	2	B

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use			Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—22-26.7-29

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Subalpine Scrub Loamy Hummock
Ecological Classification ID: R231XY148AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Earth hummocks on hills, turf hummocks on hills

Slope (percent):	Min	Max
	5	65

Elevation (feet):	Min	Max
	2,953	4,429

Range of Aspect Direction: East to west (clockwise)
Water Table Depth (cm): None recorded
Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	15	32

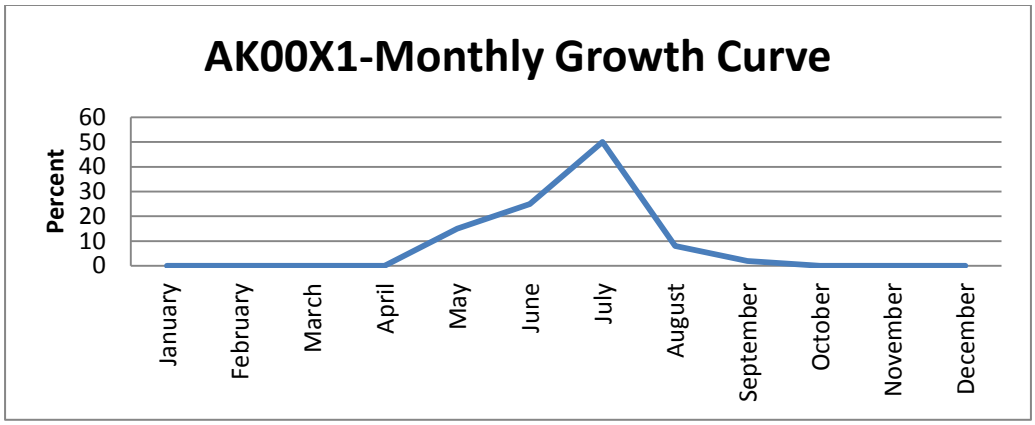
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT3—D31-Subalpine scrub silty till slopes
D31TF2—D31-Subalpine scrub silty till slopes
D31UC5—D31-Subalpine scrub silty till slopes

Characteristics of Representative Soil Components

Soil Classification: Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryorthents

Dominant Parent Material: Organic material over loess over gravelly till

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Loamy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	6	11	17

pH:	Low	RV	High
	3.4	5.5	6.9

Effective CEC (me/100g):	Low	High
	11.1	33.9

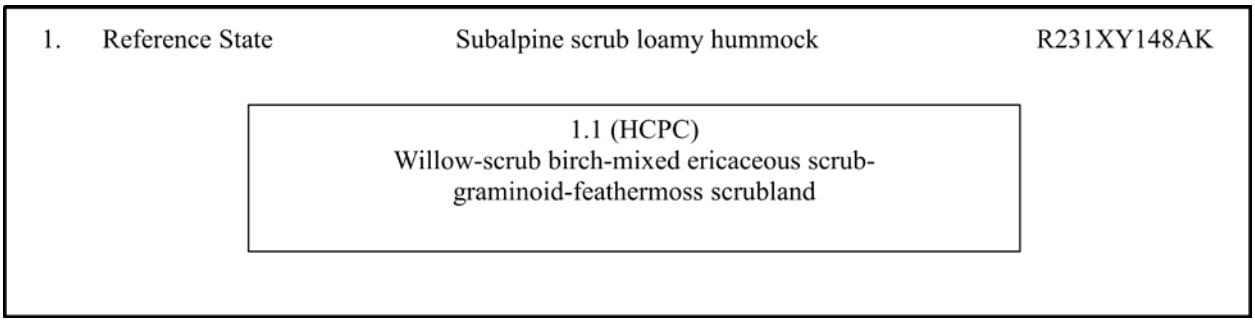
CEC (me/100g):	Min	RV	Max
	4.9	24.4	62

Organic Matter (percent):	Low	RV	High
	1.5	22.4	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.34

Plant Community Phases

Ecological Site Description ID:	R231XY148AK
Ecological Dynamics of the Site:	
This subalpine ecological site is at high elevations on backslopes of mountains (slope ranges from 5 to 45%; elevation ranges from 1,000 to 1,250 meters). The site is characterized as scrubland on hummocky terrain. No disturbance regime is documented. No alternate states were observed. This ecological site is similar to site R231XY185AK, but site R231XY148AK is in a different landform position. The soils in community phase 1.1 are classified as Cryorthents and are composed of organic matter over loess and gravelly colluvium.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	For the climax phase, the dominant vegetation is a mixture of various shrubs, graminoids, and moss. Trees, forbs, and lichen are minimal vegetative components. The site is characterized as scrubland, but the dominant shrubs are in the medium, low, and dwarf shrub strata. Generally, as elevation increases, the dominant shrubs transition from medium to dwarf species. The majority of the observations were in areas that supported dominantly medium shrub species. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Willow-scrub birch-mixed ericaceous scrub-graminoid-feathermoss scrubland
Community Phase Narrative:			
Picea glauca is present in trace amounts. Shrubs are the dominant form of vegetation and are estimated to make up >90% cover. The shrubs are evenly distributed among the medium, low, and dwarf shrub strata. The most common medium shrubs are *Salix pulchra* and *Betula glandulosa*, the most common low shrubs are *Betula glandulosa* and *Vaccinium uliginosum*, and the most common dwarf shrubs are *Vaccinium vitis-idaea*, *Empetrum nigrum*, and *Ledum palustre*. Graminoids are more abundant than forbs or lichen. The most common graminoid is *Carex bigelowii*. Forbs make up minimal cover, but diversity is high. Moss is an abundant ground cover, and the most common species are *Hylocomium splendens* and *Pleurozium schreberi*.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	No pathway observed.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm): Min RV Max
22 69.7 143

Restrictive Features: None recorded

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
3 10.4 22

Texture: Silt loam, moderately decomposed plant material, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.23 0.34 0.35

pH: Min RV Max
3.3 4.7 6.2

Subsurface Layer

Thickness (cm): Min RV Max
19 59.3 121

Texture: Gravelly coarse sandy loam, gravelly loam, gravelly silt loam, gravelly sandy loam, very cobbly coarse sandy loam, very gravelly coarse sandy loam, very gravelly loam, very cobbly silt loam, extremely cobbly coarse sand, very gravelly silt loam, extremely cobbly loamy coarse sand, very gravelly sandy loam, extremely gravelly coarse sand, extremely gravelly coarse sandy loam, extremely gravelly loamy sand, silt, loam, silt loam, moderately decomposed plant material, stony silt loam, very stony silt loam, very stony sandy loam, extremely stony coarse sandy loam, fine sandy loam, extremely stony silt loam, extremely stony sandy loam

AWC (cm/cm):	Min	RV	Max
	0.02	0.15	0.35

pH:	Min	RV	Max
	4.1	5.8	7.2

Influencing Water Features

NWI Code: PSS1

NWI Description: Palustrine Scrub-Shrub, Broad-Leaved Deciduous

Rosgen Classification: Steep, entrenched, cascading step-pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-75	8-90	2-60	0-10	0-5	0-15	0-2

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	4-50	---	---	---
FD (<4 inches)	---	3-4	---	---
FM (4-24 inches)	---	2-6	---	---
SD (<8 inches)	---	---	12-7	---
SL (8-36 inches)	---	---	25-5	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	1-7.8-45	87	26.1
FEAL	*Festuca altaica*	50-50-50	7	18.3
CACA4	*Calamagrostis canadensis*	1-6.2-20	33	14.4
POPA2	*Poa palustris*	0.1-6.3-15	27	12.9
POARA2	Poa *arctica* ssp. *arctica*	3-6.7-10	20	11.5
FEBR	*Festuca brachyphylla*	15-15-15	7	10.0
POPO9	*Poa porsildii*	3-6.5-10	13	9.3

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
FEAL	*Festuca altaica*	2-6.8-20	33	15.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ACDE2	*Aconitum delphiniifolium*	0.1-3.7-7	40	12.1
MEPA	*Mertensia paniculata*	1-4.4-10	33	12.1
ARARA2	*Artemisia arctica* ssp. *arctica*	0-3.8-10	33	11.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	55-60-65	13	28.3
EMNI	*Empetrum nigrum*	1-9.8-25	80	27.9
VAVI	*Vaccinium vitis-idaea*	0.1-8.2-25	93	27.6
LEPAD	*Ledum palustre ssp. decumbens*	1-11.5-25	27	17.5
RUAR	*Rubus arcticus*	1-6.8-20	33	15.1
DROC	*Dryas octopetala*	0.1-3.7-12	47	13.2
SACH	*Salix chamissonis*	2-7.3-10	20	12.1
SAPH	*Salix phlebophylla*	1-4.5-15	27	11.0
ARAL2	*Arctostaphylos alpina*	0-2.4-6	47	10.6
SARE2	*Salix reticulata*	2-8.5-15	13	10.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	15-38.1-55	53	45.1
VAUL	*Vaccinium uliginosum*	1-11.2-25	80	29.9
LEPAD	*Ledum palustre ssp. decumbens*	1-9.2-25	33	17.5
SAPU15	*Salix pulchra*	0.1-5.5-15	40	14.9
BENA	*Betula nana*	25-25-25	7	12.9

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	1-47-75	53	50.1
BEGL	*Betula glandulosa*	10-27.4-55	33	30.2

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	167-167-167	7.8-9-10.5	17-28-40	2	B

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other woody plants	Moose	Unknown
Moderate use	Willows	Moose	Summer
No observed use			Not grazed/browsed
Slight use	Lichen	Caribou	Unknown
Slight use	Other woody plants	Caribou	Unknown
Slight use	Other woody plants	Moose	Unknown
Slight use	Other woody plants	Other	Unknown
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Summer
Slight use	Willows	Moose	Unknown
Slight use	Willows	Moose	Winter

Notable Plants: *Pedicularis groenlandica, Koeleria macrantha, Poa porsildii*

Species Richness: Number of stops—15; plant species per stop (min-avg-max)—12-29.1-46

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Subalpine Graminoid Peat Swale
Ecological Classification ID: R231XY149AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Swales of hills

Slope (percent):	Min	Max
	0	5

Elevation (feet):	Min	Max
	2,625	3,937

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	20

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Negligible

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	17	29

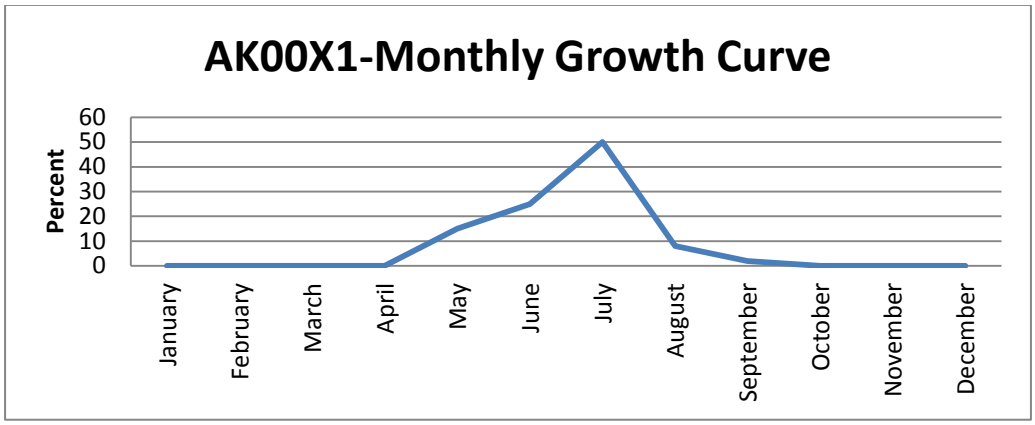
Mean Annual Air Temperature (°F):	Low	High
	21	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TF2—D31-Subalpine grass organic swales

Characteristics of Representative Soil Components

Soil Classification: Loamy, mixed, euic Terric Cryofibrists
Dominant Parent Material: Organic material over loamy alluvium
Representative Surface Texture: Peat
Subsurface Texture Group: Loamy
Saturated Hydraulic Conductivity: Very low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	58

pH:	Low	RV	High
	4.4	6.1	6.7

Effective CEC (me/100g):	Low	High
	29.9	55.8

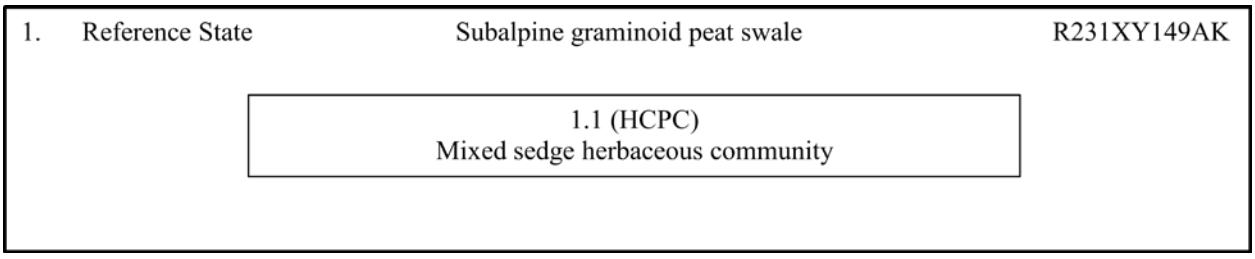
CEC (me/100g):	Min	RV	Max
	6.8	34.4	62

Organic Matter (percent):	Low	RV	High
	2	41	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.24	0.7	1.15

Plant Community Phases

Ecological Site Description ID:	R231XY149AK
Ecological Dynamics of the Site:	
This subalpine ecological site is on footslopes and/or toeslopes of hills (<5% slopes). This site is referred to as a swale because the associated community is in areas that do not have channelized surface water. Standing water covers ~50% of the soil surface. The soils in community phase 1.1 are classified as Cryofibrists and are composed of organic matter over loamy alluvium. Disturbances resulting in other plant community phases were not observed.	
State and Transition Diagram:	



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	For the climax phase, the vegetation is primarily mixed sedges. Because there is no evidence of disturbance, only one phase for this reference state is documented. Due to the regional specificity and remoteness of this ecological site, only three observations were conducted. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Mixed sedge herbaceous community
Community Phase Narrative:			
No tree species were observed in this ecological site. The shrub cover is primarily in the low and dwarf shrub strata. The most abundant low shrub species is *Salix pulchra,* and most abundant dwarf shrub species is *Andromeda polifolia.* Graminoids, primarily sedges, are the most abundant vegetation. Seven graminoid species grow on this ecological site, but the most common species are *Carex aquatilis*, *Eriophorum angustifolium*, and *Carex tenuiflora*. Lichen, forbs, and moss species are limited. The only observed forb is *Comarum palustre*, and the only observed moss is *Sphagnum sp*.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	No observed pathway.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	64	64	64

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	63	63	63

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	5.5	6.3	6.7

Subsurface Layer

Thickness (cm):	Min	RV	Max
	1	1	1

Texture: Silt loam, mucky peat

AWC (cm/cm):	Min	RV	Max
	0.23	0.29	0.35

pH:	Min	RV	Max
	5.2	6.4	6.7

Influencing Water Features

NWI Code: PEM1, PEM2

NWI Description: Palustrine, Emergent, Persistent; Palustrine, Emergent, Nonpersistent

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	15-45	60-70	0-1	0-0	0-0	40-65

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-45	---	---	---
SD (<8 inches)	---	---	0.1-5	---
SL (8-36 inches)	---	---	1-3	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAQ	*Carex aquatilis*	30-32.5-35	67	46.5
ERAN6	*Eriophorum angustifolium*	10-27.5-45	67	42.8
CATE5	*Carex tenuiflora*	30-30-30	33	31.6
CABI5	*Carex bigelowii*	20-20-20	33	25.8
ERVA4	*Eriophorum vaginatum*	15-15-15	33	22.4
TRCA30	*Trichophorum caespitosum*	10-10-10	33	18.3
JUAL4	*Juncus alpinoarticulatus*	5-5-5	33	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAQ	*Carex aquatilis*	70-70-70	33	48.3
ERAN6	*Eriophorum angustifolium*	10-10-10	33	18.3
CACA4	*Calamagrostis canadensis*	10-10-10	33	18.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COPA28	*Comarum palustre*	15-15-15	33	22.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANPO	*Andromeda polifol*ia	2-3.5-5	67	15.3
LEPAD	*Ledum palustre ssp. decumbens*	5-5-5	33	12.9

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	3-5-7	67	18.3
VAUL	*Vaccinium uliginosum*	3-3-3	33	10.0
BENA	*Betula nana*	3-3-3	33	10.0
BEGL	*Betula glandulosa*	3-3-3	33	10.0

Site Tree Measurements: Not measured

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-0-0	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—6-9.7-13

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Moss Peat Plain
Ecological Classification ID: R231XY150AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: High flood plains, thermokarst depressions of loess plains and terraces

Slope (percent):	Min	Max
	0	1

Elevation (feet):	Min	Max
	1,312	2,461

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	20

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Negligible

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	11	15

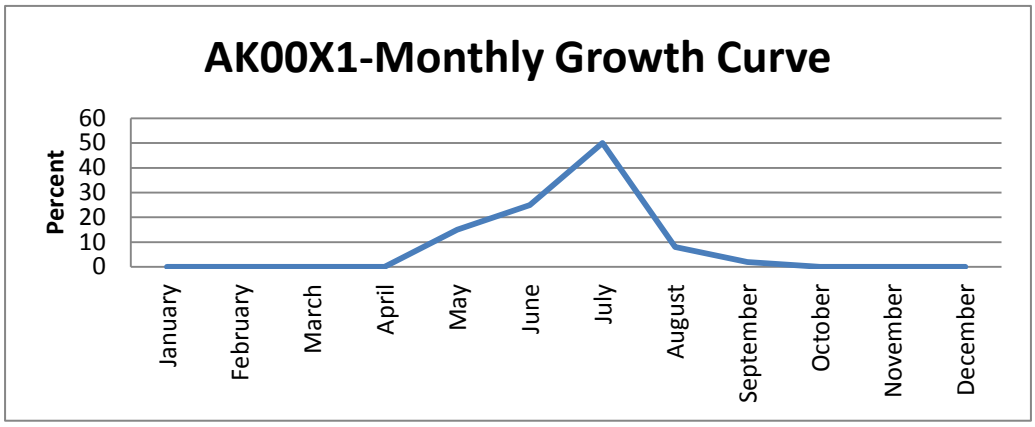
Mean Annual Air Temperature (°F):	Low	High
	27	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31KT1—D31-Boreal moss organic depressions
D31TL1—D31-Boreal moss organic depressions

Characteristics of Representative Soil Components

Soil Classification: Dysic Hydric Cryofibrists
Dominant Parent Material: Mossy organic material over silty alluvium
Representative Surface Texture: Peat
Subsurface Texture Group: Not applicable
Saturated Hydraulic Conductivity: Moderately high

AWC Total (cm):	Low	RV	High
	10	20	37

pH:	Low	RV	High
	3.4	5.9	7

Effective CEC (me/100g):	Low	High
	22	40

CEC (me/100g):	Min	RV	Max
	7.5	34.8	62

Organic Matter (percent):	Low	RV	High
	2	41	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.6	1.09

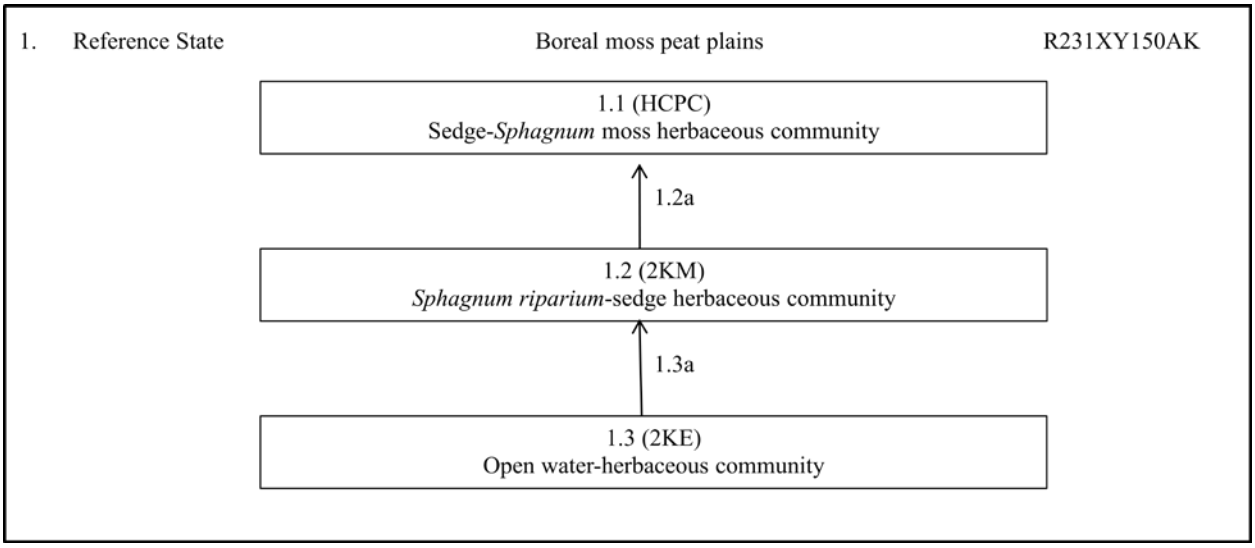
Plant Community Phases

Ecological Site Description ID:	R231XY150AK

Ecological Dynamics of the Site:

This boreal ecological site is in depressions of plains and is attributed to a thermokarst event. The underlying permafrost melts, causing the ground to slump and form wet depressions. These depressions are stable, open water bodies with little or no hydrologic input. As a result, the succession is similar to that of a bog. With time and organic matter accumulation, permafrost eventually develops in the soil and the sites progress from open water to scrubland. If succession exceeds 150 years, as is presumed with thermokarst succession, the ecological sites are divided. Site R231XY150AK characterizes the first part of the thermokarst succession on plains, and site R231XY158AK characterizes as the second part of the thermokarst succession. Prior to the thermokarst event, the site likely resembles site R231XY128AK, which is a boreal tussock peat frozen plain community. The soils in community phase 1.1 are classified as Cryofibrists and are composed of organic material over silty alluvium.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	This ecological site characterizes the first half of the thermokarst succession on plains. The vegetative community of phase 1.3 is emergent vegetation, that of phase 1.2 is a floating mat, and that of phase 1.1 is sedge meadow. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1	

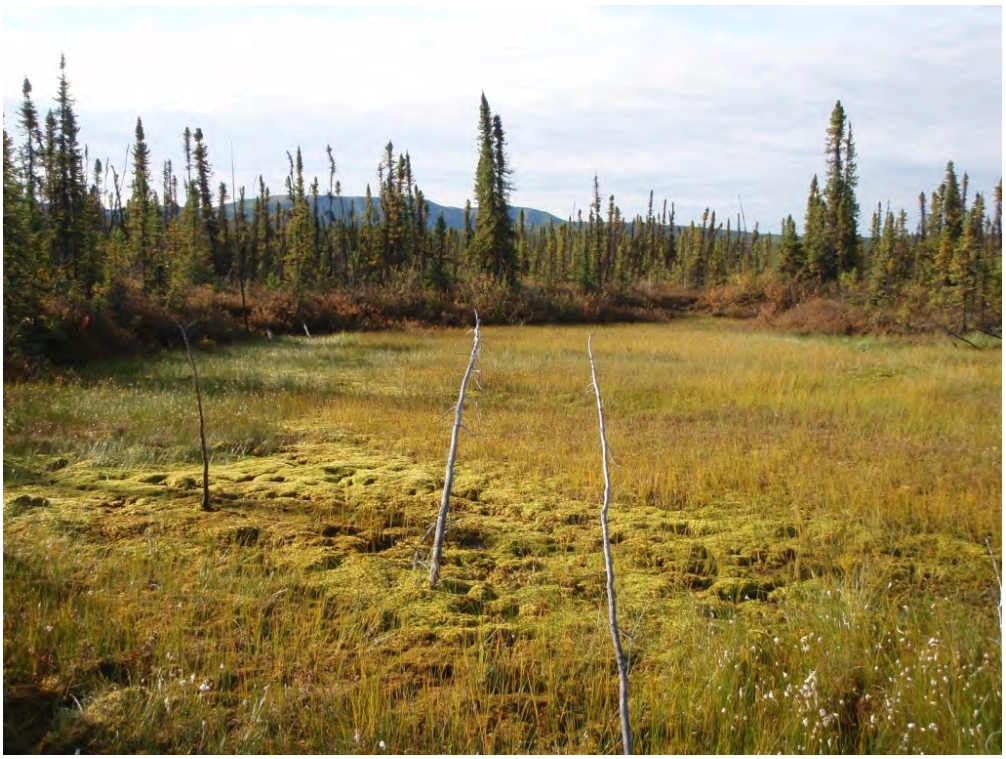
Community Phase Number:	1.1	Community Phase Name:	Sedge-Sphagnum moss herbaceous community

Community Phase Narrative:

As compared to phases 1.2 and 1.3, phase 1.1 has trace amounts of pooled water and large amounts of surface organic matter that is likely from sedges. The dominant vegetation is graminoids, including *Carex* and *Eriophorum*. The graminoid cover is >60%. Phase 1.1 does not have a tree cover. Dwarf and low shrubs are present, but they make up minimal cover. The most common shrubs are *Vaccinium oxycoccos* and *Andromeda polifolia*. Sphagnum moss makes up substantial cover, but it is not a dominant plant. Lichen and forbs are minor vegetative components. Two observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.1a	The succession progresses and is described in the report for ecological site R231XY158AK. During the transition to site R231XY158AK, the sedges are replaced by Sphagnum moss and wetland shrubs.

<table>
<tr><td>Phase 1.2</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.2</td><td>Community Phase Name:</td><td>Sphagnum riparium-sedge herbaceous community</td></tr>
<tr><td colspan="4">Community Phase Narrative:</td></tr>
<tr><td colspan="4">Pooled water covers 10% of this phase. Sphagnum moss is dominant. Sphagnum riparium is believed to be the dominant moss species. Phase 1.2 does not have a tree cover. Dwarf, low, and medium shrubs are present, but they make up minimal cover. The most common shrub is Chamaedaphne calyculata. Lichen and forbs are minor vegetative components. One observation of this phase was conducted.</td></tr>
<tr><td colspan="4">Community Pathways</td></tr>
<tr><td>Pathway Number:</td><td colspan="3">Pathway Name & Description:</td></tr>
<tr><td>1.2a</td><td colspan="3">Organic matter fills the depressions. Transitions from floating mat to soils without water layers.</td></tr>
</table>

<table>
<tr><td>Phase 1.3</td><td colspan="3">  </td></tr>
<tr><td>Community Phase Number:</td><td>1.3</td><td>Community Phase Name:</td><td>Open water-herbaceous community</td></tr>
<tr><td colspan="4">Community Phase Narrative:</td></tr>
<tr><td colspan="4">Pooled water covers 85% of the area, which is an open body of water. The dominant vegetation is emergent moss, which is likely Sphagnum riparium. Shrubs and sedges are present, but they are minor vegetative components. Trees, lichen, and forbs were not observed. One observation of this phase was conducted.</td></tr>
<tr><td colspan="4">Community Pathways</td></tr>
<tr><td>Pathway Number:</td><td colspan="3">Pathway Name & Description:</td></tr>
<tr><td>1.3a</td><td colspan="3">Organic matter fills the depressions. Transitions from open water to depressions with a floating vegetative mat.</td></tr>
</table>

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2KE

Rooting Depth (cm): Min RV Max
72 72 72

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
72 72 72

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.8 3.8 3.8

Subsurface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: None recorded

AWC (cm/cm): Not measured

pH: Not measured

Influencing Water Features

NWI Code: PAB2

NWI Description: Palustrine, Aquatic Bed, Aquatic Moss

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	80-80	5-5	2-2	0-0	0-0	60-60

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-3	---	---	---
SD (<8 inches)	---	---	0.01-1	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERAN6	*Eriophorum angustifolium*	10-10-10	100	31.6
CAAQ	*Carex aquatilis*	3-3-3	100	17.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	1-1-1	100	10.0
CHCA2	*Chamaedaphne calyculata*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—11-11-11

Community Phase 2KM

Rooting Depth (cm): Min RV Max
171 171 171
Restrictive Features: None recorded
Drainage Class: Very poorly drained
Surface Layer
Thickness (cm): Min RV Max
41 41 41
Texture: Peat
AWC (cm/cm): Min RV Max
0.35 0.35 0.35
pH: Min RV Max
4.8 4.8 4.8
Subsurface Layer
Thickness (cm): Min RV Max
130 130 130
Texture: Silt loam, muck
AWC (cm/cm): Min RV Max
0.25 0.28 0.4
pH: Min RV Max
4.6 6 6.7

Influencing Water Features

NWI Code: PEM1
NWI Description: Palustrine, Emergent, Persistent
Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	95-95	5-5	0-0	0-0	0-0	10-10

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-5	---	---	---
SD (<8 inches)	---	---	1-1	---
SL (8-36 inches)	---	---	0.1-5	---
SM (3-10 feet)	---	---	1-1	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERRU2	*Eriophorum russeolum*	15-15-15	100	38.7
CALI7	*Carex limosa*	15-15-15	100	38.7
CALO4	*Carex loliacea*	5-5-5	100	22.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAOX	*Vaccinium oxycoccos*	1-1-1	100	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	5-5-5	100	22.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENA	*Betula nana*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—9-9-9

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	69	96	123

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	69	75	81

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4.5	4.6	4.7

Subsurface Layer

Thickness (cm):	Min	RV	Max
	0	21	42

Texture: Silt loam

AWC (cm/cm):	Min	RV	Max
	0.24	0.25	0.25

pH:	Min	RV	Max
	4.8	5	5.1

Influencing Water Features

NWI Code: PAB2, PEM1

NWI Description: Palustrine, Emergent, Persistent

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	80-90	20-25	0-0	0-0	0-0	0-2

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-0.1	---	---	---
GT (>24 inches)	55-55	---	---	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERBR6	*Eriophorum brachyantherum*	60-60-60	50	54.8
CAAQ	*Carex aquatilis*	5-5-5	50	15.8
CAREX	*Carex*	2-2-2	50	10.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAUT	*Carex utriculata*	55-55-55	50	52.4

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAOX	*Vaccinium oxycoccos*	0-7.5-15	100	27.4
ANPO	*Andromeda polifol*ia	5-5-5	50	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	3-3-3	50	12.2

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Moose	Summer

Notable Plants: None observed

Species Richness: Number of stops—2; Plant Species Per Stop (min-avg-max)—3-8-13

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Subalpine Scrub Loamy Drainages
Ecological Classification ID: R231XY152AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Swales of flood plains

Slope (percent):	Min	Max
	1	20

Elevation (feet):	Min	Max
	2,625	4,429

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	2	50

Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	15	32

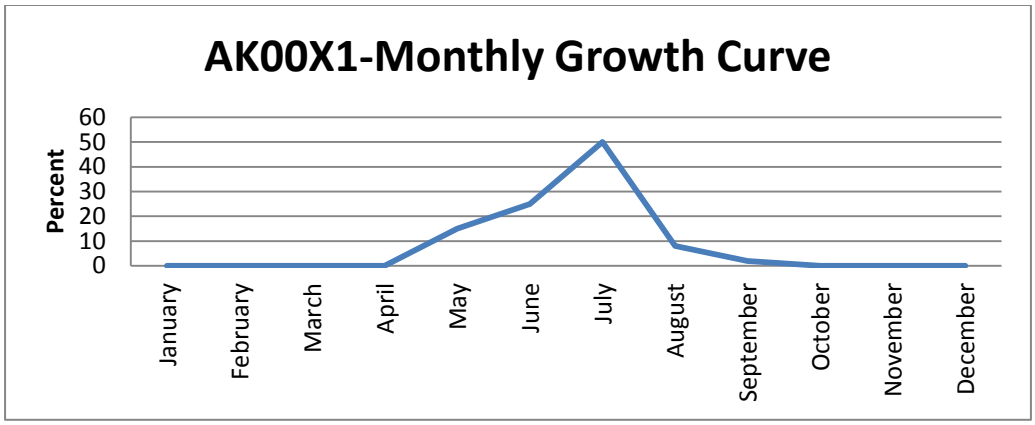
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TF1—D31-Subalpine scrub rocky drainages
D31TF2—D31-Subalpine scrub rocky drainages
D31UC5—D31-Subalpine scrub rocky drainages
D31WA1—D31-Subalpine scrub rocky drainages

Characteristics of Representative Soil Components

Soil Classification: Sandy-skeletal, mixed Typic Cryaquents
Dominant Parent Material: Organic material over gravelly alluvium
Representative Surface Texture: Peat
Subsurface Texture Group: Sandy-skeletal
Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	11	18	27

pH:	Low	RV	High
	4.6	6.2	8

Effective CEC (me/100g):	Low	High
	11.5	29

CEC (me/100g):	Min	RV	Max
	2.9	24.7	88.2

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	1.02	1.3	1.38

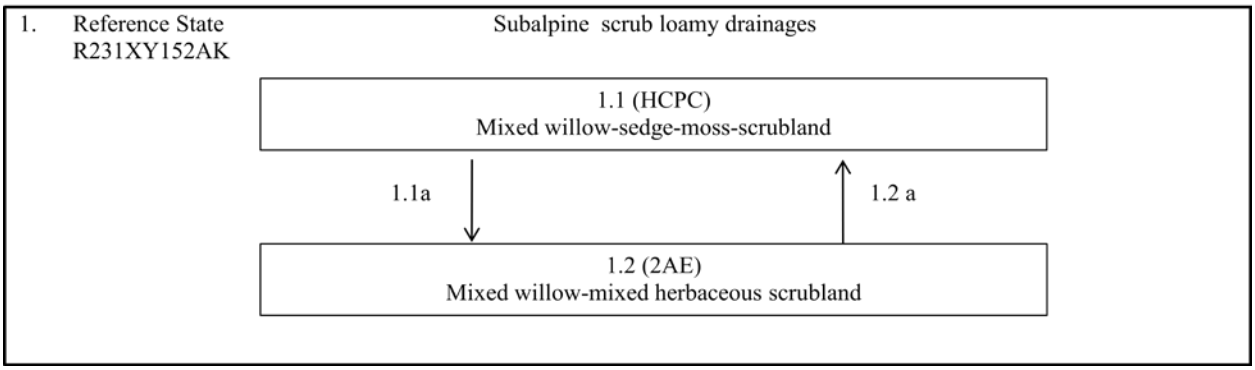
Plant Community Phases

Ecological Site Description ID:	R231XY152AK

Ecological Dynamics of the Site:

This subalpine ecological site is in mountain drainageways at high elevations (850 to 1,250 meters). The soils do not have permafrost and are saturated. The soils in community phase 1.1 are classified as Cryaquents and are composed of gravelly alluvium. The site is characterized as willow scrubland directly adjacent to flowing water. Bare sand and gravel bars are common and indicative of phases linked to a flood regime. Bare sand and gravel bars are not present in some drainageways. The presence or absence of bars likely is a result of the severity of recent flood events. No alternate states were observed.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	For the climax phase, the dominant vegetation is a mixture of shrubs, graminoids, forbs, and moss. This site is characterized as scrubland, and the shrubs are dominantly in the tall, medium, and low shrub strata. Generally, as elevation increases, the dominant shrubs transition from tall to low species. The majority of the observed areas support dominantly medium shrub species. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Mixed willow-sedge-moss-scrubland

Community Phase Narrative:

Picea glauca is present but at trace levels. Shrubs are the dominant vegetation, and they make up an estimated >50% cover. Shrubs are evenly distributed among the tall, medium, low, and dwarf shrub strata. Elevation likely affects the dominant shrub stratum. The most common tall and medium shrubs are *Salix alaxensis* and *Salix pulchra.* The most common low shrubs are *Betula glandulosa*, *Salix pulchra*, and *Dasiphora fruticosa.* Graminoids are abundant, commonly exceeding 25% cover, and are a mixture of grasses and sedges. The most common species are *Calamagrostis canadensis, Carex aquatilis,* and *Carex bigelowii.* The diversity of forbs is high, but no individual species is dominant. Moss is an abundant ground cover. Thirteen observations of this phase were conducted.

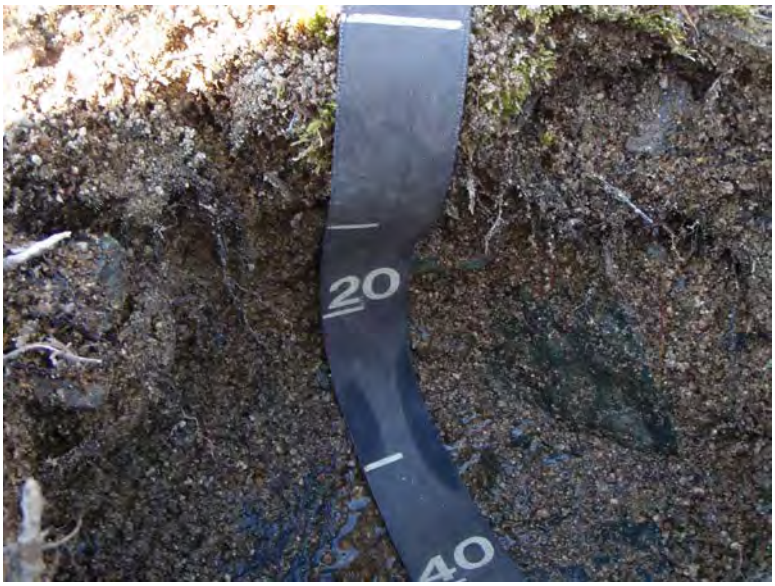
Community Pathways

Pathway Number:	Pathway Name & Description:
1.1a	Flood event that scours drainage surface and/or deposits fresh alluvial material. As compared to the climax phase community, early flood phase communities have much more exposed mineral soil, likely due to recent flood events.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Mixed willow-mixed herbaceous scrubland
Community Phase Narrative:			
As compared to the climax phase community, the early flood phase has less shrub, graminoid, forb, and moss cover. Shrubs are the dominant vegetation. Shrubs are primarily in the medium and low shrub strata, and common species are *Salix bebbiana*, *Salix pulchra*, *Salix alaxensis*, and *Dasiphora fruticosa*. Common graminoid and forb species are *Calamagrostis canadensis*, *Carex sp*., *Equisetum sp*., and *Chamerion latifolium*. Two observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Normal time and growth without flooding.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2AE



Rooting Depth (cm): Min RV Max
27 40.5 54

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 1.5 3

Texture: Cobbly silt loam

AWC (cm/cm): Min RV Max
0.18 0.18 0.19

pH: Min RV Max
5.1 5.8 6.5

Subsurface Layer

Thickness (cm): Min RV Max
27 39 51

Texture: Very cobbly coarse sand, very stony sandy loam

AWC (cm/cm): Min RV Max
0.03 0.07 0.11

pH: Min RV Max
5.4 5.6 5.8

Influencing Water Features

NWI Code: R3UB1

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel

Rosgen Classification: Moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-10	30-35	3-15	0-0	2-10	40-50	10-10

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	1-3	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	0.01-0.01	---	---
SD (<8 inches)	---	---	1-3	---
SL (8-36 inches)	---	---	2-7	---
SM (3-10 feet)	---	---	20-20	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAPO	*Carex podocarpa*	5-5-5	50	15.8
CACA4	*Calamagrostis canadensis*	1-2.5-4	100	15.8
CABI5	*Carex bigelowii*	3-3-3	50	12.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQVA	*Equisetum variegatum*	1-3-5	100	17.3
MOLA6	*Moehringia lateriflora*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SARE2	*Salix reticulata*	1-2-3	100	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	3-6.5-10	100	25.5
SAPS	*Salix pseudomonticola*	5-5-5	50	15.8
VAUL	*Vaccinium uliginosum*	2-2.5-3	100	15.8
SABE2	*Salix bebbiana*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SABE2	*Salix bebbiana*	20-20-20	50	31.6
SAALA	*Salix alaxensis var. alaxensis*	15-15-15	50	27.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Willows	Moose	Summer
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—11-15.5-20

Community Phase HCPC

Rooting Depth (cm):

Min	RV	Max
-8	43.3	103

Restrictive Features: None recorded

Drainage Class: Poorly drained

Surface Layer

Thickness (cm):

Min	RV	Max
0	7.6	45

Texture: Peat, silt, silt loam, slightly decomposed plant material

AWC (cm/cm):

Min	RV	Max
0.25	0.33	0.35

pH:

Min	RV	Max
4.7	6.1	7.8

Subsurface Layer

Thickness (cm):

Min	RV	Max
-8	35.8	58

Texture: Cobbly silt loam, gravelly silt loam, very cobbly coarse sand, extremely cobbly coarse sand, silt loam, coarse sandy loam, sandy loam, very stony coarse sandy loam, very stony silt loam, very stony sandy loam

AWC (cm/cm):	Min	RV	Max
	0.02	0.14	0.25

pH:	Min	RV	Max
	4.9	6.4	8

Influencing Water Features

NWI Code: PSS1, R3UB1, R4SB3, R4SB4

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Intermittent, Stream Bed, Cobble-Gravel; Riverine, Intermittent, Stream Bed, Sand

Rosgen Classification: Steep, entrenched, cascading step-pools; moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-25	5-75	5-55	0-12	0-40	0-20	0-35

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	3-3	---	---	---
GT (>24 inches)	10-15	---	---	---
FD (<4 inches)	---	0.01-3	---	---
FM (4-24 inches)	---	0.01-8	---	---
FT (>24 inches)	---	10-5	---	---
SL (8-36 inches)	---	---	10-10	---
SM (3-10 feet)	---	---	1-1	---
ST (>10 feet)	---	---	70-70	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	3-13.1-35	54	26.6
CAAQ	*Carex aquatilis*	2-19.7-50	23	21.3
CAPO	*Carex podocarpa*	1-9.8-15	31	17.3
FEAL	*Festuca altaica*	5-11-20	23	15.9
CACA4	*Calamagrostis canadensis*	30-30-30	8	15.2
CARO7	*Carex rotundata*	15-15-15	8	10.7
POPO9	*Poa porsildii*	15-15-15	8	10.7
CAREX	*Carex*	1-4-10	23	9.6

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	12-22.3-30	23	22.7
POPO9	*Poa porsildii*	20-20-20	8	12.4
CACA12	*Carex capillaris*	15-15-15	8	10.7

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	0-4.4-10	54	15.4
BORI2	*Boykinia richardsonii*	0-6-15	23	11.8

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ACDE2	*Aconitum delphiniifolium*	5-5.5-6	15	9.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SARE2	*Salix reticulata*	1-9.6-25	69	25.7
DROC	*Dryas octopetala*	0-7-20	38	16.4
EMNI	*Empetrum nigrum*	1-3.1-5	62	13.9
SACH	*Salix chamissonis*	3-7-15	23	12.7
VAUL	*Vaccinium uliginosum*	4-9.5-15	15	12.1
VAVI	*Vaccinium vitis-idaea*	0-2.8-10	46	11.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	10-18.8-30	31	24.0
BEGL	*Betula glandulosa*	7-10.4-15	38	20.0
VAUL	*Vaccinium uliginosum*	1-4.2-10	62	16.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAGL	*Salix glauca*	10-30-60	23	26.3
SAPU15	*Salix pulchra*	2-13.4-25	38	22.7
SAAL	*Salix alaxensis*	2-31-60	15	21.8
BEGL	*Betula glandulosa*	1-13-25	15	14.1
SABE2	*Salix bebbiana*	5-12.5-20	15	13.9
ALVIF	*Alnus viridis ssp. fruticosa*	15-15-15	8	10.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	70-70-70	8	23.2
SAAL	*Salix alaxensis*	20-30-40	15	21.5
SAALA	*Salix alaxensis var. alaxensis*	18-19-20	15	17.1

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use			Summer
Slight use	Forbs, ferns, and	Other	Unknown
Slight use	Grasses and sedges	Caribou	Summer
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Summer
Slight use	Willows	Moose	Unknown
Slight use	Willows	Moose	Winter

Notable Plants: *Poa porsildii*

Species Richness: Number of stops—13; plant species per stop (min-avg-max)—9-26.2-47

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Scrub Peat Plains
Ecological Classification ID: R231XY158AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Thermokarst depressions of loess plains

Slope (percent):	Min	Max
	0	2

Elevation (feet):	Min	Max
	1,312	2,001

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	2	40

Flooding: None

Ponding:	Frequency	Duration
	Rare	Brief

Runoff: Negligible

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	11	15

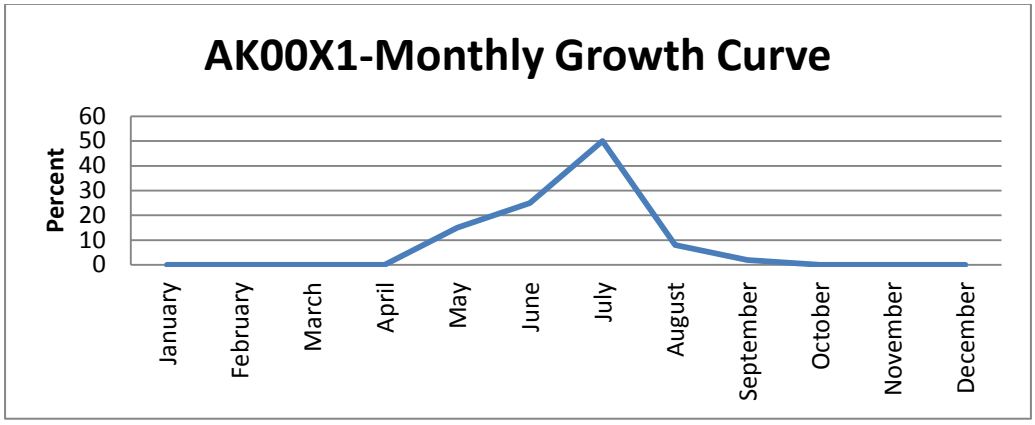
Mean Annual Air Temperature (°F):	Low	High
	27	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31KT1—D31-Boreal scrub-sedge organic depressions

Characteristics of Representative Soil Components

Soil Classification: Loamy, dysic Terric Cryofibrists
Dominant Parent Material: Mossy organic material over silty alluvium
Representative Surface Texture: Peat
Subsurface Texture Group: Loamy
Saturated Hydraulic Conductivity: Moderately high

AWC Total (cm):	Low	RV	High
	15	30	57

pH:	Low	RV	High
	3.4	5.2	5.4

Effective CEC (me/100g):	Low	High
	21.2	40

CEC (me/100g):	Min	RV	Max
	10	36	62

Organic Matter (percent):	Low	RV	High
	2	41	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.3	0.7	1.15

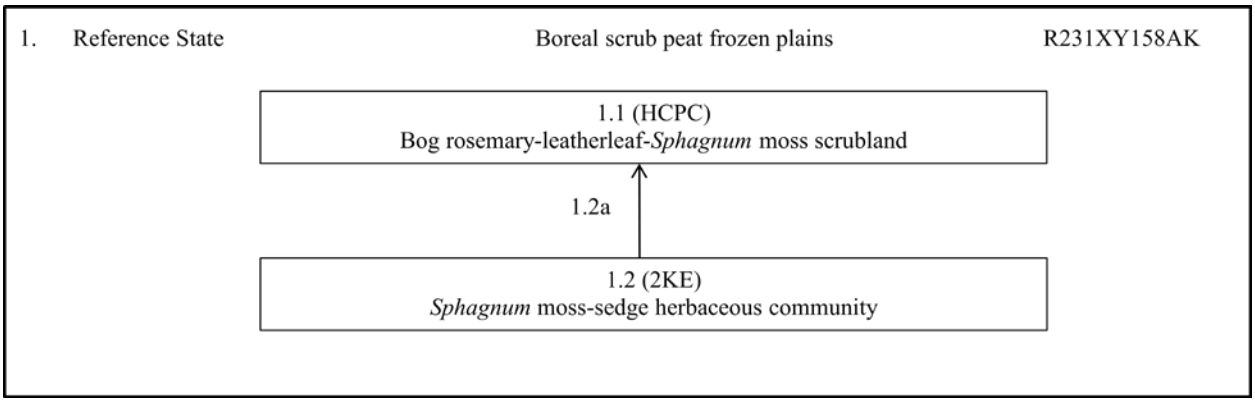
Plant Community Phases

Ecological Site Description ID:	R231XY158AK

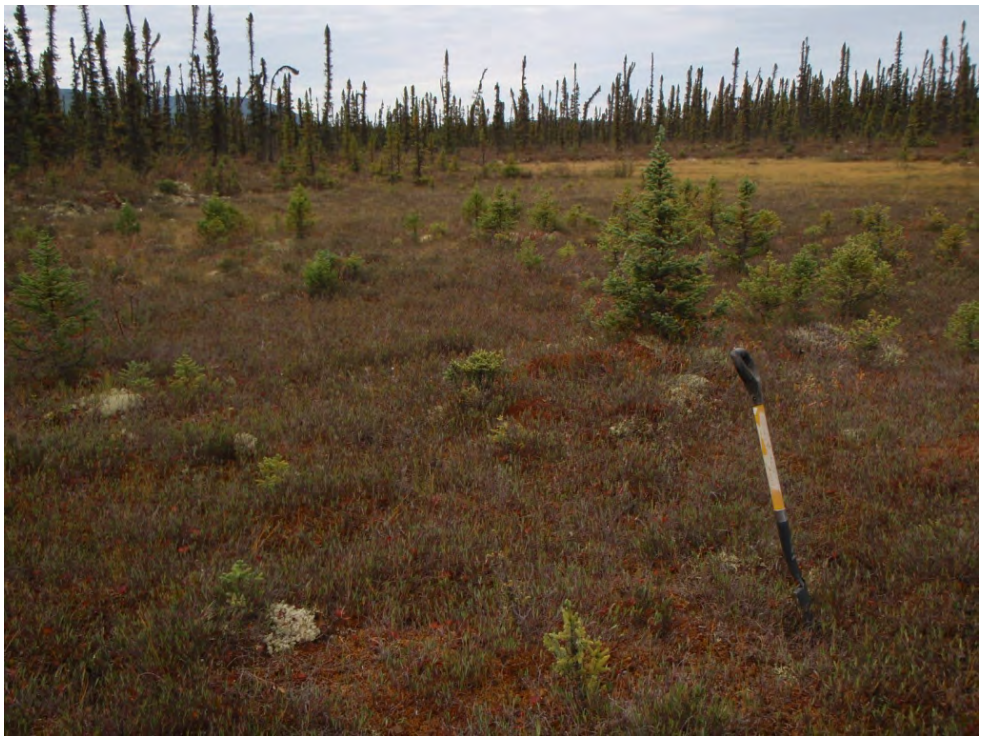
Ecological Dynamics of the Site:

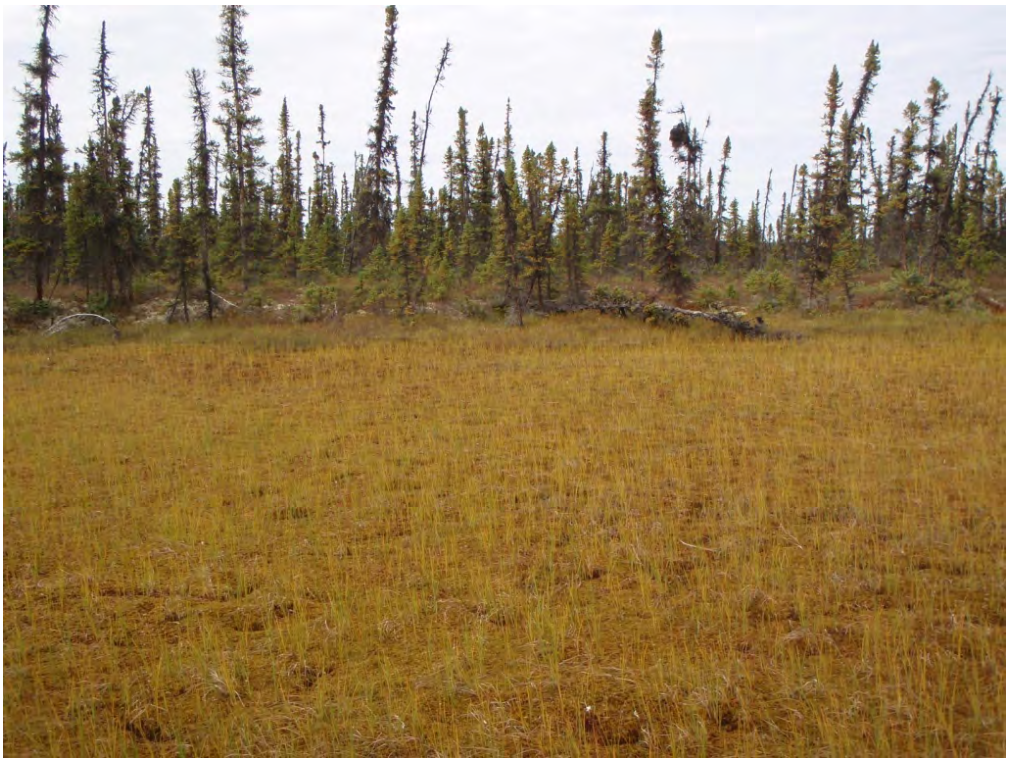
This boreal ecological site is on depressions of plains and is attributed to a thermokarst event. The underlying permafrost melts, causing the ground to slump and form wet depressions. These depressions are stable, open bodies of water with little or no hydrologic input. As a result, the succession is similar to that of a bog. With time and organic matter accumulation, permafrost eventually reforms in the soil and the site progresses from open water to scrubland. If succession exceeds 150 years, as is presumed with the thermokarst succession, the ecological sites are divided. Ecological site R231XY150AK characterizes the first part of the thermokarst succession on plains, and site R231XY158AK characterizes the second part of the thermokarst succession. Prior to the thermokarst event, the site likely resembles ecological site R231XY128AK. The soils in community phase 1.1 are classified as Cryofibrists and are composed of organic material over silty alluvium.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	This ecological site characterizes the second half of the thermokarst succession on plains. The vegetative community of phase 1.2 is Sphagnum moss meadow and that of phase 1.1 is scrubland. The height of stunted and regenerative trees is defined as less than 15 feet. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Bog rosemary-leatherleaf-Sphagnum moss scrubland
Community Phase Narrative:			
This phase is dominantly low scrubs. Stunted and regenerative *Picea mariana* is a minor vegetative component. Dwarf and low shrubs are present, and the most common shrubs are *Andromeda polifolia* and *Chamaedaphne calyculata*. Graminoids, forbs, and lichen are present but as minor vegetative components. Sphagnum moss makes up more than 90% cover. One observation of this phase was conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	With time and absence of thermokarst, the climax phase might transition to ecological site R231XY128AK.		

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Sphagnum moss-sedge herbaceous community
Community Phase Narrative:			
This phase is dominantly Sphagnum moss, which is estimated to make up more than 95% cover. Trees are not present. The shrub cover is limited, and the most common species are *Chamaedaphne calyculata* and *Andromeda polifolia*. Graminoids are a major component of the vegetation (40% cover) and are a mixture of *Carex* and *Eriophorum*. *Comarum palustre* is the only forb observed, but it is a minor vegetative component. Two observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Phase 1.2 is similar to phase 1.1 of ecological site R231XY150AK, but it differs in that Sphagnum moss is dominant. As a result, phase 1.2 has less overall sedge cover and litter.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2KE

Rooting Depth (cm): Min RV Max
70 70 70

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
79 79 79

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3 3.7 4.3

Subsurface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Muck

AWC (cm/cm): None recorded

pH: None recorded

Influencing Water Features

NWI Code: PEM1, PML1

NWI Description: Palustrine, Emergent, Persistent; Palustrine, Moss-Lichen, Moss

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	99-100	5-15	0-0	0-0	0-0	1-2

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-5	---	---	---
FD (<4 inches)	---	6-6	---	---
SD (<8 inches)	---	---	0.01-5	---
SL (8-36 inches)	---	---	3-3	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	35-35-35	50	41.8
CALI7	*Carex limosa*	35-35-35	50	41.8
CAAQ	*Carex aquatilis*	15-15-15	50	27.4
CASA10	*Carex saxatilis*	5-5-5	50	15.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COPA28	*Comarum palustre*	6-6-6	50	17.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANPO	*Andromeda polifol*ia	5-5-5	50	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	0.1-1.6-3	100	12.4

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—7-8.5-10

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	40	40	40

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	54	54	54

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4.4	4.4	4.4

Subsurface Layer

Thickness (cm):	Min	RV	Max
	0	0	0

Texture: Muck

AWC (cm/cm): None recorded

pH: None recorded

Influencing Water Features

NWI Code: PSS1

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-5	95-95	2-2	1-1	0-0	0-0	1-1

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-10	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	0.1-0.1	---
SL (8-36 inches)	---	---	40-5	---
TR (<15 feet)	---	---	---	3-3
TS (<15 feet)	---	---	---	0.1-1

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CALI7	*Carex limosa*	10-10-10	100	31.6

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANPO	*Andromeda polifol*ia	40-40-40	100	63.2
CHCA2	*Chamaedaphne calyculata*	5-5-5	100	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-3-3	100	17.3

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	1-1-1	100	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—24-24-24

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Subalpine Scrub-Tussock Loamy Frozen Hummock
Ecological Classification ID: R231XY185AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Turf hummocks on mountains and hills, mountains

Slope (percent):	Min	Max
	1	35

Elevation (feet):	Min	Max
	2,625	4,429

Range of Aspect Direction: Southwest to northeast (clockwise)

Water Table Depth (cm):	Min	Max
	2	40

Flooding: None
Ponding: None
Runoff: High

Frost-Free Days:	Min	Max
	50	80

Mean Annual Precipitation (inches):	Low	High
	11	32

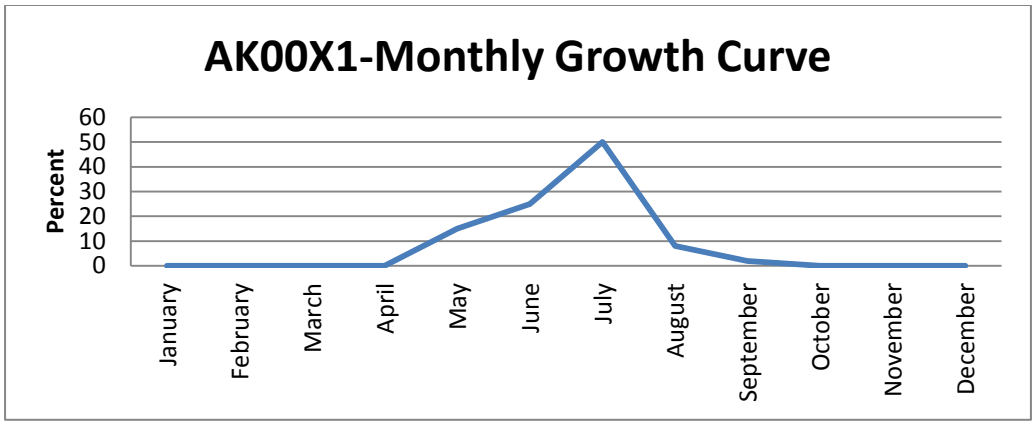
Mean Annual Air Temperature (°F):	Low	High
	19	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	3	-35	14
February	0	1	-29	18
March	0	2	-20	28
April	0	2	-6	48
May	0	2	21	64
June	1	5	30	72
July	1	6	34	75
August	1	6	30	70
September	1	5	19	55
October	1	3	-2	34
November	0	4	-18	14
December	0	3	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31MT3—D31-Subalpine tussock-scrub loamy colluvial slopes, frozen
D31TF1—D31-Subalpine tussock-scrub loamy colluvial slopes, frozen
D31TF2—D31-Subalpine tussock-scrub loamy colluvial slopes, frozen
D31UC5—D31-Subalpine tussock-scrub loamy colluvial slopes, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, acid, subgelic Typic Histoturbels
Dominant Parent Material: Organic material over loess over loamy cryoturbate
Representative Surface Texture: Peat
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: Moderately low to high

AWC Total (cm):	Low	RV	High
	15	27	44

pH:	Low	RV	High
	3.5	5.4	6.6

Effective CEC (me/100g):	Low	High
	12.2	37.8

CEC (me/100g):	Min	RV	Max
	6.6	25	62

Organic Matter (percent):	Low	RV	High
	2	22.5	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.34

Plant Community Phases

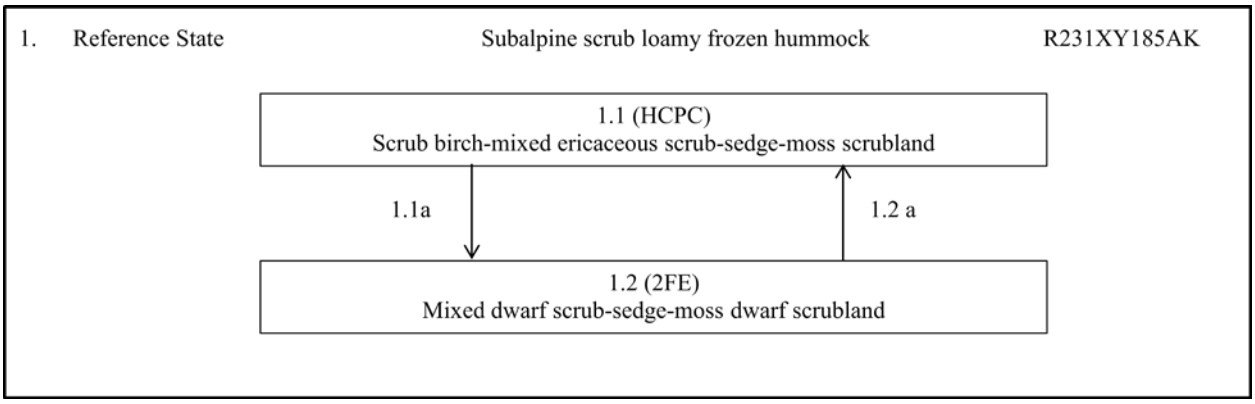
Ecological Site Description ID:	R231XY185AK

Ecological Dynamics of the Site:

This subalpine ecological site is at high elevations on footslopes of mountains and hills (slope >20%; elevation 850 to 1,250 meters). The site is characterized as scrubland covering hummocky terrain. It is similar to site R231XY148AK, but this site has permafrost and is on footslopes of mountains and hills. The soils in community phase 1.1 are classified as Histoturbels and are composed of organic matter over gravelly cryoturbate.

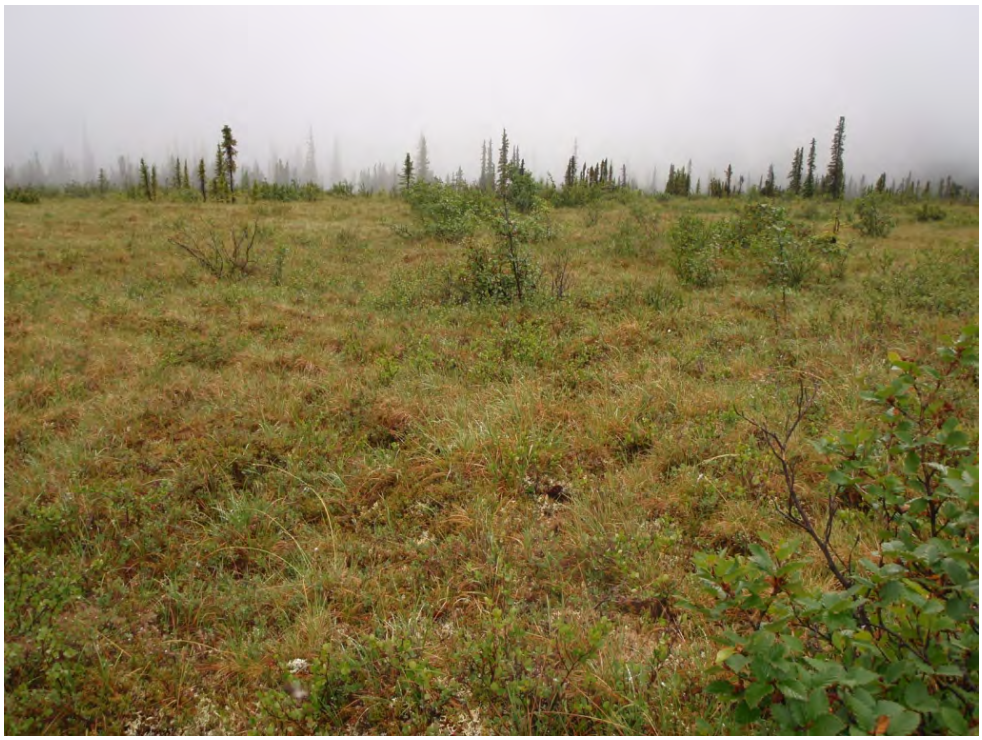
Fire is believed to result in unique plant communities in this ecological site. Evidence of fire within the soil profile is difficult to obtain due to a lack of coarse charcoal, which is more evident in soils that support coniferous forests. No alternate states were observed.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	In the climax phase, the dominant vegetation is a mixture of shrubs, graminoids, and moss. Trees, forbs, and lichen are minimal vegetative components. The shrubs are dominantly in the medium, low, and dwarf shrub strata. Generally, as elevation increases, the dominant shrubs transition from medium to dwarf species. The majority of areas observed support dominantly low shrub species. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Scrub birch-mixed ericaceous scrub-sedge-moss scrubland
Community Phase Narrative:			
Picea glauca and *Picea mariana* are present but generally in trace amounts. Shrubs commonly are in the medium, low, and dwarf shrub strata. The most common medium shrub is *Betula glandulosa*. The most common low shrubs are *Betula glandulosa*, *Ledum palustre*, and *Vaccinium uliginosum*. The most common dwarf shrubs are *Empetrum nigrum* and *Vaccinium vitis-idaea*. Sedges are the most common graminoids, and the most common species are *Carex bigelowii* and *Eriophorum vaginatum*. Lichen and forbs are minor vegetative components. Moss makes up more than 50% cover, and it is a mixture of feathermoss and Sphagnum moss.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Low-intensity fire. The soils are wet and generally have a thick organic mat (>15 cm. thick). The typical disturbance regime is low-severity fires. During a low-severity burn, some shrubs and graminoids quickly recolonize and become dominant as a result of the below-ground root reserves that are not consumed in the fire event.		

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Mixed dwarf scrub-sedge-moss dwarf scrubland
Community Phase Narrative:			
After fire, shrub species primarily are in the dwarf stratum. The most common shrubs are *Vaccinium uliginosum* and *Salix pulchra*. As compared to the climax phase, the graminoid cover is more abundant and the most common species is *Carex bigelowii*. Forbs and lichen are minor vegetative components. Moss makes up more than 50% cover and is a mixture of feathermoss and Sphagnum moss. Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Normal time and growth without fire.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
57 57 57

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
29 29 29

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
5.2 5.2 5.2

Subsurface Layer

Thickness (cm): Min RV Max
28 28 28

Texture: Very stony coarse sandy loam

AWC (cm/cm): Min RV Max
0.11 0.11 0.12

pH: Min Avg Max
6.1 6.1 6.1

Influencing Water Features

NWI Code: PSS1

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-45	40-75	15-30	0-2	0-2	0-0	0-3

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.01-70	---	---	---
FD (<4 inches)	---	1-1	---	---
FM (4-24 inches)	---	0.01-1	---	---
SD (<8 inches)	---	---	1-5	---
SL (8-36 inches)	---	---	3-3	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	15-55-80	100	74.2
ERVA4	*Eriophorum vaginatum*	15-15-15	33	22.4
POARA2	*Poa arctica ssp. arctica*	5-5-5	33	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	18-18-18	33	24.5
CAREX	*Carex*	5-5-5	33	12.9

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	5-16-25	100	40.0
SARE2	*Salix reticulata*	35-35-35	33	34.2
LEPAD	*Ledum palustre ssp. decumbens*	6-10.3-15	100	32.1
SAPU15	*Salix pulchra*	30-30-30	33	31.6
EMNI	*Empetrum nigrum*	4-6.3-10	100	25.2
VAVI	*Vaccinium vitis-idaea*	5-5.7-7	100	23.8
BENA	*Betula nana*	15-15-15	33	22.4
DROC	*Dryas octopetala*	10-10-10	33	18.3
RUCH	*Rubus chamaemorus*	1-2.5-4	67	12.9
VAOX	*Vaccinium oxycoccos*	4-4-4	33	11.5

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	3-6.5-10	67	20.8
ALVIF	*Alnus viridis ssp. fruticosa*	4-4-4	33	11.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	11-11-11	33	19.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-3-3	33	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use			Spring
Unknown			Not grazed/browsed
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—19-23.3-29

Community Phase HCPC

Rooting Depth (cm): Min RV Max
5 60 145

Restrictive Feature: Permafrost

Drainage Class: Poorly drained

Surface Layer

Thickness (cm): Min RV Max
5 24.3 77

Texture: Peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.3 4.3 5.5

Subsurface Layer

Thickness (cm): Min RV Max
0 35.7 68

Texture: Bouldery loam, gravelly silt loam, gravelly sandy loam, permanently frozen silt loam, channery loam, loam, silt loam, moderately decomposed plant material, sandy loam, extremely stony coarse sand, fine sandy loam

AWC (cm/cm): Min RV Max
0.02 0.2 0.38

pH: Min RV Max
5 5.6 6.3

Influencing Water Features

NWI Code: PSS1

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-40	25-85	10-55	0-10	0-2	0-5	0-10

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-7	---	---	---
FM (4-24 inches)	---	0.01-7	---	---
SD (<8 inches)	---	---	15-7	---
SL (8-36 inches)	---	---	15-7	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CABI5	*Carex bigelowii*	1-16.9-50	88	38.6
ERVA4	*Eriophorum vaginatum*	5-24.4-65	47	33.9
CACA4	*Calamagrostis canadensis*	1-4.1-15	53	14.8
FEAL	*Festuca altaica*	0.1-7.5-20	24	13.3
FEBR	*Festuca brachyphylla*	5-9.3-15	18	12.8

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	20-20-20	6	10.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	1-5.8-10	24	11.6

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	0.1-3-7	29	9.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	2-10.4-25	82	29.3
VAVI	*Vaccinium vitis-idaea*	2-8.4-15	100	29.0
RUCH	*Rubus chamaemorus*	0.1-5.3-10	53	16.8
VAUL	*Vaccinium uliginosum*	10-12.5-15	12	12.1
LEPAD	*Ledum palustre ssp. decumbens*	20-20-20	6	10.8
SARE2	*Salix reticulata*	1-4.5-10	24	10.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	15-27.9-45	71	44.4
VAUL	*Vaccinium uliginosum*	1-18.8-65	88	40.7
LEPAD	*Ledum palustre ssp. decumbens*	5-14.9-35	82	35.0
SAPU15	*Salix pulchra*	1-10.3-25	76	28.1
BENA	*Betula nana*	20-27.5-35	12	18.0
SPST3	*Spiraea stevenii*	0-7.5-15	12	9.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	55-58.3-60	18	32.1

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	50-64-77	3.9-5-6	17-22-28	2	B

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown
Slight use	Other woody plants	Other	Unknown
Slight use	Willows		Unknown
Slight use	Willows	Caribou	Unknown
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—17; plant species per stop (min-avg-max)—11-28.3-48

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Scrub Gravelly Drainages
Ecological Classification ID: R231XY195AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Drainageways of terraces, mountains, low flood plains, and hills

Slope (percent):	Min	Max
	3	20

Elevation (feet):	Min	Max
	1,007	3,182

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	5	45

Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	15

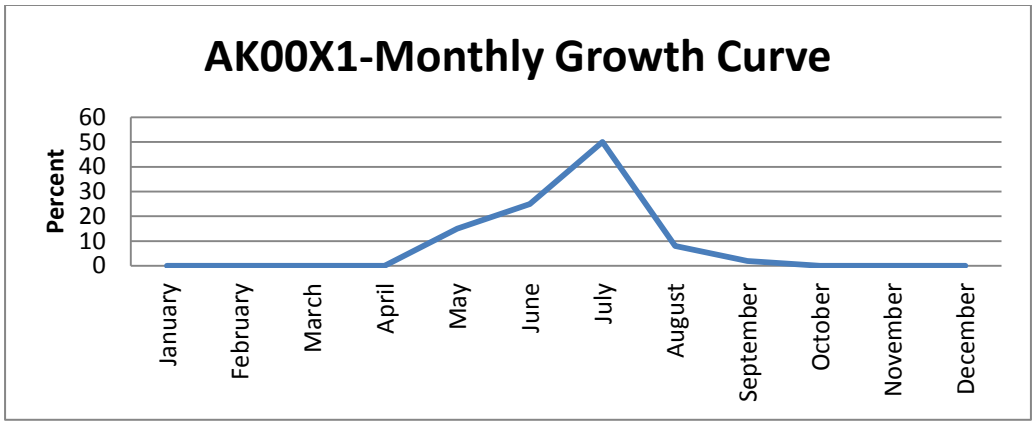
Mean Annual Air Temperature (°F):	Low	High
	23	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TE1—D31-Boreal forest silty drainages, frozen
D31TE2—D31-Boreal forest silty drainages, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Fluvaquentic Aquorthels

Dominant Parent Material: Organic material over gravelly alluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	47

pH:	Low	RV	High
	4.5	6.4	7.9

Effective CEC (me/100g):	Low	High
	14	29

CEC (me/100g):	Min	RV	Max
	3.2	31.8	88.2

Organic Matter (percent):	Low	RV	High
	2	29.3	80

Bulk Density (1/3-Bar):	Min	RV	Max
	1	1.1	1.17

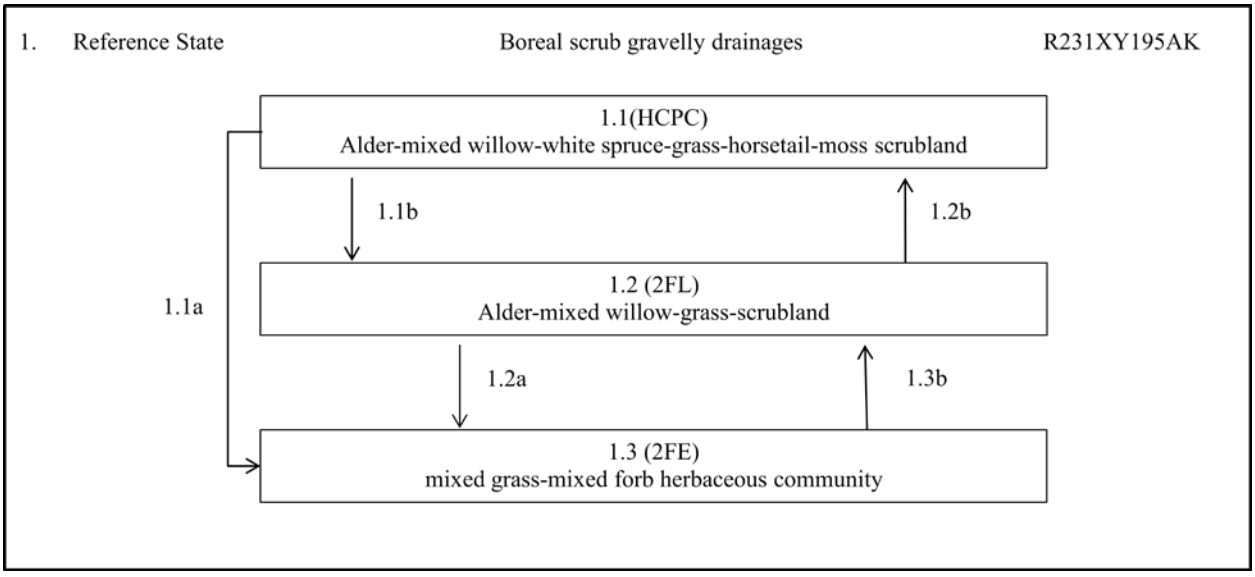
Plant Community Phases

Ecological Site Description ID:	R231XY195AK

Ecological Dynamics of the Site:

This boreal ecological site is a low-gradient drainageway that dissected hills, mountains, and plains. (<15% slopes). The site is characterized by a dense shrub canopy growing directly adjacent to flowing water. Trees were present, but the climax phase lacks sufficient tree cover to qualify as woodland (<10% tree cover). Because the drainageways do not have unvegetated bars, flooding is not included as a disturbance regime. Fire is the dominant disturbance regime. The soils in community phase 1.1 are classified as Cryofluvents and are composed of organic material over gravelly alluvium. Fire is a disturbance regime that resulted in three phases. No alternate states were observed.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	In the climax phase, the dominant vegetation is a mixture of trees, shrubs, graminoids, forbs, and moss. The trees are in the tall, medium, stunted, and regenerative strata. The shrubs are in the tall, medium, low, and dwarf strata. The climax and late phase communities are very similar, but they are separated based on the size/age of trees. During a low-severity fire, minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Graminoids and scrubs quickly recolonize and become dominant as a result of below-ground root reserves that were not consumed in the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow).		

	The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Alder-mixed willow-white spruce-grass-horsetail-moss scrubland
Community Phase Narrative:			
The tree cover is primarily in the tall and medium strata. The most common tree species is *Picea glauca,* but *Betula neoalaskana* and *Populus balsamifera* are also present. *Picea glauca* averages 90 years of age, and the diameter at breast height averages 5.7 inches. Medium shrubs are most abundant, but tall, low, and dwarf species are also common. The most common tall shrubs are *Alnus sp*. and *Salix sp*., the most common medium shrubs are *Salix sp*., and the most common low shrub is *Vaccinium uliginosum*. Graminoids and forbs are equally abundant, totally more than 25% cover. A common graminoid is *Calamagrostis canadensis*, and common forbs are *Equisetum sp*. Moss makes up an abundant ground cover.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	High-intensity fire. No field observations. Under a high-severity fire regime, the community likely would be herbaceous.		

1.1b	Low-intensity fire. Evidence of fire exists in late fire phase (i.e., standing burned trees and charcoal). It is unclear whether a fire typically resets the community (high-intensity fire) or merely removes isolated pockets of shrubs and white spruce (low-intensity fire). Under a low-severity fire regime, the resulting community likely would resemble that of community phase 1.2.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Alder-mixed willow-grass-scrubland
Community Phase Narrative:			
The tree cover is primarily in the medium and regenerative strata, and it is less abundant as compared to the climax phase. The dominant tree species are a mixture of *Picea glauca*, *Betula neoalaskana*, and *Populus balsamifera*. The dominant shrub stratum is tall shrubs, but medium, low, and dwarf shrubs are common. The most common tall shrubs are a mixture of *Alnus* and *Salix sp*. The most common medium and low shrubs are *Salix sp*. Graminoids and forbs are equally abundant, totally more than 25% cover. A common graminoid is *Calamagrostis canadensis*, and common forbs are *Equisetum sp.* and *Parnassia palustris*. As compared to the climax phase, the moss cover is less abundant.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire might occur within this phase, but it was not observed.
1.2b	Normal time and growth without fire. The differences in the vegetation between the late and climax phases are minimal. As time progresses, the late phase community eventually supports a limited amount of tall *Picea glauca* and the shrub understory shifts from the tall to medium shrub stratum.

Phase 1.3	No data.		
Community Phase Number:	1.3	Community Phase Name:	Mixed grass-mixed forb herbaceous community
Community Phase Narrative:			
No data. This phase is included because there is a theoretical chance for a fire event that removes the majority of the tree and shrub canopy. This community likely would be best characterized as herbaceous.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	No data.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FL

Rooting Depth (cm): Min RV Max
50 69.7 93

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 2.4 5

Texture: Fine sandy loam, silt loam, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.17 0.31 0.35

pH: Min RV Max
4.7 6.2 7.2

Subsurface Layer

Thickness (cm): Min RV Max
50 67.3 88

Texture: Gravelly silt loam, extremely cobbly sandy loam, very gravelly sandy loam

AWC (cm/cm): Min RV Max
0.03 0.14 0.35

pH: Min RV Max
5.2 6.6 7.6

Influencing Water Features

NWI Code: R3UB1, R3UB2

NWI Description: Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Upper Perennial, Unconsolidated Bottom, Sand

Rosgen Classification: Steep, entrenched, cascading step-pools; moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	15-30	15-55	2-15	2-35	2-35	10-20

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.01-1	---	---	---
FD (<4 inches)	---	0.01-1	---	---
FM (4-24 inches)	---	0.01-5	---	---
SD (<8 inches)	---	---	3-7	---
SL (8-36 inches)	---	---	1-7	---
SM (3-10 feet)	---	---	40-40	---
TR (<15 feet)	---	---	---	0.01-0.01

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	1-23-45	33	27.7
CARO7	*Carex rotundata*	10-10-10	17	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	7-14.2-25	67	30.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
WIPH	*Wilhelmsia physodes*	1-4.3-7	50	14.7
EQSC	*Equisetum scirpoides*	2-4-5	50	14.1
RALA	*Ranunculus lapponicus*	8-8-8	17	11.5
CHAN9	*Chamerion angustifolium*	5-5-5	17	9.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	5-13.3-20	50	25.8
PAPA8	*Parnassia palustris*	1-6.5-15	67	20.8
EQAR	*Equisetum arvense*	5-12.5-20	33	20.4
RALA	*Ranunculus lapponicus*	15-15-15	17	15.8
HEAL	*Hedysarum alpinum*	10-10-10	17	12.9
CHLA13	*Chamerion latifolium*	0-4-8	33	11.6
EQVA	*Equisetum variegatum*	7-7-7	17	10.8
MEPA	*Mertensia paniculata*	5-5-5	17	9.1

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	7-7-7	17	10.8
RUCH	*Rubus chamaemorus*	5-5-5	17	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	7-9-10	50	21.2
RIHU	*Ribes hudsonianum*	15-15-15	17	15.8
VAUL	*Vaccinium uliginosum*	15-15-15	17	15.8
SAGL	*Salix glauca*	10-10-10	17	12.9
LEGR	*Ledum groenlandicum*	1-2.3-3	50	10.8
PEFL15	*Pentaphylloides floribunda*	0-2.5-5	33	9.1
PEFL15	*Pentaphylloides floribunda*	0-2.5-5	33	9.1
LEPAD	*Ledum palustre ssp. decumbens*	5-5-5	17	9.1
SAPS	*Salix pseudomonticola*	5-5-5	17	9.1
ROAC	*Rosa acicularis*	5-5-5	17	9.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	5-22.5-40	33	27.4
BEOC2	*Betula occidentalis*	1-5.5-10	33	13.5
SARE2	*Salix reticulata*	10-10-10	17	12.9
SAALL	*Salix alaxensis var. longistylis*	10-10-10	17	12.9
SAAR3	*Salix arbusculoides*	10-10-10	17	12.9
SAPS	*Salix pseudomonticola*	5-5-5	17	9.1

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	25-27.5-30	33	30.3
ALVIF	*Alnus viridis ssp. fruticosa*	50-50-50	17	28.9
SABE2	*Salix bebbiana*	5-10-15	50	22.4
SAALL	*Salix alaxensis var. longistylis*	5-12.5-20	33	20.4
SAAL	*Salix alaxensis*	20-20-20	17	18.3
SAALA	*Salix alaxensis var. alaxensis*	20-20-20	17	18.3
SAAR3	*Salix arbusculoides*	15-15-15	17	15.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	2-3.5-5	33	10.8
PIGL	*Picea glauca*	0-2.5-5	33	9.1

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-4.7-10	50	15.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Summer
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—10-20.5-29

Community Phase HCPC

Rooting Depth (cm):	Min	RV	Max
	32	63.5	97

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
0 3.9 9

Texture: Highly organic silt loam, moderately decomposed plant material, peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.22 0.33 0.35

pH: Min RV Max
5.1 6.5 8.1

Subsurface Layer

Thickness (cm): Min RV Max
32 59.6 88

Texture: Very bouldery highly decomposed organic matter, gravelly sandy loam, very gravelly coarse sandy loam, very gravelly loamy coarse sand, channers, silt loam

AWC (cm/cm): Min RV Max
0.03 0.14 0.39

pH: Min RV Max
5.7 6.5 7.5

Influencing Water Features

NWI Code: PSS1, R2RS2, R3UB1, R3UB2, R3UB3

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Riverine, Lower Perennial, Rocky Shore, Rubble; Riverine, Upper Perennial, Unconsolidated Bottom, Cobble-Gravel; Riverine, Upper Perennial, Unconsolidated Bottom, Sand; Riverine, Upper Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Steep, entrenched, cascading step-pools; moderately entrenched, moderate gradient, riffle-dominant channel with infrequently spaced pools; low-gradient, meandering, riffle/pool stream with low W/D ratio and little deposition

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-5	10-95	1-80	1-20	0-85	0-35	0-20

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	20-5	---	---	---
FM (4-24 inches)	---	0.1-2	---	---
SD (<8 inches)	---	---	10-30	---
SL (8-36 inches)	---	---	40-40	---
SM (3-10 feet)	---	---	10-45	---
TR (<15 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	10-10-10	10	10.0

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	4-14.1-20	70	31.5
CAPO	*Carex podocarpa*	25-25-25	10	15.8
CAAQ	*Carex aquatilis*	20-20-20	10	14.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	0-10-20	20	14.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
WIPH	*Wilhelmsia physodes*	1-5.5-10	20	10.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	25-27.5-30	20	23.5
EQAR	*Equisetum arvense*	1-12.8-20	40	22.6
COPA28	*Comarum palustre*	15-15-15	10	12.2
CHAN9	*Chamerion angustifolium*	1-5.5-10	20	10.5
RALA	*Ranunculus lapponicus*	10-10-10	10	10.0
ACDE2	*Aconitum delphiniifolium*	10-10-10	10	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EMNI	*Empetrum nigrum*	3-16.5-30	20	18.2
RUCH	*Rubus chamaemorus*	5-7.5-10	20	12.2
ARRU	*Arctostaphylos rubra*	10-10-10	10	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	1-10-40	70	26.5
ROAC	*Rosa acicularis*	0-3.8-7	40	12.3
SAPU15	*Salix pulchra*	5-5-5	20	10.0
LEPAD	*Ledum palustre ssp. decumbens*	2-3-5	30	9.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAPU15	*Salix pulchra*	10-33-75	50	40.6
ALINT	*Alnus incana ssp. tenuifolia*	1-14-35	40	23.7
SARI4	*Salix richardsonii*	45-45-45	10	21.2
ALVIF	*Alnus viridis ssp. fruticosa*	1-12-20	30	19.0
SABE2	*Salix bebbiana*	1-12-30	30	19.0
PEFL15	*Pentaphylloides floribunda*	20-20-20	10	14.1
PEFL15	*Pentaphylloides floribunda*	20-20-20	10	14.1
SAGL	*Salix glauca*	5-6.7-10	30	14.1
BEOC2	*Betula occidentalis*	15-15-15	10	12.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	5-16-33	30	21.9
SAALL	*Salix alaxensis var. longistylis*	30-30-30	10	17.3
SAIN3	*Salix interior*	10-10-10	20	14.1
ALINT	*Alnus incana ssp. tenuifolia*	20-20-20	10	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	0.1-2.9-5	70	14.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	3-4.3-5	30	11.4

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	1-9.2-15	50	21.4
BENE4	*Betula neoalaskana*	1-5.5-10	20	10.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	33-92-182	1.4-6-16.4	5-31-79	17	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
30-40-60	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Severe use	Willows	Moose	Summer
Slight use			Spring
Slight use	Willows	Moose	Spring
Slight use	Willows	Moose	Summer

Notable Plants: None observed

Species Richness: Number of stops—10; plant species per stop (min-avg-max)—9-17.8-25

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Scrub Sandy Floodplain, Low
Ecological Classification ID: R231XY198AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Low and middle flood plains

Slope (percent):	Min	Max
	0	10

Elevation (feet):	Min	Max
	650	889

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	0

Flooding:	Frequency	Duration
	Frequent	Brief

Ponding: None
Runoff: Low

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	16

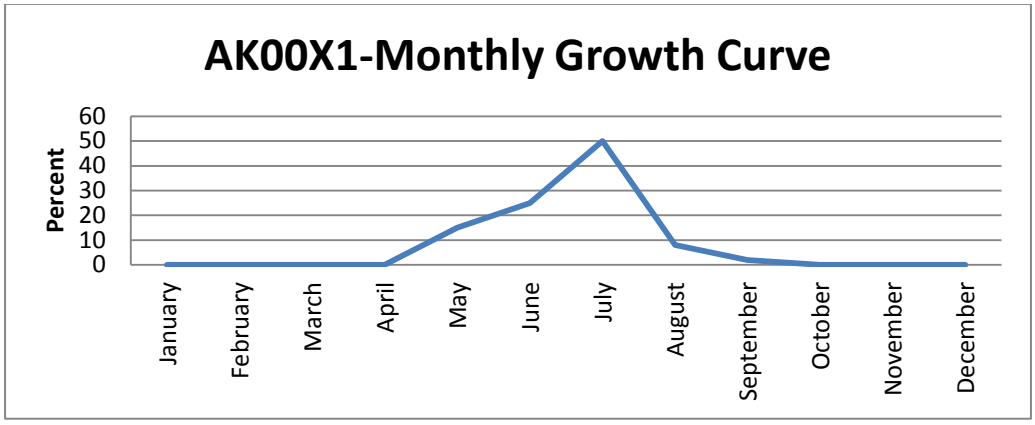
Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31YV1—D31-Boreal scrub sandy low flood plains
D31YV8—D31-Boreal scrub sandy low flood plains
D31YV9—D31-Boreal scrub sandy low flood plains

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents
Dominant Parent Material: Loamy alluvium
Representative Surface Texture: Stratified loamy sand to sandy loam
Subsurface Texture Group: Coarse-loamy
Saturated Hydraulic Conductivity: High

AWC Total (cm):	Low	RV	High
	15	33	48

pH:	Low	RV	High
	6.9	7.6	8.3

Effective CEC (me/100g):	Low	High
	10	12

CEC (me/100g):	Min	RV	Max
	2.1	2.1	2.1

Organic Matter (percent):	Low	RV	High
	2	2	2

Bulk Density (1/3-Bar):	Min	RV	Max
	1.23	1.3	1.38

Plant Community Phases

Ecological Site Description ID:	R231XY198AK

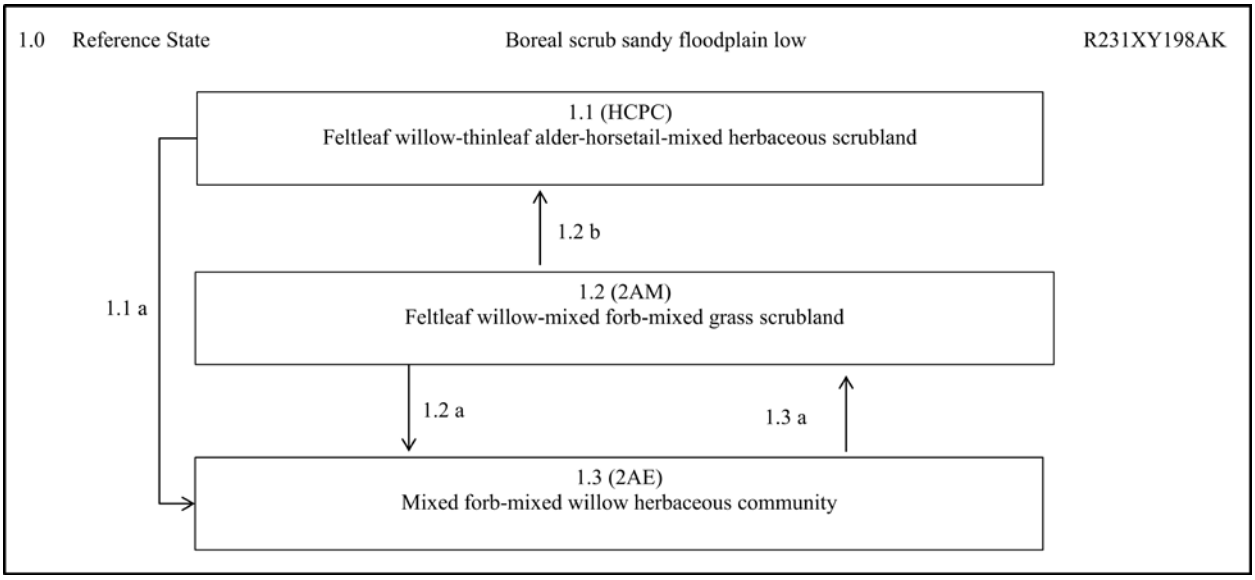
Ecological Dynamics of the Site:

This boreal ecological site is in areas adjacent to the Yukon River that are frequently flooded. The soils in community phase 1.1 are classified as Cryofluvents and are composed of loamy and/or sandy alluvium. Although the duration of flooding is short enough to allow vegetation to grow on bars, the intensity of flooding hinders establishment of tree species and tends to lead to stands of alder and willow. As the site progresses from phase 1.3 to 1.1, less bare soil is exposed and surface plant litter increases. These changes are likely due to increases in vegetative cover. Ice damning disturbance is common on this ecological site, but it did not result in unique community phases.

Areas of phase 1.3 that are underlain by loamier soils tend to support horsetail communities, and areas that are underlain by sandier soils tend to support mixed forb communities. Both soil types support similar vegetation in areas of phase 1.1.

Flooding is a disturbance regime for this ecological site that results in three unique phases.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state are grouped on the basis of the structure and dominance of forbs and shrubs, which are believed to be directly related to the duration and intensity of flooding and/or ice damning on bars adjacent to the Yukon River. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Feltleaf willow-thinleaf alder-horsetail-mixed herbaceous scrubland
Community Phase Narrative:			
This phase is characterized by a closed canopy of alder and willow. *Picea glauca* and *Populus balsamifera* are present, but trees are a minor vegetative component. The majority of the shrub cover is in the tall and medium strata (total shrub cover ~140%). Common shrub species include *Salix interior*, *Alnus incana spp. Tenuifolia,* and *Salix alaxensis*. Graminoids are a minor vegetative component. Forbs are common (total forb cover ~60%). Common forbs include *Artemisia tilesii*, *Eurybia sibirica*, *Equisetum arvense,* and *Equisetum pratense*. Lichen and moss were not observed. Four observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Increased flood frequency, duration, and intensity and/or ice damning might shift the community from dominantly tall shrubs with a closed canopy to a sparse herbaceous community.		

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Feltleaf willow-mixed forb-mixed grass scrubland

Community Phase Narrative:

This phase is characterized by open stands of willow. Seedlings of *Populus balsamifera* are common, but trees are considered a minor vegetative component. The majority of the shrub cover is in the medium stratum (total shrub cover ~60%). Common shrubs include *Salix alaxensis*, *Salix interior*, and *Salix pseudomonticola.* Graminoids are a minor vegetative component (~10% cover), but *Festuca rubra* and *Calamagrostis canadensis* are common species. Forbs are a dominant and diverse vegetative component (~50% cover), and common species include *Hedysarum alpinum, Equisetum sp., Argentina anserina, Astragalus bodinii*, *Artemisia tilesii*, and *Eurybia sibirica.* Lichen and moss were not observed. Nine observations of this phase were conducted.

One sampled plot in this phase supported dominantly regenerating *Populus balsamifera* (60% cover). This might be the result of ice damning that severely disturbed an intact stand of balsam poplar trees.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.2a	Increased flood frequency, duration, and intensity and/or ice damning might shift the community from dominantly medium and tall shrubs with an open canopy to a sparse herbaceous community.
1.2b	Normal time and growth. Flood disturbance is less frequent, and the community shifts from an open shrub community to a closed shrub community.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Mixed forb-mixed willow herbaceous community

Community Phase Narrative:

This phase is characterized by sparse shrub and forb cover. *Populus balsamifera* is present, but trees are considered a minor vegetative component. The shrub cover is primarily in the medium and low strata (total shrub cover ~15%). Common shrubs include *Salix interior* and *Salix alaxensis*. Forbs are the most abundant vegetative component (~45% cover), and common species include an assortment of *Equisetum sp*., *Hedysarum alpinum, Argentina anserina, Astragalus bodinii*, and *Artemisia tilesii*. Graminoids, lichen, and moss are minor vegetative components. Six observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.3a	Normal time and growth. Flood disturbance is less frequent, and the community shifts from a sparse forb community to an open shrub community.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2AE

Rooting Depth (cm): Min RV Max
50 70.2 101

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
0 1 1

Texture: Extremely gravelly loamy sand, fine sandy loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.02 0.15 0.25

pH: Min RV Max
6.9 7.4 7.9

Subsurface Layer

Thickness (cm): Min RV Max
50 69 100

Texture: Very gravelly coarse sandy loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.11 0.15 0.25

pH: Min RV Max
6.6 7.2 7.6

Influencing Water Features

NWI Code: R2UB2, R2UB3

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Sand; Riverine, Lower Perennial, Unconsolidated Bottom, Mud

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	0-20	1-70	0-3	20-99	0-50	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-20	---	---	---
FM (4-24 inches)	---	0.1-35	---	---
SL (8-36 inches)	---	---	0.1-0.1	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAAQ	*Carex aquatilis*	20-20-20	17	18.3
CAST36	*Calamagrostis stricta*	5-5-5	17	9.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-5-5	17	9.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ASBO	*Astragalus bodinii*	10-10-10	17	12.9
EQPA	*Equisetum palustre*	5-5-5	17	9.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQUIS	*Equisetum*	80-80-80	17	36.5
EQHY	*Equisetum hyemale*	2-16.8-35	67	33.4
EQPA	*Equisetum palustre*	0.1-12.6-25	33	20.5
ARAN7	*Argentina anserina*	2-4.5-7	33	12.2
HEAL	*Hedysarum alpinum*	0-2.5-5	33	9.1
PAPA8	*Parnassia palustris*	5-5-5	17	9.1

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQHY	*Equisetum hyemale*	45-45-45	17	27.4
ARTI	*Artemisia tilesii*	6-6-6	17	10.0
ACMIB	*Achillea millefolium var. borealis*	5-5-5	17	9.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAIN3	*Salix interior*	1-12-30	50	24.5
SAALL	*Salix alaxensis var. longistylis*	5-10-15	33	18.3
SAPS	*Salix pseudomonticola*	5-5-5	17	9.1
SAALA	*Salix alaxensis var. alaxensis*	5-5-5	17	9.1

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAIN3	*Salix interior*	30-30-30	17	22.4
SAAL	*Salix alaxensis*	8-8-8	17	11.5
SAAR3	*Salix arbusculoides*	8-8-8	17	11.5
SAALL	*Salix alaxensis var. longistylis*	5-5-5	17	9.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	5-5-5	17	9.1

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Summer
Unknown			Unknown

Notable Plants: None observed

Species Richness: Number of stops—6; plant species per stop (min-avg-max)—4-10.5-17

Community Phase 2AM

Rooting Depth (cm): Min RV Max
40 103 190

Restrictive Features: None recorded

Drainage Class: Well drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Fine sandy loam, sandy loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.08 0.17 0.25

pH: Min RV Max
6.9 7.5 8.1

Subsurface Layer

Thickness (cm): Min RV Max
40 101 185

Texture: Very gravelly coarse sand, very cobbly loamy sand, sand, loamy fine sand, loamy sand, coarse sand, sandy loam, fine sandy loam

AWC (cm/cm): Min RV Max
0.02 0.12 0.25

pH: Min RV Max
7.2 7.7 8.1

Influencing Water Features

NWI Code: R2UB2

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Sand

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	0-5	3-25	1-60	2-95	0-5	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	6-6	---	---	---
FM (4-24 inches)	---	1-9	---	---
FT (>24 inches)	---	75-75	---	---
SM (3-10 feet)	---	---	1-5	---
TR (<15 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	0.1-13.7-40	33	21.4
FESTU	*Festuca*	5-15-25	22	18.3
AGROP2	*Agropyron*	12-12-12	11	11.5
CAREX	*Carex*	10-10-10	11	10.5

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	4-4.7-6	33	12.5

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ASBO	*Astragalus bodinii*	5-15-25	22	18.3

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPA	*Equisetum palustre*	0.1-22-70	44	31.3
EQAR	*Equisetum arvense*	0.1-26.4-75	33	29.6
EQHY	*Equisetum hyemale*	0.1-25.7-75	33	29.3
ARAN7	*Argentina anserina*	1-6.2-10	56	18.6
EUSI13	*Eurybia sibirica*	0-4.6-7	56	16.0
HEAL	*Hedysarum alpinum*	1-4.2-8	44	13.7
ASBO	*Astragalus bodinii*	8-8.5-9	22	13.7
SOCA6	*Solidago canadensis*	4-7-10	22	12.5
ACSI	*Achillea sibirica*	6-6-6	22	11.5
AREGE	*Argentina egedii ssp. egedii*	10-10-10	11	10.5
ARTI	*Artemisia tilesii*	0-1.8-5	56	10.1
PAPA8	*Parnassia palustris*	0-2.7-6	33	9.4
PLMA2	*Plantago major*	1-2.7-5	33	9.4

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
HEAL	*Hedysarum alpinum*	35-55-75	22	35.0
ARTI	*Artemisia tilesii*	3-6-10	33	14.1
CAYU	*Castilleja yukonis*	15-15-15	11	12.9
PAPA8	*Parnassia palustris*	8-8-8	11	9.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAIN3	*Salix interior*	20-20-20	11	14.9
ROAC	*Rosa acicularis*	10-10-10	11	10.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAALL	*Salix alaxensis var. longistylis*	1-13.3-45	78	32.1
SAIN3	*Salix interior*	7-22.2-60	44	31.4
SAALA	*Salix alaxensis var. alaxensis*	5-17.2-45	56	30.9
SAPS	*Salix pseudomonticola*	3-7.6-15	78	24.3
ALINT	*Alnus incana ssp. tenuifolia*	5-8.3-15	67	23.6
SAAL	*Salix alaxensis*	20-20-20	11	14.9
SAPS8	*Salix pseudomyrsinites*	1-4.2-8	44	13.7
SALUL	*Salix lucida ssp. lasiandra*	2-6-10	22	11.5
ROAC	*Rosa acicularis*	4-4.5-5	22	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	2-25-60	56	37.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown
Slight use	Willows	Moose	Winter
Unknown			Unknown

Notable Plants: *Symphyotrichum falcatum var. falcatum*

Species Richness: Number of stops—9; plant species per stop (min-avg-max)—7-17.7-26

Community Phase HCPC

Rooting Depth (cm):

Min	RV	Max
110	142	183

Restrictive Feature: Abrupt textural change

Drainage Class: Well drained

Surface Layer

Thickness (cm):

Min	RV	Max
0	2	5

Texture: Stratified fine sandy loam, silt loam, very fine sandy loam

AWC (cm/cm):

Min	RV	Max
0.17	0.23	0.25

pH:

Min	RV	Max
7.6	8.1	8.5

Subsurface Layer

Thickness (cm): Min RV Max
110 140 178

Texture: Very gravelly sand, fine sandy loam, very fine sandy loam

AWC (cm/cm): Min RV Max
0.02 0.17 0.25

pH: Min RV Max
7.5 7.9 8.3

Influencing Water Features

NWI Code: R2UB2

NWI Description: Riverine, Lower Perennial, Unconsolidated Bottom, Sand

Rosgen Classification: Low-gradient, meandering, alluvial riffle/pool channels with point bars

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-2	1-10	20-45	5-45	2-50	0-2	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	1-2	---	---
FM (4-24 inches)	---	1-30	---	---
SL (8-36 inches)	---	---	5-5	---
ST (>10 feet)	---	---	15-20	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	11-11-11	25	16.6
CALAM	*Calamagrostis*	11-11-11	25	16.6
POA	*Poa*	5-5-5	25	11.2

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
FERU2	*Festuca rubra*	30-30-30	25	27.4
CACA4	*Calamagrostis canadensis*	10-10-10	25	15.8

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ASBO	*Astragalus bodinii*	7-7-7	25	13.2
ARAN7	*Argentina anserina*	1-3-5	50	12.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	4-32-60	50	40.0
EQPR	*Equisetum pratense*	30-30-30	25	27.4
EQPA	*Equisetum palustre*	30-30-30	25	27.4
EUSI13	*Eurybia sibirica*	1-2.8-5	100	16.6
GABO2	*Galium boreale*	4-5-6	50	15.8
CAYU	*Castilleja yukonis*	5-5-5	25	11.2
PAPA8	*Parnassia palustris*	2-2.5-3	50	11.2
ARLA9	*Artemisia laciniata*	5-5-5	25	11.2
ACSI	*Achillea sibirica*	5-5-5	25	11.2
ARAN7	*Argentina anserina*	4-4-4	25	10.0
SOMU	*Solidago multiradiata*	4-4-4	25	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARTI	*Artemisia tilesii*	3-5-7	75	19.4
COSE5	*Corydalis sempervirens*	10-10-10	25	15.8
HEAL	*Hedysarum alpinum*	10-10-10	25	15.8
SANGU2	*Sanguisorba*	8-8-8	25	14.1
ACMIB	*Achillea millefolium var. borealis*	5-5-5	25	11.2
ACSI	*Achillea sibirica*	4-4-4	25	10.0
CHANA2	*Chamerion angustifolium ssp. angustifolium*	4-4-4	25	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARRU	*Arctostaphylos rubra*	4-4-4	25	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COSES	*Cornus sericea ssp. sericea*	4-4.5-5	50	15.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COSES	*Cornus sericea ssp. sericea*	25-25-25	25	25.0
ROAC	*Rosa acicularis*	5-12.5-20	50	25.0
VIED	*Viburnum edule*	12-12-12	25	17.3
SAIN3	*Salix interior*	8-8-8	25	14.1
SAPS8	*Salix pseudomyrsinites*	5-5-5	25	11.2

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	18-39.5-80	100	62.8
SAALL	*Salix alaxensis var. longistylis*	5-23.8-40	100	48.7
SAALA	*Salix alaxensis var. alaxensis*	8-23.2-40	100	48.2
ALVIF	*Alnus viridis ssp. fruticosa*	30-30-30	25	27.4
SAIN3	*Salix interior*	5-10-15	75	27.4
SAPS	*Salix pseudomonticola*	7-11-15	50	23.5
SAGL	*Salix glauca*	20-20-20	25	22.4
SABE2	*Salix bebbiana*	15-15-15	25	19.4
SALUL	*Salix lucida ssp. lasiandra*	5-5-5	25	11.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POBA2	*Populus balsamifera*	6-10.5-15	50	22.9

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—12-19.8-35

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Graminoid Peat Terrace, Depression
Ecological Classification ID: R231XY199AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Thermokarst depressions of terraces, terraces

Slope (percent):	Min	Max
	0	1

Elevation (feet):	Min	Max
	656	1,968

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	20

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Negligible

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	10	15

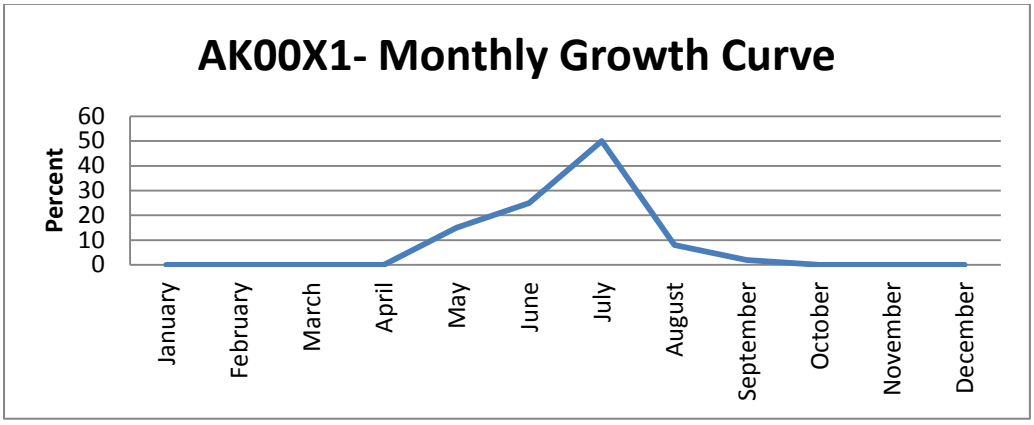
Mean Annual Air Temperature (°F):	Low	High
	25	28

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	2	-31	10
February	0	1	-31	18
March	0	1	-22	30
April	0	1	1	52
May	0	2	23	63
June	1	5	32	72
July	1	7	36	75
August	1	7	32	70
September	1	4	21	57
October	0	3	3	34
November	0	3	-17	16
December	0	2	-29	18

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D31TE1—D31-Boreal grass organic depressions
D31TE2—D31-Boreal grass organic depressions
D31YV3—D31-Boreal grass organic depressions

Characteristics of Representative Soil Components

Soil Classification: Dysic Hydric Cryofibrists
Dominant Parent Material: Mossy organic material over silty alluvium
Representative Surface Texture: Peat
Subsurface Texture Group: Not applicable
Saturated Hydraulic Conductivity: Moderately high

AWC Total (cm):	Low	RV	High
	10	20	35

pH:	Low	RV	High
	3.4	5.7	7

Effective CEC (me/100g):	Low	High
	21.5	40

CEC (me/100g):	Min	RV	Max
	10	36	62

Organic Matter (percent):	Low	RV	High
	2	41	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.7	1.15

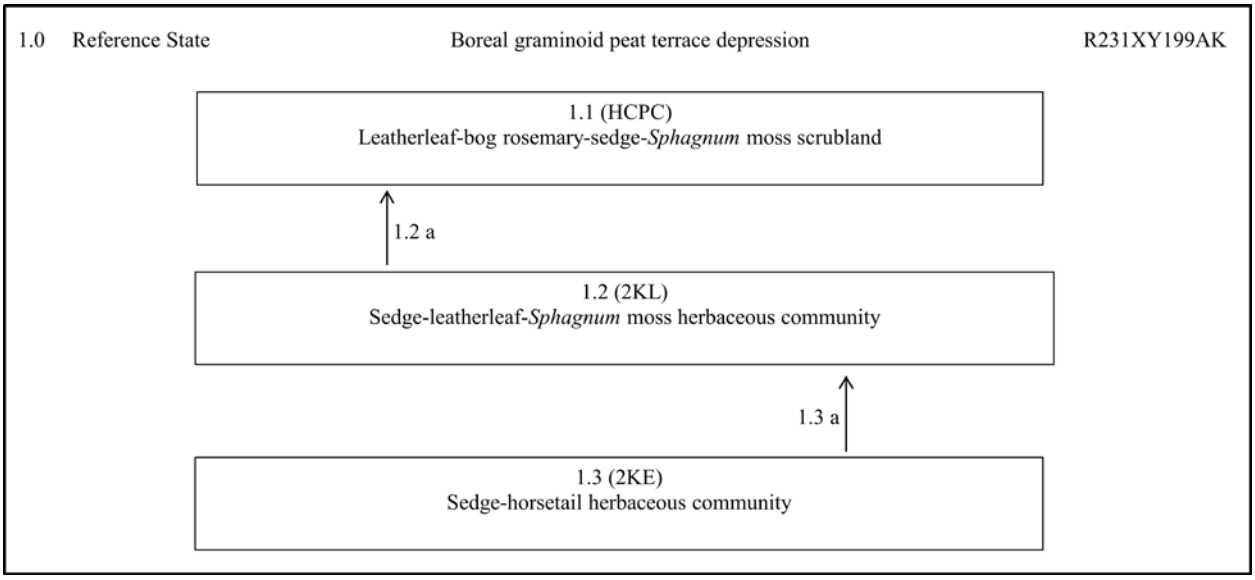
Plant Community Phases

Ecological Site Description ID:	R231XY199AK

Ecological Dynamics of the Site:

This boreal ecological site is in spherical depressions of flood plain terraces and is attributed to a thermokarst event. The underlying permafrost melts, causing the ground to slump and form wet depressions. These depressions are stable, open bodies of water with little or no hydrologic input, and the succession is similar to that of a bog. With time and organic matter accumulation, the permafrost eventually reforms in the soil and the site progresses from open water to scrubland. Prior to the thermokarst, the site likely resembles ecological site R231XY169AK. Limited observations in the lowland thermokarst made conceptualization of the state and transition model difficult. It is believed that phases are expressions of the time since the thermokarst event, depth of the water table, amount of accumulated organic matter, and the presence or absence of permafrost. The soils in community phase 1.1 are classified as Cryofibrists and are composed of organic matter over silty alluvium.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	The height of stunted and regenerative trees is defined as less than 15 feet. The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1	

Community Phase Number:	1.1	Community Phase Name:	Leatherleaf-Bog Rosemary-Sedge-Sphagnum Moss Scrubland

Community Phase Narrative:

This community is thought to be the climax phase for this ecological site due to the presence of stunted *Picea mariana,* dominance of ericaceous scrubs, and limited amount of standing water. *Picea mariana* is present in trace amounts in the depressions. The shrubs are primarily in the low and dwarf strata (total shrub cover ~30%). Common shrubs include *Chamaedaphne calyculata*, *Andromeda polifolia*, and *Vaccinium oxycoccos*. Graminoids are abundant (~95% cover) and are an unknown *Carex sp*. Forbs and lichen are minor vegetative components. Sphagnum moss is an abundant ground cover. Two observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.1a	With time and absence of thermokarst, the climax phase might transition to ecological site R231XY169AK.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Sedge-Leatherleaf-Sphagnum Moss Herbaceous Community

Community Phase Narrative:

This phase is characterized by abundant sedge and Sphagnum moss cover and a limited amount of ericaceous scrubs and standing water on the soil surface. Trees are not present. The shrubs are in the low and dwarf strata, but they make up limited cover (~15% cover). The most common shrub species are *Chamaedaphne calyculata*, *Andromeda polifolia*, and *Vaccinium oxycoccos*. Graminoids are abundant (~30% cover), and they include *Eriophorum sp*., *Carex limosa*, and *Carex aquatilis*. Forbs and lichen are minor vegetative components. Sphagnum moss is an abundant ground cover (~90% cover). Two observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.2a	Normal time and growth. Organic matter increases. Ericaceous shrubs become a dominant vegetative component.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Sedge-Horsetail Herbaceous Community
Community Phase Narrative:			
This phase is characterized by an abundance of sedges, forbs, and standing water on soil surface. Trees are not present. Shrubs are a minor vegetative component. Graminoids are abundant (~40% cover), and they include *Carex aquatilis*, *Carex microchaeta*, *Carex tenuiflora*, and *Eriophorum angustifolium*. Forbs are abundant (~10% cover) and are primarily *Equisetum fluviatile*. One observation of this phase was conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	Normal time and growth. Organic matter accumulates, and standing water on the soil surface is reduced. The community transitions from cotton grass and horsetail species to an increased abundance of Sphagnum moss and ericaceous scrubs.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2KE

Rooting Depth (cm): Min RV Max
50 80 110

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
50 50 50

Texture: Peat

AWC (cm/cm): Min Avg Max
0.35 0.35 0.35

pH: Min RV Max
3.7 3.9 4.1

Subsurface Layer

Thickness (cm): Min RV Max
60 60 60

Texture: Mucky peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.1 4.3 4.5

Influencing Water Features

NWI Code: PEM1

NWI Description: Palustrine, Emergent, Persistent

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	60-60	50-50	0-0	0-0	0-0	40-40

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GD (<4 inches)	5-5	---	---	---
GM (4-24 inches)	15-15	---	---	---
FM (4-24 inches)	---	0.1-10	---	---
FT (>24 inches)	---	0.1-0.1	---	---
SD (<8 inches)	---	---	0.1-0.1	---
SL (8-36 inches)	---	---	0.1-0.1	---
SM (3-10 feet)	---	---	0.1-0.1	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERAN6	*Eriophorum angustifolium*	5-5-5	100	22.4
CATE5	*Carex tenuiflora*	5-5-5	100	22.4

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAMI4	*Carex microchaeta*	15-15-15	100	38.7
CAAQ	*Carex aquatilis*	15-15-15	100	38.7

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQFL	*Equisetum fluviatile*	10-10-10	100	31.6

Site Tree Measurements: Not measured

Tree Basal Area:

Min-Avg-Max	Number of Stands
0-0-0	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—12-12-12

Community Phase 2KL

Rooting Depth (cm):	Min	RV	Max
	16	83	150

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	16	48	80

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	3.7	3.9	4.1

Subsurface Layer

Thickness (cm):	Min	RV	Max
	0	41	82

Texture: Peat, water

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4.1	4.3	4.5

Influencing Water Features

NWI Code: PSS1, PML1

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Deciduous; Palustrine, Moss-Lichen, Moss

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	90-99	5-10	0-1	0-0	0-0	10-10

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	15-30	---	---	---
SD (<8 inches)	---	---	0.1-0.1	---
SL (8-36 inches)	---	---	0.1-5	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CALI7	*Carex limosa*	1-15.5-30	100	39.4
ERIOP	*Eriophorum*	15-15-15	50	27.4
CAAQ	*Carex aquatilis*	12-12-12	50	24.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAOX	*Vaccinium oxycoccos*	0.1-4.1-8	100	20.1
CHCA2	*Chamaedaphne calyculata*	5-5-5	50	15.8
ANPO	*Andromeda polifol*ia	5-5-5	50	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	10-10-10	50	22.4
ANPO	*Andromeda polifol*ia	5-5-5	50	15.8

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Grasses and sedges	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—8-9-10

Community Phase HCPC

Rooting Depth (cm): Min RV Max
152 152 152
Restrictive Features: None recorded
Drainage Class: Very poorly drained
Surface Layer
Thickness (cm): Min RV Max
60 60 60
Texture: Peat
AWC (cm/cm): Min Avg Max
0.35 0.35 0.35
pH: Min RV Max
5 5 5
Subsurface Layer
Thickness (cm): Min RV Max
0 60 120
Texture: Peat
AWC (cm/cm): Min Avg Max
0.35 0.35 0.35
pH: Min RV Max
5 5 5

Influencing Water Features

NWI Code: PML1
NWI Description: Palustrine, Moss-Lichen, Moss
Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
0-0	30-60	3-12	0-0	0-3	0-0	12-20

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	95-95	---	---	---
FD (<4 inches)	---	2-2	---	---
SD (<8 inches)	---	---	1-4	---
SL (8-36 inches)	---	---	15-3	---
TS (<15 feet)	---	---	---	4-4

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	65-65-65	50	57.0

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	5-41.7-95	150	79.1

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
DRRO	*Drosera rotundifolia*	2-3-4	100	17.3
TOPU	*Tofieldia pusilla*	3-3-3	50	12.2
LYAN2	*Lycopodium annotinum*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ANPO	*Andromeda polifol*ia	4-6-8	100	24.5
VAOX	*Vaccinium oxycoccos*	4-4-4	100	20.0
RUCH	*Rubus chamaemorus*	2-2.5-3	100	15.8
CHCA2	*Chamaedaphne calyculata*	5-5-5	50	15.8
MYGA	*Myrica gale*	3-3-3	50	12.2
BENA	*Betula nana*	3-3-3	50	12.2
LEGR	*Ledum groenlandicum*	2-2-2	50	10.0
VAUL	*Vaccinium uliginosum*	2-2-2	50	10.0
LEPAD	*Ledum palustre ssp. decumbens*	2-2-2	50	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	15-15-15	50	27.4
BENA	*Betula nana*	3-3-3	50	12.2

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	4-4-4	50	14.1

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: *Malaxis paludosa*

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—12-13-14

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea mariana/Vaccinium uliginosum-Ledum groenlandicum*

Ecological Classification ID: F232XY201AK

Major Land Resource Area: 232—Yukon Flats Lowlands

Physiographic Features

Landform: Loess plains, terraces

Slope (percent):	Min	Max
	0	8

Elevation (feet):	Min	Max
	1,033	1,690

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	25

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Very low

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	14

Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

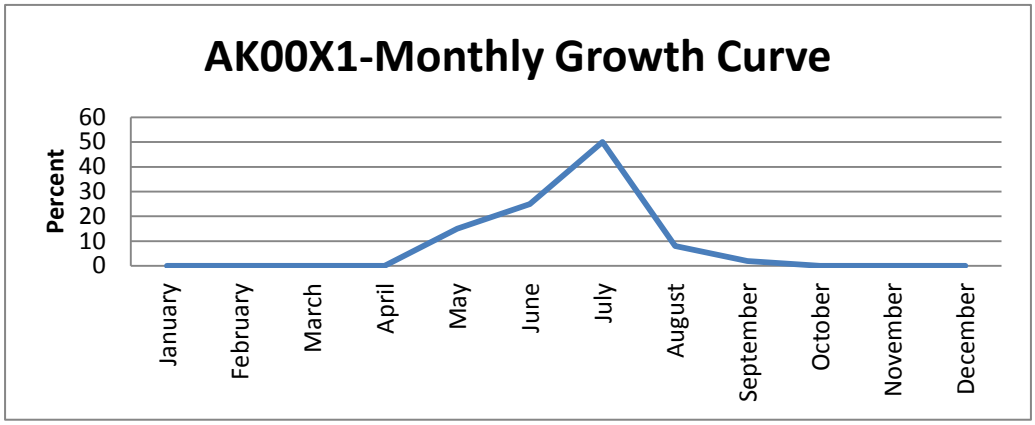
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	1	-35	1
February	0	1	-29	12
March	0	1	-17	19
April	0	1	3	43
May	0	2	27	61
June	1	4	41	72
July	1	4	43	77
August	1	4	39	72
September	1	3	27	54
October	1	2	7	28
November	0	2	-17	10
December	0	2	-29	1

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D32TL1—D32-Boreal taiga organic plains, frozen
D32TL2—D32-Boreal taiga organic plains, frozen
D32TL4—D32-Boreal taiga organic plains, frozen

Characteristics of Representative Soil Components

Soil Classification: Loamy, mixed, euic, subgelic Terric Fibristels

Dominant Parent Material: Organic material over silty cryoturbate

Representative Surface Texture: Peat

Subsurface Texture Group: Loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	59

pH:	Low	RV	High
	3.4	5.5	6.5

Effective CEC (me/100g):	Low	High
	16	40

CEC (me/100g):	Min	RV	Max
	10	27.3	62

Organic Matter (percent):	Low	RV	High
	2	28	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.19

Plant Community Phases

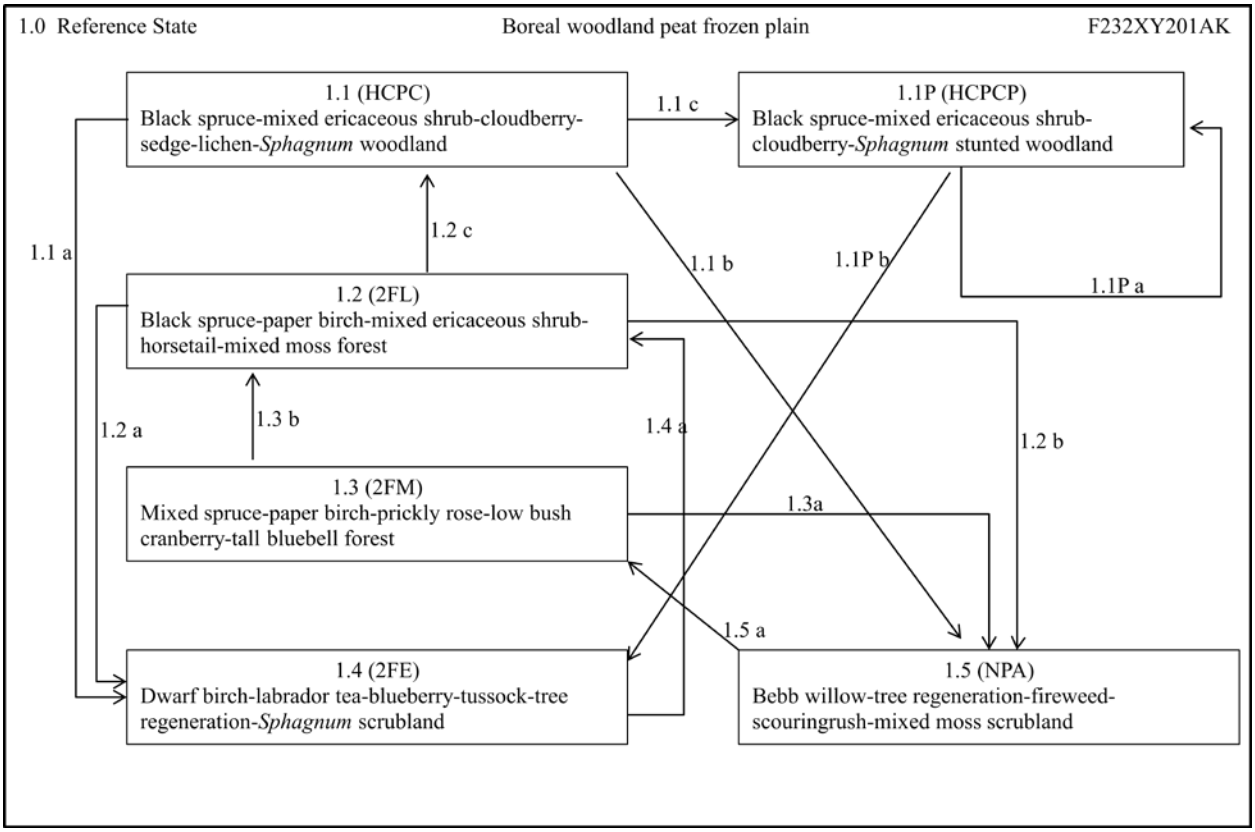
Ecological Site Description ID:	F232XY201AK
Ecological Dynamics of the Site:	

This boreal ecological site is on loess plains, in all positions not related to thermokarst or drainages. The average slope is 4%, but slope ranges from 0 to 18%. As time elapses after a fire event and plant communities progress from community phase 1.5 to 1.1, the surface organic matter content increases and permafrost develops and/or rises in the soil profile. The soils in community phase 1.1 are classified as Fibristels and are composed of organic matter over silty cryoturbate.

Fire resulted in six documented community phases. It is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. For this ecological site, low-severity fire events are more typical than high-severity fire events. The low-severity fire community phase (phase 1.4) and the high-severity fire community phase (phase 1.5) appear to differ in the depth of organic material on the soil surface, the presence and/or depth of permafrost, and the present and potential vegetation.

It was presumed that sites devoid of fire for long periods of time eventually support dominantly a mat of Sphagnum moss. The organic material becomes so thick and has enough moisture that a fire event would not necessarily reset the community to an early fire sere (phase 1.4). Communities that support dominantly Sphagnum moss have a less productive black spruce forest and thus are considered post climax for this ecological site.

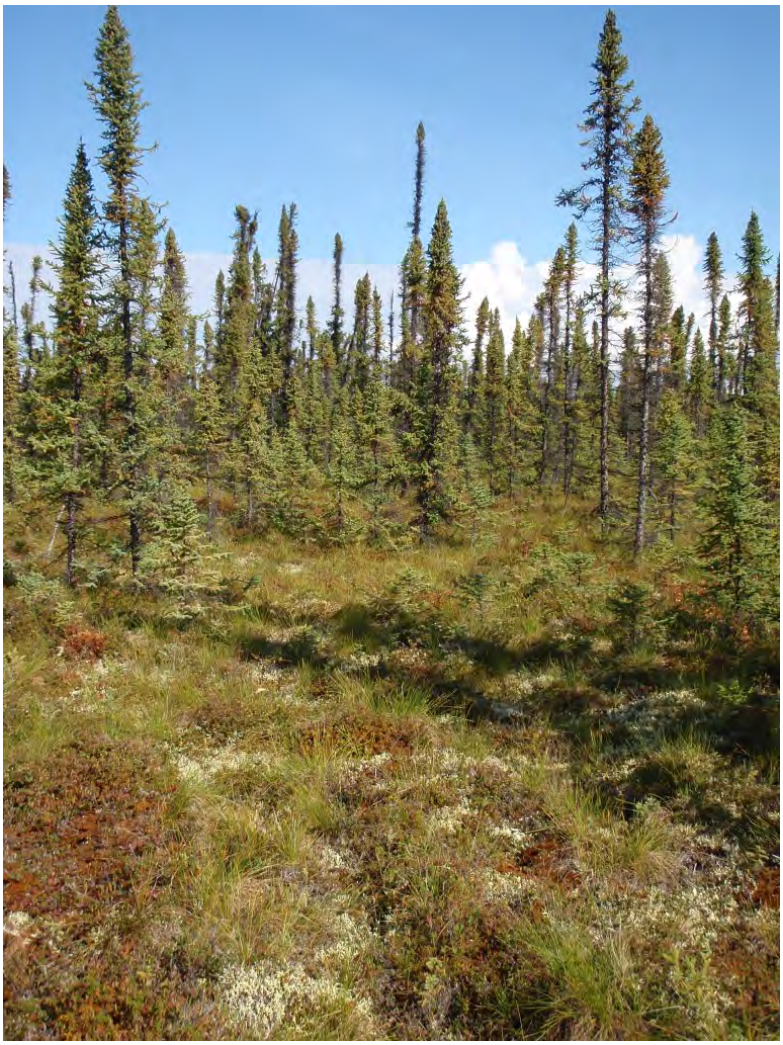
State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of the structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the severity of the burn and the time since the last fire event. During a low-severity fire (phase 1.4), minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Permafrost typically remains in the soil profile, and water commonly perches above it. Graminoids and scrubs quickly recolonize and become dominant as a result of below-ground root reserves that were not consumed in the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.2. During a high-severity fire (phase 1.5), large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost commonly drops out of the soil profile, and the sites become drier. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.3.

	The fire return interval plays a substantial role in the structure of the observed forest. Longer fire return intervals favor development of community phases 1.1 and 1.1P, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Black spruce-mixed ericaceous shrub-cloudberry-sedge-lichen-moss woodland

Community Phase Narrative:
Picea mariana is the dominant tree species, and it is distributed among the medium, stunted, and regenerative tree strata (total mature tree cover ~20%; average age 124 years). *Betula neoalaskana* is present as a trace species. The shrub cover is primarily in the low and dwarf strata (total shrub cover ~70%), and common species are *Vaccinium uliginosum*, *Ledum palustre ssp. decumbens*, *Vaccinium vitis-idaea*, and *Rubus chamaemorus*. Graminoids generally are abundant (~30% cover), and common species are *Carex bigelowii* and *Eriophorum vaginatum*. Lichen (30% cover) and moss (30% cover) form an extensive ground cover. Common species include *Flavocetraria cucullata*, *Cladina sp.*, *Cladonia sp.*, *Sphagnum sp.*, and *Hylocomium splendens*. Nine observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Low-severity fire.
1.1b	High-severity fire.
1.1c	Normal time and growth without fire. Black spruce forest becomes less productive, and the Sphagnum moss cover increases. Phase 1.1 is thought to have a shorter fire return interval than phase 1.1P and a longer fire return interval than phase 1.2.

Phase 1.1P	

Community Phase Number:	1.1P	Community Phase Name:	Black spruce-mixed ericaceous shrub-cloudberry-Sphagnum stunted woodland

Community Phase Narrative:

As compared to community phase 1.1, phase 1.1P has increased Sphagnum moss cover, reduced tree size and total cover of *Picea mariana*, and a thicker organic mat (average depth 70 cm. in phase 1.1P and 40 cm. in phase 1.1). *Picea mariana* is the dominant tree species, and the tree cover is primarily in the stunted tree stratum (total mature tree cover ~15%; average age 108 years). The shrub cover primarily is in the low and dwarf shrub strata (total shrub cover ~60%), and common species are *Vaccinium uliginosum*, *Chamaedaphne calyculata*, *Ledum palustre ssp. decumbens*, *Rubus chamaemorus*, *Vaccinium vitis-idaea*, and *Vaccinium oxycoccos*. Graminoids and forbs are minor vegetative components (<10% cover). Lichen (~20% cover) and *Sphagnum sp*. (~65% cover) form an extensive ground cover. Three observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.1Pa	Low-severity fire. Fire reduces the black spruce cover but does not dramatically alter the vegetative community.
1.1Pb	High-severity fire. Fire may remove a significant portion of the Sphagnum moss mat, reverting the community back to the typical early fire sere.

Phase 1.2	

Community Phase Number:	1.2	Community Phase Name:	Black spruce-paper birch-mixed ericaceous shrub-horsetail-mixed moss forest

Community Phase Narrative:
Picea mariana is the dominant tree species, and *Betula neoalaskana* is present in lower densities. The tree cover is primarily in the medium tree stratum (total mature tree cover ~40%; average age 80 years). The shrub cover primarily is in the low shrub stratum (total shrub cover ~100%), and common species are *Alnus viridis ssp. fruticosa*, *Vaccinium uliginosum*, *Ledum groenlandicum*, *Rosa acicularis*, *Dasiphora fruticosa*, and *Vaccinium vitis-idaea*. Graminoids (~15% cover) and forbs (~20% cover) are abundant, and common species include *Eriophorum vaginatum*, *Carex bigelowii*, and *Equisetum sylvaticum*. Lichen (20% cover) and moss (50% cover) form an extensive ground cover, and the most common species are *Cladina sp*., *Cladonia sp*., *Sphagnum sp*., *Hylocomium splendens*, and *Pleurozium schreberi*. Thirteen observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Low-severity fire.
1.2b	High-severity fire.
1.2c	Normal time and growth without fire. Paper birch disappears from the community, black spruce matures, and the overall shrub cover decreases. Phase 1.2 is thought to have a shorter fire return interval than that of phase 1.1 and a longer fire return interval than that of phase 1.4.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Mixed spruce-paper birch-prickly rose-low bush cranberry-tall bluebell forest
Community Phase Narrative:			
Betula neoalaskana is the dominant tree species, and *Picea mariana* and *Picea glauca* are present at lower densities. The tree cover is primarily in the tall and medium tree strata (total mature tree cover ~105%; average age 63 years). The shrub cover primarily is in the tall and medium strata (total shrub cover ~50%), and common species include *Salix bebbiana*, *Rosa acicularis*, *Ribes triste*, *Vaccinium vitis-idaea*, and *Linnaea borealis*. Graminoids (~5% cover) and forbs (~20% cover) are common, including *Calamagrostis canadensis*, *Cornus canadensis*, *Mertensia paniculata*, and *Geocaulon lividum*. Lichen and moss are minor vegetative components. Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	High-severity fire. Sites appear to typically revert back to community phase 1.5. This likely occurs due to the limited depth of organic material.		
1.3b	Normal time and growth without fire. Organic material increases and permafrost migrates upward in the soil profile. Paper birch and white spruce are replaced by a maturing black spruce stand. Phase 1.3 is thought to have a shorter fire return interval than that of phase 1.1 and a longer fire return interval than that of phase 1.5. A long period without fire would be needed for this pathway to occur. This period is likely longer than the typical interval between fire events in Interior Alaska, which is approximately 100 years.		

Phase 1.4			
Community Phase Number:	1.4	Community Phase Name:	Dwarf birch-Labrador tea-blueberry-tussock-tree regeneration-Sphagnum scrubland
Community Phase Narrative:			
Picea mariana and *Betula neoalaskana* are common (~10% cover) and are primarily in the regenerative tree stratum. Shrubs primarily are in the medium, low, and dwarf shrub strata (total shrub cover ~150%). The most common shrub species are *Betula glandulosa*, *Betula nana*, *Ledum palustre spp. decumbens*, *Vaccinium uliginosum*, *Vaccinium vitis-idaea*, and *Rubus chamaemorus*. Graminoids are abundant (~80% cover), and the most common species are *Eriophorum vaginatum* and *Carex bigelowii*. Moss is abundant (~35% cover), and the most common species is *Sphagnum*. Four observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.4a	Normal time and growth without fire. Black spruce and paper birch mature into a forest, and graminoids become less prevalent. This community is thought to result from a low-severity fire regime.

Phase 1.5			
Community Phase Number:	1.5	Community Phase Name:	Bebb willow-tree regeneration-fireweed-scouringrush-mixed moss scrubland

Community Phase Narrative:

Picea mariana and *Betula neoalaskana* are common (~20% cover) and primarily are in the regenerative tree stratum. *Picea glauca* is also present in lower densities. Shrubs are evenly distributed among all shrub strata (total shrub cover ~110%), and common species include *Salix bebbiana*, *Rosa acicularis*, *Alnus viridis ssp. fruticosa*, *Ledum groenlandicum, Vaccinium uliginosum*, *Vaccinium vitis-idaea*, and *Linnaea borealis*. Forbs are abundant (~40% cover), and common species are *Chamerion angustifolium*, *Cerastium sp*., and *Equisetum scirpoides*. Moss is abundant (~20% cover), and common species include *Ceratodon purpureus* and *Polytrichum sp*. Three observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.5a	Normal time and growth without fire. Paper birch, black spruce, and white spruce mature into a forest. This community is thought to result from a high-severity fire regime.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase NPA

Rooting Depth (cm):	Min	RV	Max
	22	51	80

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	8	10	12

Texture: Moderately decomposed plant material, peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	3.1	3.1	3.1

Subsurface Layer

Thickness (cm):	Min	RV	Max
	14	41	68

Texture: Silt loam

AWC (cm/cm):	Min	RV	Max
	0.25	0.25	0.25

pH:	Min	RV	Max
	5.8	6.6	7.2

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-5	5-35	30-70	15-20	3-10	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	1-2	---	---
FM (4-24 inches)	---	15-15	---	---
FT (>24 inches)	---	4-4	---	---
SD (<8 inches)	---	---	4-6	---
SM (3-10 feet)	---	---	7-8	---
ST (>10 feet)	---	---	12-70	---
TR (<15 feet)	---	---	---	12-5
TM (15-40 feet)	---	---	---	3-3

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	5-5-5	67	18.3

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-15-15	33	22.4

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	10-15-20	67	31.6
CERAS	*Cerastium*	1-1.7-2	100	12.9
ORSE	*Orthilia secunda*	3-3-3	33	10.0
PEFR5	*Petasites frigidus*	3-3-3	33	10.0
GABO2	*Galium boreale*	3-3-3	33	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQAR	*Equisetum arvense*	25-25-25	33	28.9
EQSC	*Equisetum scirpoides*	15-15-15	33	22.4
EQSY	*Equisetum arvense*	8-8-8	33	16.3
MEPA	*Mertensia paniculata*	4-4-4	33	11.5

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	4-9-15	100	30.0
POAL11	*Polygonum alpinum*	4-4-4	33	11.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	6-7.7-10	100	27.7
ARRU	*Arctostaphylos rubra*	15-15-15	33	22.4
LIBO3	*Linnaea borealis*	4-4.5-5	67	17.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	80-80-80	33	51.6
VAUL	*Vaccinium uliginosum*	7-7-7	33	15.3
RUID	*Rubus idaeus*	5-5-5	33	12.9

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	7-16-25	67	32.7
SABE2	*Salix bebbiana*	15-15-15	33	22.4
LEGR	*Ledum groenlandicum*	8-8-8	33	16.3
RUID	*Rubus idaeus*	7-7-7	33	15.3
VAUL	*Vaccinium uliginosum*	5-5-5	33	12.9

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SABE2	*Salix bebbiana*	25-47.5-70	67	56.3
ALVIF	*Alnus viridis ssp. fruticosa*	12-12-12	67	28.3
SAGL	*Salix glauca*	20-20-20	33	25.8
ALINT	*Alnus incana ssp. tenuifolia*	7-7-7	33	15.3
LEGR	*Ledum groenlandicum*	5-5-5	33	12.9

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-10-15	100	31.6
BENE4	*Betula neoalaskana*	5-7.7-10	100	27.7
PIGL	*Picea glauca*	5-5-5	33	12.9

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	3-3-3	33	10.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other	Other	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—16-21-27

Community Phase 2FE

Rooting Depth (cm): Min RV Max
50 74 98

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
31 46 61

Texture: Mucky peat, peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.7 4.9 5.1

Subsurface Layer

Thickness (cm): Min RV Max
19 28 37

Texture: Permanently frozen silt, permanently frozen very fine sandy loam

AWC (cm/cm): Min RV Max
0.25 0.26 0.27

pH: Min RV Max
5.7 6.1 6.5

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-20	20-50	8-20	2-5	3-5	0-0	2-5

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	85-85	---	---	---
SD (<8 inches)	---	---	10-8	---
SL (8-36 inches)	---	---	15-55	---
TR (<15 feet)	---	---	---	4-4
TS (<15 feet)	---	---	---	8-8

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	75-83.3-90	75	79.1

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERVA4	*Eriophorum vaginatum*	75-75-75	25	43.3
CAREX	*Carex*	2-10.7-20	75	28.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	8-14.5-20	100	38.1
RUCH	*Rubus chamaemorus*	3-9.2-18	100	30.4
VAOX	*Vaccinium oxycoccos*	2-5-10	75	19.4
ANPO	*Andromeda polifol*ia	3-3.5-4	50	13.2
CHCA2	*Chamaedaphne calyculata*	4-4-4	25	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	30-52.5-80	100	72.5
BEGL	*Betula glandulosa*	5-40-65	75	54.8
VAUL	*Vaccinium uliginosum*	4-9-20	100	30.0
BENA	*Betula nana*	15-15-15	50	27.4
CHCA2	*Chamaedaphne calyculata*	15-15-15	25	19.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALINT	*Alnus incana ssp. tenuifolia*	55-55-55	25	37.1
BEGL	*Betula glandulosa*	20-20-20	25	22.4
SAPU15	*Salix pulchra*	20-20-20	25	22.4
BETUL	*Betula*	7-9.5-12	50	21.8
SAGL	*Salix glauca*	15-15-15	25	19.4
SALIX	*Salix*	5-5-5	50	15.8
BENA	*Betula nana*	4-4-4	25	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	4-10.5-17	50	22.9
PIMA	*Picea mariana*	4-5.2-7	100	22.9

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-6.5-8	50	18.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	17-18-20	0.9-1-1.5	5-6-8	2	G

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—17-20.2-22

Community Phase 2FM

Rooting Depth (cm):

Min	RV	Max
56	114.5	173

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):

Min	RV	Max
5	11.5	18

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max

	0.35	0.35	0.35

pH:	Min	RV	Max
	3.7	4.6	5.3

Subsurface Layer

Thickness (cm):	Min	RV	Max
	51	103	155

Texture: Permanently frozen silt loam, silt loam

AWC (cm/cm):	Min	RV	Max
	0.25	0.25	0.25

pH:	Min	RV	Max
	5.8	6.8	7.7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-5	8-60	10-76	14-25	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	8-8	---	---
FT (>24 inches)	---	5-5	---	---
SD (<8 inches)	---	---	4-4	---
SL (8-36 inches)	---	---	4-4	---
ST (>10 feet)	---	---	10-10	---
TR (<15 feet)	---	---	---	10-4
TM (15-40 feet)	---	---	---	20-80
TT (>40 feet)	---	---	---	5-5

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	5-5-5	33	12.9

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	10-10-10	33	18.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	8-8.5-9	67	23.8
GELI2	*Geocaulon lividum*	4-4-4	33	11.5
LYAL3	*Lycopodium alpinum*	4-4-4	33	11.5
ORSE	*Orthilia secunda*	3-3-3	33	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	15-15-15	33	22.4
GELI2	*Geocaulon lividum*	3-3-3	33	10.0
PYAS	*Pyrola asarifolia*	3-3-3	33	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	5-5-5	67	18.3
CHAN9	*Chamerion angustifolium*	4-4-4	33	11.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	3-4.3-6	100	20.8
LIBO3	*Linnaea borealis*	3-5-7	67	18.3

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	4-4-4	33	11.5
SPST3	*Spiraea stevenii*	3-3-3	33	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	10-32.5-55	67	46.5
VIED	*Viburnum edule*	7-7-7	33	15.3
RITR	*Ribes triste*	7-7-7	33	15.3
ALVIF	*Alnus viridis ssp. fruticosa*	5-5-5	33	12.9

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SABE2	*Salix bebbiana*	10-12.5-15	67	28.9
ALINT	*Alnus incana ssp. tenuifolia*	10-10-10	33	18.3
SALIX	*Salix*	10-10-10	33	18.3

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	5-8.3-10	100	28.9
PIMA	*Picea mariana*	4-12-20	67	28.3
BENE4	*Betula neoalaskana*	5-5-5	33	12.9

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-35-80	100	59.2
PIGL	*Picea glauca*	10-21.7-30	100	46.5
PIMA	*Picea mariana*	10-15-20	67	31.6

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	5-45-85	67	54.8
PIGL	*Picea glauca*	5-12.5-20	67	28.9

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	31-63-128	1.9-7-15.4	30-48-81	7	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
73-85.8-112	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other	Moose	Unknown
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—16-20-23

Community Phase 2FL

Rooting Depth (cm): Min RV Max
25 55.3 88

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
16 21.8 34

Texture: Moderately decomposed plant material, peat, slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.2 4.3 5.5

Subsurface Layer

Thickness (cm): Min RV Max
9 33.5 54

Texture: Permanently frozen silt, permanently frozen silt loam, silt, loam, silt loam

AWC (cm/cm): Min RV Max
0.22 0.25 0.27

pH: Min RV Max
4.6 6 7.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
4-45	25-85	5-15	2-15	0-3	0-0	0-4

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-5	---	---	---
FM (4-24 inches)	---	10-2	---	---
SD (<8 inches)	---	---	3-6	---
SL (8-36 inches)	---	---	18-8	---
SM (3-10 feet)	---	---	5-8	---
TR (<15 feet)	---	---	---	25-25
TS (<15 feet)	---	---	---	35-35

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	5-14.2-45	46	25.6
ERIOP	*Eriophorum*	10-18.3-30	23	20.6
ERVA4	*Eriophorum vaginatum*	2-10.7-20	23	15.7
CACA4	*Calamagrostis canadensis*	15-15-15	15	15.2
CALAM	*Calamagrostis*	2-6-10	15	9.6

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PEFR5	*Petasites frigidus*	1-5.2-8	38	14.1

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	2-10.8-50	77	28.8
GELI2	*Geocaulon lividum*	3-7-10	31	14.7
PEFR5	*Petasites frigidus*	4-7-10	31	14.7

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	4-13.2-50	92	35.0
RUCH	*Rubus chamaemorus*	3-10-20	54	23.2
VAOX	*Vaccinium oxycoccos*	0.1-2.6-5	38	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	5-33.8-70	62	45.6
LEPAD	*Ledum palustre ssp. decumbens*	18-40.8-70	31	35.4
VAUL	*Vaccinium uliginosum*	4-11.3-20	77	29.5
BENA	*Betula nana*	0.1-8.8-18	31	16.4
SPST3	*Spiraea stevenii*	0.1-5.4-10	46	15.7
ROAC	*Rosa acicularis*	1-6.2-10	38	15.4

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	8-11.7-25	54	25.1
LEGR	*Ledum groenlandicum*	80-80-80	8	24.8
BEGL	*Betula glandulosa*	6-12.7-20	23	17.1
SAPU15	*Salix pulchra*	4-5.5-8	31	13.0
ROAC	*Rosa acicularis*	3-5.2-8	31	12.7
CACA4	*Calamagrostis canadensis*	15-15-15	8	10.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	40-40-40	8	17.5
BETUL	*Betula*	35-35-35	8	16.4
SABE2	*Salix bebbiana*	4-8.7-12	23	14.1

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	2-12.8-25	100	35.8
BENE4	*Betula neoalaskana*	1-4.7-10	46	14.7

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	15-26.7-35	23	24.8

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	7-44.7-90	77	58.6
BENE4	*Betula neoalaskana*	5-10-15	31	17.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	80-83-87	4.7-5-6.3	32-34-38	3	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
10-47.9-75	6

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other woody plants	Other	Summer
Moderate use	Willows	Moose	Unknown
No observed use			Not grazed/browsed
Slight use		Moose	Unknown
Slight use	Other woody plants	Moose	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—13; plant species per stop (min-avg-max)—18-26-38

Community Phase HCPC

Rooting Depth (cm): Min 16 RV 55 Max 108

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min 16 RV 37 Max 56

Texture: Mucky peat, peat

AWC (cm/cm): Min 0.35 RV 0.35 Max 0.4

pH: Min 3.1 RV 3.9 Max 4.7

Subsurface Layer

Thickness (cm): Min 0 RV 18 Max 52

Texture: Permanently frozen silt, permanently frozen silt loam, permanently frozen sandy loam, silt, silt loam

AWC (cm/cm): Min 0.15 RV 0.24 Max 0.27

pH: Min 4.6 RV 5.4 Max 6.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
14-60	20-70	5-15	2-15	0-4	0-0	0-10

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	10-20	---	---	---
FD (<4 inches)	---	2-3	---	---
SD (<8 inches)	---	---	2-20	---
SL (8-36 inches)	---	---	10-8	---
SM (3-10 feet)	---	---	5-5	---
TR (<15 feet)	---	---	---	10-2
TS (<15 feet)	---	---	---	35-35

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERIOP	*Eriophorum*	20-21-25	56	34.2
ERVA4	*Eriophorum vaginatum*	95-95-95	11	32.5
CAREX	*Carex*	2-11.7-20	67	27.9
CALAM	*Calamagrostis*	10-10-10	11	10.5

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	15-15-15	11	12.9
GELI2	*Geocaulon lividum*	10-10-10	11	10.5

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-10.8-20	100	32.8
LEPAD	*Ledum palustre ssp. decumbens*	65-65-65	11	26.9
RUCH	*Rubus chamaemorus*	2-6.9-10	78	23.1
VAOX	*Vaccinium oxycoccos*	3-3.5-5	67	15.3
EMNI	*Empetrum nigrum*	3-10.5-18	22	15.3
ARRU	*Arctostaphylos rubra*	5-6-7	22	11.5
ANPO	*Andromeda polifol*ia	3-5-7	22	10.5
CHCA2	*Chamaedaphne calyculata*	4-4-4	22	9.4

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	10-20-45	56	33.3
VAUL	*Vaccinium uliginosum*	2-11-20	78	29.2
LEPAD	*Ledum palustre ssp. decumbens*	15-25-30	33	28.9
BEGL	*Betula glandulosa*	4-8.8-20	56	22.1
BENA	*Betula nana*	4-7.8-15	56	20.8
SAPU15	*Salix pulchra*	5-6.3-8	33	14.5
ANPO	*Andromeda polifol*ia	2-5.7-10	33	13.7
CHCA2	*Chamaedaphne calyculata*	10-10-10	11	10.5

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SAGL	*Salix glauca*	5-6.5-8	22	12.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-10.4-18	100	32.3

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	15-28.8-50	44	35.7

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	12-20.8-25	56	34.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	57-124-200	1.9-3-4.4	9-18-27	9	G

Tree Basal Area:

Min-Avg-Max	Number of Stands
6-27-60	3

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other woody plants	Other	Unknown
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—9; plant species per stop (min-avg-max)—15-23.2-29

Community Phase HCPCP

Rooting Depth (cm): Min RV Max
57 57 57

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
57 57 57

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.6 4.0 4.5

Subsurface Layer

Thickness (cm) : Min RV Max
0 0 0

Texture: Permanently frozen peat

AWC (cm/cm): Min RV Max
N/A N/A N/A

pH: Min RV Max
3.4 3.9 4.4

Influencing Water Features

NWI Code: PSS3

NWI Description: Palustrine, Scrub-Shrub, Broad-Leaved Evergreen

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
4-25	60-75	10-15	0-5	0-5	0-0	0-15

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	0.1-0.1	---	---	---
FD (<4 inches)	---	0.1-0.1	---	---
FM (4-24 inches)	---	0.1-1	---	---
SD (<8 inches)	---	---	15-2	---
SL (8-36 inches)	---	---	0.1-3	---
TR (<15 feet)	---	---	---	5-5
TS (<15 feet)	---	---	---	20-20

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	10-10-10	33	18.3
ERVA4	*Eriophorum vaginatum*	0.1-3.6-7	67	15.4
ERIOP	*Eriophorum*	5-5-5	33	12.9

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUCH	*Rubus chamaemorus*	15-16.7-20	100	40.8
LEPAD	*Ledum palustre ssp. decumbens*	50-50-50	33	40.8
VAVI	*Vaccinium vitis-idaea*	2-5-8	100	22.4
VAOX	*Vaccinium oxycoccos*	2-3.3-5	100	18.3
VAUL	*Vaccinium uliginosum*	5-5-5	33	12.9
CHCA2	*Chamaedaphne calyculata*	3-3-3	33	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEPAD	*Ledum palustre ssp. decumbens*	15-20-25	67	36.5
VAUL	*Vaccinium uliginosum*	3-9-15	67	24.5
BENA	*Betula nana*	1-3-5	100	17.3
BEGL	*Betula glandulosa*	3-3-3	33	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	5-7.5-10	67	22.4

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	8-14.3-20	100	37.9

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	70-108-150	0.75-2-3.1	4-11-17	6	G

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—12-21.3-27

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site

Ecological Classification Name: *Picea mariana*/*Salix pulchra-Alnus viridis ssp. fruticosa*

Ecological Classification ID: F232XY203AK

Major Land Resource Area: 232—Yukon Flats Lowlands

Physiographic Features

Landform: Drainageways of loess plains

Slope (percent):	Min	Max
	1	5

Elevation (feet):	Min	Max
	1,312	1,640

Range of Aspect Direction: All aspects

Water Table Depth (cm)):	Min	Max
	2	35

Flooding: None

Ponding: None

Runoff: Low

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	14

Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

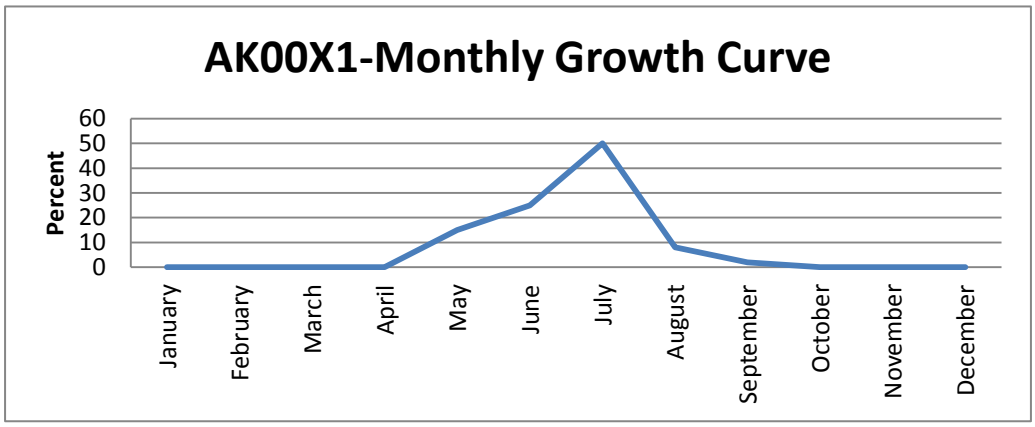
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	1	-35	1
February	0	1	-29	12
March	0	1	-17	19
April	0	1	3	43
May	0	2	27	61
June	1	4	41	72
July	1	4	43	77
August	1	4	39	72
September	1	3	27	54
October	1	2	7	28
November	0	2	-17	10
December	0	2	-29	1

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D32TL1—D32-Boreal woodland loamy drainages, frozen
D32TL2—D32-Boreal woodland loamy drainages, frozen
D32TL4—D32-Boreal woodland loamy drainages, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, acid, subgelic Fluvaquentic Aquorthels

Dominant Parent Material: Organic material over loamy alluvium

Representative Surface Texture: Peat

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	30	60

pH:	Low	RV	High
	3.4	4.5	5.3

Effective CEC (me/100g):	Low	High
	13	33.9

CEC (me/100g):	Min	RV	Max
	9	27	62

Organic Matter (percent):	Low	RV	High
	2	28	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.35

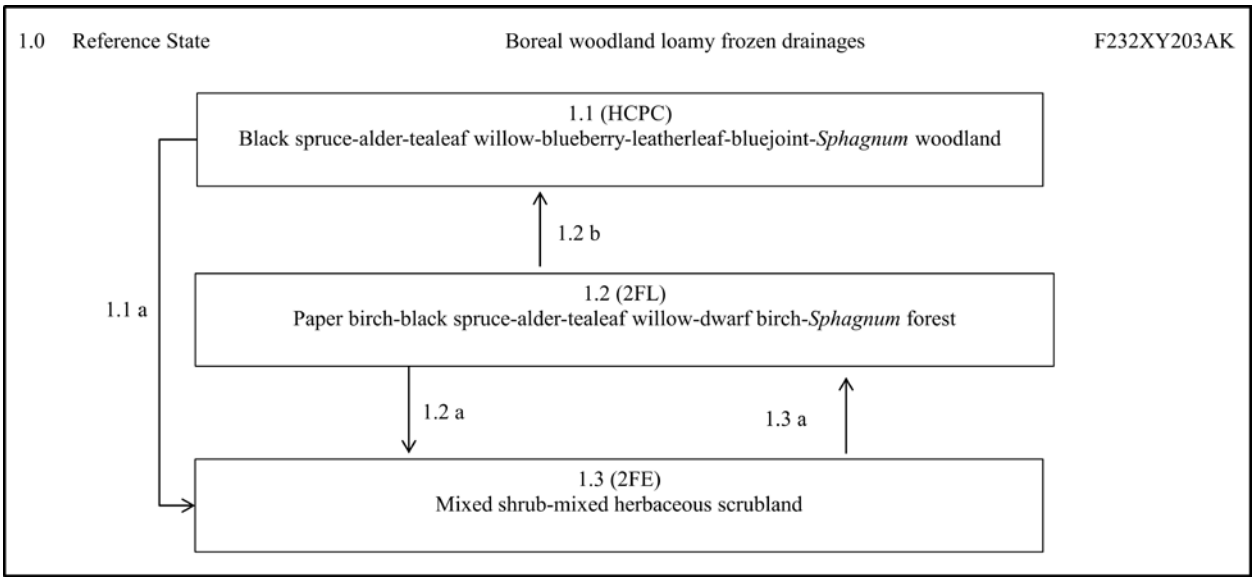
Plant Community Phases

Ecological Site Description ID:	F232XY203AK

Ecological Dynamics of the Site:

This boreal ecological site is associated with drainageways of loess plains. The gradient of these drainageways is minimal (<5% slopes), and communities based on disturbances from an intense flood regime are not present. Differences in the plant communities in this ecological site are presumed to be due to the fire history. As sites progress from community phase 1.3 to 1.1, the surface organic matter content increases and permafrost rises in the soil profile. The soils in community phase 1.1 are classified as Aquorthels and are composed of organic matter over loamy alluvium.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of the structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the time since the last fire event and the severity of the burn. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Black spruce-alder-tealeaf willow-blueberry-leatherleaf-bluejoint-Sphagnum woodland
Community Phase Narrative:			
Picea mariana is the dominant tree species, and it is primarily in the medium and regenerative strata (total mature tree cover ~10%). The majority of the shrub cover is in the tall and low shrub strata (total shrub cover ~170%). Common shrub species include *Alnus viridis ssp. fruticosa*, *Salix pulchra*, *Vaccinium uliginosum*, *Betula glandulosa*, *Chamaedaphne calyculata*, and *Ledum palustre ssp. decumbens*. Graminoids are abundant in some areas, and the most common species is *Calamagrostis canadensis*. Forbs and lichen are minor vegetative components. Sphagnum moss forms an extensive ground cover (~40% cover). Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Low-intensity fire. In general, the plant communities resemble those that are likely associated with a low-intensity fire regime. In a low-intensity fire regime, the tree canopy is removed and the surface organic matter is reduced but not enough to expose mineral soils. Permafrost commonly remains in the soil profile after the initial fire event. In a low-intensity fire regime, tussock-forming grasses and scrubs quickly recolonize and become dominant as a result of below-ground root reserves that were not consumed in the fire event. Because black spruce has semi-serotenous cones, it quickly establishes in this ecological site after fire events. Since mineral soils typically are not exposed, conditions are not suitable for development of extensive stands of aspen or paper birch. For this ecological site, phase 1.1 has a longer fire return interval than phase 1.2. The fire return interval likely plays a substantial role in the structure of the black spruce forest. Longer fire return intervals result in a greater abundance of mature black spruce, and shorter fire return intervals result in a greater abundance of shrubs and paper birch.

Phase 1.2			
			
Community Phase Number:	1.2	Community Phase Name:	Paper birch-black spruce-alder-tealeaf willow-dwarf birch-Sphagnum forest

Community Phase Narrative:
Betula neoalaskana and *Picea mariana* are the dominant tree species, and they primarily are in the medium and regenerative tree strata (total mature tree cover ~45%). *Picea glauca* are also present but at low densities. The majority of the shrub cover is in the tall and low shrub strata (total shrub cover ~260%). Common shrub species include *Alnus viridis ssp. fruticosa*, *Salix pulchra*, *Vaccinium uliginosum*, *Betula glandulosa*, *Rubus chamaemorus*, and *Ledum groenlandicum*. Graminoids, forbs, and lichen are minor vegetative components, but a common species is *Equisetum sylvaticum*. Sphagnum moss is the most abundant type of moss (~20% cover). Two observations of this phase were conducted.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Low-intensity fire. The fire return interval is presumed to be shorter than that of phase 1.1 but longer than that of phase 1.3.
1.2b	Normal time and growth without fire. This pathway occurs from a low-intensity fire regime. Paper birch and overall shrub cover decrease. Black spruce matures, and the Sphagnum moss ground cover increases.

Phase 1.3	n/a		
Community Phase Number:	1.3	Community Phase Name:	Mixed shrub-mixed herbaceous scrubland

Community Phase Narrative:
No observations for this community phase were conducted. This phase is theoretical.

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.3a	Black spruce and paper birch mature, creating a mixed forest.

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FL

Rooting Depth (cm) :

Min	RV	Max
63	63	63

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm) :

Min	RV	Max
13	13	13

Texture: Mucky peat, peat

AWC (cm/cm):

Min	RV	Max
0.35	0.35	0.35

pH:

Min	RV	Max
2.7	2.7	2.7

Subsurface Layer

Thickness (cm) :

Min	RV	Max
50	50	50

Texture: Permanently frozen coarse sandy loam, silt loam, muck

AWC (cm/cm) :

Min	RV	Max
0.15	0.24	0.27

pH:

Min	RV	Max
2.9	3.3	3.7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
3-5	25-30	10-20	15-20	2-25	0-0	0-10

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FM (4-24 inches)	---	4-4	---	---
SD (<8 inches)	---	---	5-8	---
SL (8-36 inches)	---	---	25-85	---
SM (3-10 feet)	---	---	70-70	---
ST (>10 feet)	---	---	12-60	---
TR (<15 feet)	---	---	---	3-4
TM (15-40 feet)	---	---	---	10-20

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	8-8-8	50	20.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	4-12-20	100	34.6
PEFR5	*Petasites frigidus*	3-3-3	50	12.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RUCH	*Rubus chamaemorus*	5-5.5-6	100	23.5
VAVI	*Vaccinium vitis-idaea*	8-8-8	50	20.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	15-50-85	100	70.7
VAUL	*Vaccinium uliginosum*	10-17.5-25	100	41.8
BEGL	*Betula glandulosa*	25-25-25	50	35.4
BENA	*Betula nana*	15-15-15	50	27.4
LEPAD	*Ledum palustre ssp. decumbens*	8-8-8	50	20.0
SPST3	*Spiraea stevenii*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BEGL	*Betula glandulosa*	70-70-70	50	59.2
ROAC	*Rosa acicularis*	4-4-4	50	14.1

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	60-72.5-85	100	85.1
SAPU15	*Salix pulchra*	12-31-50	100	55.7
BETUL	*Betula*	15-17.5-20	100	41.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	4-5.5-7	100	23.5
PIGL	*Picea glauca*	3-3-3	50	12.2

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	20-22.5-25	100	47.4
PIMA	*Picea mariana*	10-15-20	100	38.7
PIGL	*Picea glauca*	12-12-12	50	24.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	44-94-144	3.5-6-8	36-51-66	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
17-17-17	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—16-17-18

Community Phase HCPC

Rooting Depth (cm): Min Avg Max
42 42 42

Restrictive Feature: Permafrost

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm): Min RV Max
26 26 26

Texture: Peat

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.8 3.8 3.8

Subsurface Layer

Thickness (cm): Min RV Max
16 16 16

Texture: Silt loam

AWC (cm/cm): Min RV Max
0.25 0.32 0.4

pH: Min RV Max
5 5 5

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
1-4	15-65	7-25	3-25	0-5	0-0	10-35

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	70-70	---	---	---
FM (4-24 inches)	---	10-10	---	---
SL (8-36 inches)	---	---	10-5	---
SM (3-10 feet)	---	---	15-15	---
ST (>10 feet)	---	---	35-35	---
TR (<15 feet)	---	---	---	5-5
TM (15-40 feet)	---	---	---	10-10

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CALAM	*Calamagrostis*	70-70-70	50	59.2
CACA4	*Calamagrostis canadensis*	10-10-10	50	22.4

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
HUSES	*Huperzia selago var. selago*	4-4-4	50	14.1
RALA	*Ranunculus lapponicus*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COPA28	*Comarum palustre*	10-10-10	50	22.4
EQSY	*Equisetum sylvaticum*	8-8-8	50	20.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHAN9	*Chamerion angustifolium*	3-3-3	50	12.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	20-20-20	50	31.6
RUCH	*Rubus chamaemorus*	5-5-5	50	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAUL	*Vaccinium uliginosum*	5-22.5-40	100	47.4
LEPAD	*Ledum palustre ssp. decumbens*	35-35-35	50	41.8
CHCA2	*Chamaedaphne calyculata*	8-11.5-15	100	33.9
LEGR	*Ledum groenlandicum*	15-15-15	50	27.4
SPST3	*Spiraea stevenii*	15-15-15	50	27.4
BENA	*Betula nana*	10-10-10	50	22.4
BEGL	*Betula glandulosa*	5-5-5	50	15.8

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SALIX	*Salix*	15-15-15	50	27.4
BEGL	*Betula glandulosa*	10-10-10	50	22.4

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	50-50-50	50	50.0
SAPU15	*Salix pulchra*	50-50-50	50	50.0
ALINT	*Alnus incana ssp. tenuifolia*	35-35-35	50	41.8
SABE2	*Salix bebbiana*	20-20-20	50	31.6
BETUL	*Betula*	7-7-7	50	18.7

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	2-3.5-5	100	18.7

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-11-12	100	33.2

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Willows	Moose	Unknown
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—12-16.5-21

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Picea glauca-Betula* papyrifera/*Alnus viridis ssp. fruticosa*
Ecological Classification ID: F232XY210AK
Major Land Resource Area: 232—Yukon Flats Lowlands

Physiographic Features

Landform: Escarpments

Slope (percent):	Min	Max
	10	70

Elevation (feet):	Min	Max
	656	1,083

Range of Aspect Direction: Southwest to south (clockwise)

Water Table Depth (cm) :	Min	Max
	2	35

Flooding: None
Ponding: None
Runoff: Very high

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	14

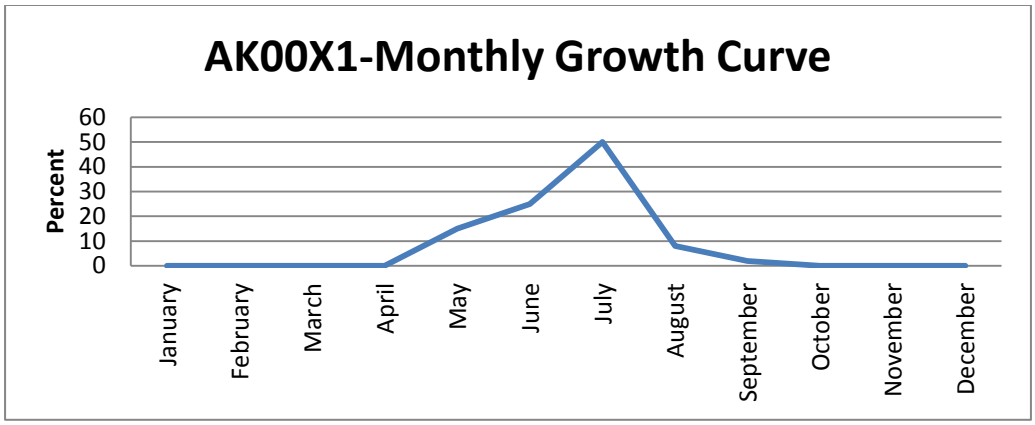
Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	1	-35	1
February	0	1	-29	12
March	0	1	-17	19
April	0	1	3	43
May	0	2	27	61
June	1	4	41	72
July	1	4	43	77
August	1	4	39	72
September	1	3	27	54
October	1	2	7	28
November	0	2	-17	10
December	0	2	-29	1

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D32TL1—D32-Boreal forest gravelly escarpments, frozen
D32TL2—D32-Boreal forest gravelly escarpments, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haplorthels

Dominant Parent Material: Organic material over gravelly colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	13	21	34

pH:	Low	RV	High
	3.4	6.2	7.6

Effective CEC (me/100g):	Low	High
	16	40

CEC (me/100g):	Min	RV	Max
	3.1	23	62

Organic Matter (percent):	Low	RV	High
	2	28	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	1	1.44

Plant Community Phases

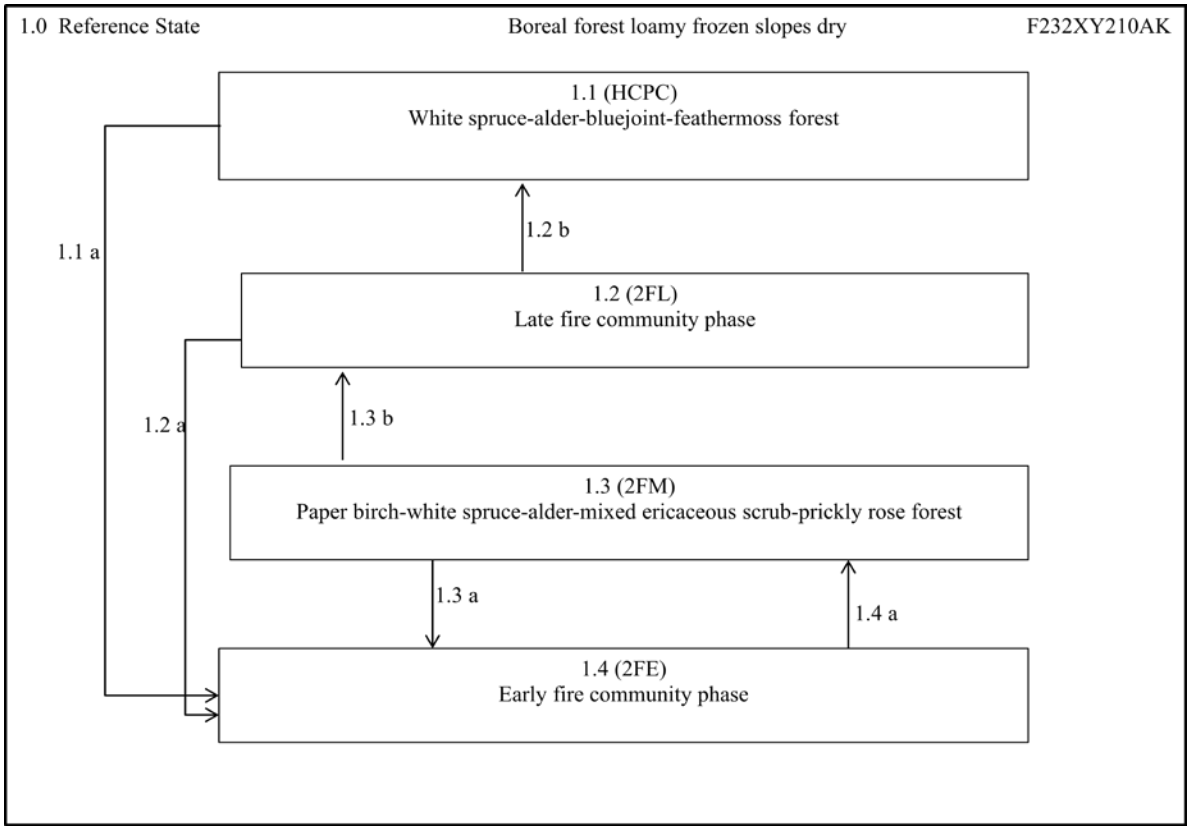
Ecological Site Description ID:	F232XY210AK

Ecological Dynamics of the Site:

This boreal ecological site is on steeper escarpments adjacent to loess plains. Slope averages 41% but ranges from 11 to 70%. This ecological site is on slopes with north and east aspects. Fire resulted in two documented phases. As sites progress from community phase 1.4 to 1.1, the surface organic matter increases and permafrost develops and/or rises in the soil profile. The soils in community phase 1.1 are classified as Haplorthels and are composed of organic matter over loamy colluvium.

Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. Due to limited sampling, only two community phases were developed for this ecological site. Since this ecological site has an associated fire regime, it is assumed that there are several undocumented community phases, making the state-and-transition model incomplete.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Phases in the reference state are grouped on the basis of the structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the severity of the burn and the time since the last fire event. Due to the steepness of slope and dominance of a white spruce forest, a high-severity fire regime is considered to be the typical fire disturbance for this ecological site. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost often drops out of the soil profile, and the sites become drier. Many pre-fire species likely will regenerate after fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The fire return interval plays a substantial role in the structure of the observed forest. Longer fire return intervals favor development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	White spruce-alder-bluejoint-feathermoss forest
Community Phase Narrative:			
Picea glauca is the dominant tree species and is primarily in the tall tree stratum. *Betula neoalaskana* and *Picea mariana* are also present but at lower densities (total mature tree cover ~40%; average age of white spruce is 147 years). The shrub cover is primarily in the tall, low, and dwarf strata (total shrub cover ~40%), and common species are *Alnus viridis ssp. fruticosa*, *Ribes triste, Rosa acicularis, Linnaea borealis,* and *Vaccinium vitis-idaea*. Graminoids (~50% cover) and forbs (~50% cover) are abundant, and the most common species are *Calamagrostis canadensis*, *Mertensia paniculata*, and various *Equisetum sp*. Moss forms an extensive ground cover (70% cover), and the most abundant species are *Hylocomium splendens* and *Pleurozium schreberi*. Two observations of this phase were conducted.			

Community Pathways	
Pathway Number:	Pathway Name & Description:
1.1a	Fire. Large proportions of the organic mat are consumed (average depth 26 cm), representing a high-severity fire regime.

Phase 1.2	n/a		
Community Phase Number:	1.2	Community Phase Name:	Late fire community phase
Community Phase Narrative:			
This community phase is theoretical, but it is based on field observations.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Fire.		
1.2b	Normal time and growth without fire. White spruce forest matures and largely replaces the paper birch stand. Phase 1.2 is thought to have a shorter fire return interval than phase 1.1 and a longer fire return interval than phase 1.3.		

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Paper birch-white spruce-alder-mixed ericaceous scrub-prickly rose forest

Community Phase Narrative:

Betula neoalaskana is the dominant tree species and is primarily in the tall and medium tree strata. *Picea glauca* is present in lower densities and is in the tall, medium, and regenerative tree strata (total mature tree cover ~70%; average age of white spruce is 48 years). The shrub cover is distributed among the tall, medium, low, and dwarf strata (total shrub cover ~60%), and common species are *Alnus viridis ssp. fruticosa*, *Ribes triste, Rosa acicularis, Ledum groenlandicum, Spiraea stevenii,* and *Vaccinium vitis-idaea*. Graminoids (~20% cover) and forbs (~30% cover) are abundant, and the most common species are *Calamagrostis canadensis* and *Mertensia paniculata*. Moss (30% cover) and leaf litter (~30% cover) are the primary components of the ground cover. The most common moss species is *Hylocomium splendens*. Four observations of this phase were conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.3a	Fire. Because this phase has limited organic material (average depth 7 cm), a high-severity fire regime in which a large proportion of the organic mat is consumed during a fire is likely.
1.3b	Normal time and growth without fire. White spruce matures and becomes dominant in the canopy, outcompeting paper birch. Phase 1.3 is thought to have a shorter fire return interval than phase 1.2 and a longer fire return interval than phase 1.4.

Phase 1.4	n/a		
Community Phase Number:	1.4	Community Phase Name:	Early fire community phase
Community Phase Narrative:			
This community phase is theoretical, but it is based on field observations.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.4a	Normal time and growth without fire. Paper birch matures into a forest.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FM

Rooting Depth (cm):	Min	RV	Max
	22	55.7	80

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	8	9.7	11

Texture: Slightly decomposed plant material

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	3	4.1	4.8

Subsurface Layer

Thickness (cm):	Min	RV	Max
	14	46	69

Texture: Gravelly silt loam, gravelly sandy loam, very gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly loamy coarse sand, sandy loam

AWC (cm/cm):	Min	RV	Max
	0.02	0.12	0.24

pH:	Min	RV	Max
	4.5	5.4	6.5

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
2-15	20-60	15-35	5-10	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	1-2	---	---
FM (4-24 inches)	---	2-8	---	---
FT (>24 inches)	---	2-4	---	---
SD (<8 inches)	---	---	20-20	---
SL (8-36 inches)	---	---	10-12	---
SM (3-10 feet)	---	---	12-4	---
ST (>10 feet)	---	---	25-25	---
TR (<15 feet)	---	---	---	20-8
TM (15-40 feet)	---	---	---	15-60

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-30-45	75	47.4

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	2-3.5-5	50	13.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	35-35-35	25	29.6
MEPA	*Mertensia paniculata*	15-15-15	50	27.4
EQAR	*Equisetum arvense*	5-7.7-10	75	24.0
POAL11	*Polygonum alpinum*	15-15-15	25	19.4
GABO2	*Galium boreale*	10-10-10	25	15.8
DEGL3	*Delphinium glaucum*	5-5-5	25	11.2
ASAL7	*Astragalus alpinus*	5-5-5	25	11.2
CHANA2	*Chamerion angustifolium ssp. angustifolium*	2-2-2	50	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POAL11	*Polygonum alpinum*	3-3.5-4	50	13.2
MEPA	*Mertensia paniculata*	2-3-4	50	12.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	5-11.7-20	75	29.6
LIBO3	*Linnaea borealis*	2-3.5-5	50	13.2

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RITR	*Ribes triste*	4-9.7-15	75	26.9
LEGR	*Ledum groenlandicum*	2-7.3-12	75	23.5
ROAC	*Rosa acicularis*	20-20-20	25	22.4
SHCA	*Shepherdia canadensis*	10-10-10	25	15.8

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	8-15-25	75	33.5
SPST3	*Spiraea stevenii*	4-5.5-7	50	16.6

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-15.7-25	75	34.3
SAHA	*Salix hastata*	15-15-15	25	19.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	4-11-20	100	33.2
BENE4	*Betula neoalaskana*	8-8-8	50	20.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	20-46.7-60	75	59.2
PIGL	*Picea glauca*	9-14.7-20	75	33.2

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	55-55-55	25	37.1
PIGL	*Picea glauca*	45-45-45	25	33.5

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	34-48-59	3.6-6-8	26-40-48	8	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
30-40.3-80	4

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other woody plants	Moose	Unknown

Notable Plants: None

Species Richness: Number of stops—4; plant species per stop (min-avg-max)—17-21.2-27

Community Phase HCPC

Rooting Depth (cm): Min RV Max
38 38 38

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
24 24 24

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
3.6 3.6 3.6

Subsurface Layer

Thickness (cm): Min RV Max
14 14 14

Texture: Very fine sandy loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
6.1 6.1 6.1

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
4-10	60-75	8-10	6-15	0-0	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	75-75	---	---	---
FD (<4 inches)	---	4-4	---	---
FM (4-24 inches)	---	2-30	---	---
SD (<8 inches)	---	---	2-6	---
SL (8-36 inches)	---	---	3-5	---
SM (3-10 feet)	---	---	7-7	---
ST (>10 feet)	---	---	15-15	---
TR (<15 feet)	---	---	---	10-5
TM (15-40 feet)	---	---	---	5-5
TT (>40 feet)	---	---	---	25-25

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	15-15-15	50	27.4

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	75-75-75	50	61.2

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSC	*Equisetum scirpoides*	15-15-15	50	27.4
PYROL	*Pyrola*	5-5-5	50	15.8
GELI2	*Geocaulon lividum*	4-4-4	50	14.1
STELL	*Stellaria*	3-3-3	50	12.2

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQSY	*Equisetum sylvaticum*	30-30-30	50	38.7
MEPA	*Mertensia paniculata*	20-20-20	50	31.6
EQPR	*Equisetum pratense*	20-20-20	50	31.6
CHANA2	*Chamerion angustifolium ssp. angustifolium*	3-3-3	50	12.2
BORO	*Boschniakia rossica*	3-3-3	50	12.2
GORE2	*Goodyera repens*	2-2-2	50	10.0
PYAS	*Pyrola asarifolia*	2-2-2	50	10.0
GABO2	*Galium boreale*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	6-8-10	100	28.3
LIBO3	*Linnaea borealis*	2-2.5-3	100	15.8

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RITR	*Ribes triste*	3-4-5	100	20.0
SPST3	*Spiraea stevenii*	2-3.5-5	100	18.7
ROAC	*Rosa acicularis*	5-5-5	50	15.8
LEGR	*Ledum groenlandicum*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	7-7-7	50	18.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	15-15-15	100	38.7
ALINT	*Alnus incana ssp. tenuifolia*	15-15-15	50	27.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	15-15-15	50	27.4
BENE4	*Betula neoalaskana*	5-7.5-10	100	27.4
PIGL	*Picea glauca*	5-5-5	50	15.8

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	5-7.5-10	100	27.4
PIGL	*Picea glauca*	5-5-5	100	22.4

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	25-32.5-40	100	57.0

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea glauca	126-147-166	9-11-12.7	72-78-87	4	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
10-54-98	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—25-27-29

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Picea glauca*/*Shepherdia canadensis-Rosa acicularis*
Ecological Classification ID: F232XY211AK
Major Land Resource Area: 232—Yukon Flats Lowlands

Physiographic Features

Landform: Escarpments

Slope (percent):	Min	Max
	50	70

Elevation (feet):	Min	Max
	1,033	1,312

Range of Aspect Direction: East to northwest (clockwise)

Water Table Depth (cm):	Min	Max
	0	0

Flooding: None
Ponding: None
Runoff: High

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	14

Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	1	-35	1
February	0	1	-29	12
March	0	1	-17	19
April	0	1	3	43
May	0	2	27	61
June	1	4	41	72
July	1	4	43	77
August	1	4	39	72
September	1	3	27	54
October	1	2	7	28
November	0	2	-17	10
December	0	2	-29	1

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days

Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D32TL2—D32-Boreal taiga loamy escarpment slopes

Characteristics of Representative Soil Components

Soil Classification: Sandy or sandy-skeletal, mixed Typic Haplocryods

Dominant Parent Material: Sandy and gravelly colluvium

Representative Surface Texture: Loam

Subsurface Texture Group: Sandy or sandy-skeletal

Saturated Hydraulic Conductivity: Moderately high to high

AWC Total (cm):	Low	RV	High
	7	12	20

pH:	Low	RV	High
	5.2	6.4	7.5

Effective CEC (me/100g):	Low	High
	5.7	9

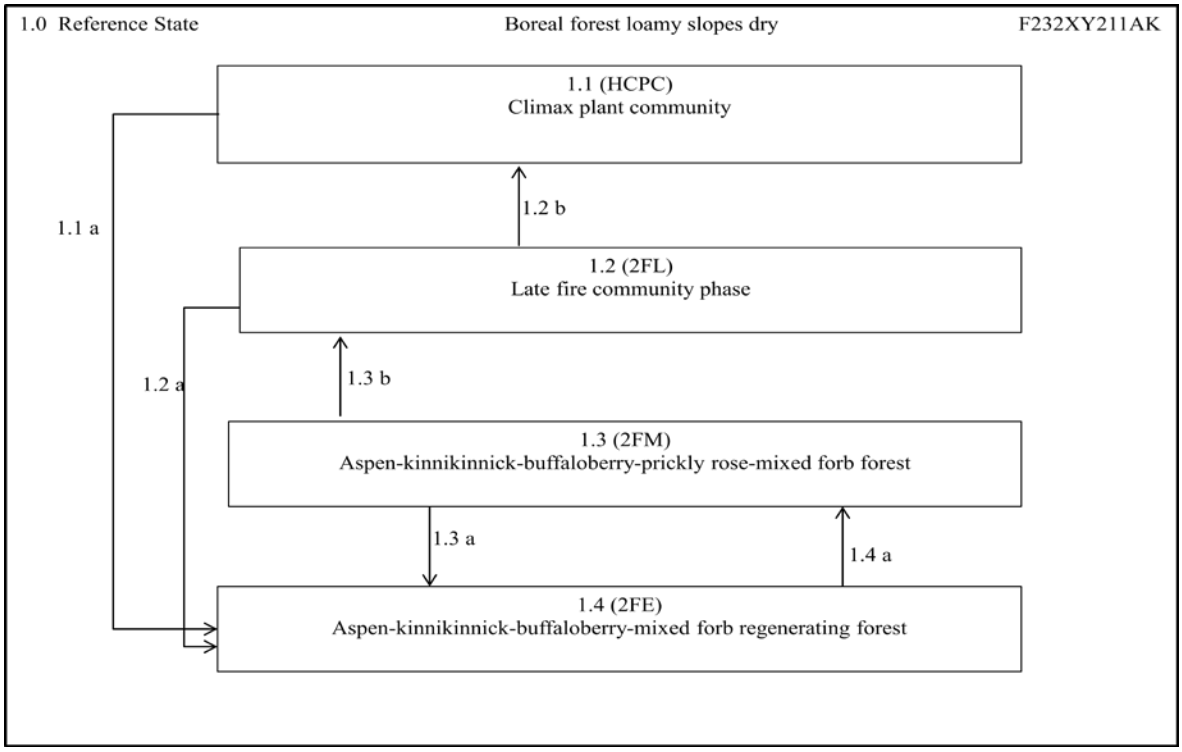
CEC (me/100g):	Min	RV	Max
	2.4	5.2	8

Organic Matter (percent):	Low	RV	High
	0.9	3	6

Bulk Density (1/3-Bar):	Min	RV	Max
	1.33	1.5	1.59

Plant Community Phases

Ecological Site Description ID:	F232XY211AK
Ecological Dynamics of the Site:	
This boreal ecological site is on very steep escarpments adjacent to loess plains. Slope averages 61% and ranges from 58 to 64%. This ecological site is on south and west aspects. Fire resulted in two observed plant communities. As sites progress from community phase 1.4 to 1.3, the surface organic matter increases and a deciduous forest develops. The soils in community phase 1.3 are classified as Haplocryods and are composed of organic material over loamy colluvium over sandy and gravelly colluvium. Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. Due to limited sampling, only two community phases were developed for this ecological site. Since this ecological site has an associated fire regime, it is assumed that there are several undocumented community phases, making the state-and-transition model incomplete.	

State and Transition Diagram:


State and Transition Diagram:	1	State Name:	Reference

State Narrative:	Phases in the reference state were grouped on the basis of the structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the severity of the burn and the time since the last fire event. Due to the steepness of slope, aspect, and minimal depth of the organic matter, a high-severity fire regime is considered to be the typical fire disturbance for this ecological site. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost often drops out of the soil profile, and the sites become drier. Many pre-fire species likely regenerate after fire, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). The fire return interval plays a substantial role in the structure of the forest. Longer fire return intervals favor development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.

Phase 1.1	n/a		
Community Phase Number:	1.1	Community Phase Name:	Climax plant community
Community Phase Narrative:			
This community phase is theoretical, but it is based on field observations. This phase is believed to be a white spruce forest.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Fire.		

Phase 1.2	n/a		
Community Phase Number:	1.2	Community Phase Name:	Late fire community phase
Community Phase Narrative:			
This community phase is theoretical, but it is based on field observations. This phase is believed to be a mixed white spruce-aspen forest.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.2a	Fire.		
1.2b	Normal time and growth without fire.		

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Aspen-kinnikinnick-buffaloberry-prickly rose-mixed forb forest

Community Phase Narrative:

Populus tremuloides is the dominant tree species and is primarily in the medium tree stratum. *Picea glauca* is present in lower densities and is in the regenerative tree stratum (total mature tree cover ~65%). The shrub cover is distributed between the low and dwarf strata (total shrub cover ~60%), and common species are *Rosa acicularis, Shepherdia canadensis, Juniperus communis, Arctostaphylos uva-ursi,* and *Linnaea borealis*. Forbs (~20% cover) are abundant, and the most common species are *Galium boreale*, *Silene menziesii, Eurybia sibirica,* and *Pulsatilla patens.* Moss (~20% cover), leaf litter (~25% cover), and woody litter (~20% cover) are the primary components of the ground cover. The most common moss species is *Polytrichum sp*. One observation of this phase was conducted.

Community Pathways

Pathway Number:	Pathway Name & Description:
1.3a	Fire.
1.3b	Normal time and growth without fire.

Phase 1.4			
Community Phase Number:	1.4	Community Phase Name:	Aspen-kinnikinnick-buffaloberry-mixed forb regenerating forest
Community Phase Narrative:			
Populus tremuloides is the dominant tree species and is primarily in the regenerative tree stratum (~55% cover saplings). *Picea glauca* and *Betula neoalaskana* are present in lower densities and are in the regenerative tree stratum (total mature tree cover ~10% [all aspen]). The shrub cover is distributed between the low and dwarf strata (total shrub cover ~120%), and common species are *Rosa acicularis, Viburnum edule, Shepherdia canadensis, Arctostaphylos uva-ursi, and Linnaea borealis*. Forbs (~30% cover) are abundant and diverse. The most common species are *Galium boreale*, *Silene menziesii, Eurybia sibirica, Chamerion angustifolium, and Pulsatilla patens.* Moss (~15% cover), leaf litter (~25% cover), and woody litter (~15% cover) are the primary components of the ground cover. The most common moss species are *Polytrichum sp.* and *Ceratodon purpurascens*. Two observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.4a	Normal time and growth without fire.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FE

Rooting Depth (cm): Min RV Max
71 71 71

Restrictive Features: None recorded

Drainage Class: Excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 0 0

Texture: Coarse sandy loam, silt loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
6.5 6.5 6.5

Subsurface Layer

Thickness (cm): Min RV Max
71 71 71

Texture: Very gravelly coarse sand, extremely gravelly coarse sand, silt loam

AWC (cm/cm): Min RV Max
0.01 0.07 0.24

pH: Min RV Max
5.2 6.1 7.3

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
4-8	5-23	25-30	4-20	5-7	5-5	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	2-2	---	---
FM (4-24 inches)	---	3-6	---	---
FT (>24 inches)	---	2-5	---	---
SD (<8 inches)	---	---	3-60	---
SL (8-36 inches)	---	---	15-7	---
TR (<15 feet)	---	---	---	20-7
TM (15-40 feet)	---	---	---	18-18

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SIME	*Silene menziesii*	4-4-4	50	14.1
ANSE4	*Androsace septentrionalis*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PUPA5	*Pulsatilla patens*	6-6-6	100	24.5
GABO2	*Galium boreale*	5-5.5-6	100	23.5
EUSI13	*Eurybia sibirica*	4-4-4	100	20.0
CHAN9	*Chamerion angustifolium*	4-4-4	50	14.1
SATR5	*Saxifraga tricuspidata*	4-4-4	50	14.1
MEPA	*Mertensia paniculata*	4-4-4	50	14.1
ARABI2	*Arabis*	4-4-4	50	14.1
SIME	*Silene menziesii*	3-3-3	50	12.2
SARE8	*Saxifraga reflexa*	3-3-3	50	12.2
SOSI3	*Solidago simplex*	3-3-3	50	12.2

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SOLID	*Solidago*	5-5-5	50	15.8
CHAN9	*Chamerion angustifolium*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARUV	*Arctostaphylos uva-ursi*	60-67.5-75	100	82.2
LIBO3	*Linnaea borealis*	3-11.5-20	100	33.9
SARE2	*Salix reticulata*	4-4-4	50	14.1

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SHCA	*Shepherdia canadensis*	17-17.5-18	100	41.8
VIED	*Viburnum edule*	10-12.5-15	100	35.4
ROAC	*Rosa acicularis*	7-7-7	100	26.5
JUCO6	*Juniperus communis*	2-2-2	50	10.0

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	20-55-90	100	74.2
PIGL	*Picea glauca*	4-5.5-7	100	23.5
BENE4	*Betula neoalaskana*	10-10-10	50	22.4

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	18-18-18	50	30.0

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Other	Other	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—20-20-20

Community Phase 2FM

Rooting Depth (cm): Min RV Max
80 84.5 89

Restrictive Features: None recorded

Drainage Class: Excessively drained

Surface Layer

Thickness (cm): Min RV Max
0 1.5 3

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.14 0.24 0.35

pH: Min RV Max
6.5 7 7.5

Subsurface Layer

Thickness (cm): Min RV Max
80 83 86

Texture: Very gravelly loamy coarse sand, extremely gravelly loamy coarse sand, loam, coarse sandy loam

AWC (cm/cm): Min RV Max
0.02 0.08 0.22

pH: Min RV Max
5.7 6.5 7

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
6-6	20-20	25-25	20-20	5-5	4-4	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	1-4	---	---
FM (4-24 inches)	---	1-7	---	---
SD (<8 inches)	---	---	20-4	---
SL (8-36 inches)	---	---	12-5	---
TR (<15 feet)	---	---	---	3-5
TM (15-40 feet)	---	---	---	65-65

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SIME	*Silene menziesii*	4-4-4	100	20.0
MOLA6	*Moehringia lateriflora*	1-1-1	100	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PUPA5	*Pulsatilla patens*	7-7-7	100	26.5
GABO2	*Galium boreale*	4-4-4	100	20.0
EUSI13	*Eurybia sibirica*	3-3-3	100	17.3
SOMU	*Solidago multiradiata*	3-3-3	100	17.3
ARABI2	*Arabis*	1-1-1	100	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ARRU	*Arctostaphylos rubra*	20-20-20	100	44.7
LIBO3	*Linnaea borealis*	4-4-4	100	20.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
SHCA	*Shepherdia canadensis*	15-15-15	100	38.7
ROAC	*Rosa acicularis*	12-12-12	100	34.6
JUCO6	*Juniperus communis*	5-5-5	100	22.4
VIED	*Viburnum edule*	5-5-5	100	22.4

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	5-5-5	100	22.4
PIGL	*Picea glauca*	3-3-3	100	17.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
POTR5	*Populus tremuloides*	65-65-65	100	80.6

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Slight use	Other		Unknown

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—21-21-21

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS forestland site
Ecological Classification Name: *Picea mariana*/*Alnus viridis ssp. fruticosa-Ledum groenlandicum*
Ecological Classification ID: F232XY227AK
Major Land Resource Area: 232—Yukon Flats Lowlands

Physiographic Features

Landform: Loess plains, escarpments

Slope (percent):	Min	Max
	10	20

Elevation (feet):	Min	Max
	755	1,378

Range of Aspect Direction: Northeast to west (clockwise)

Water Table Depth (cm):	Min	Max
	2	35

Flooding: None
Ponding: None
Runoff: Medium

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	14

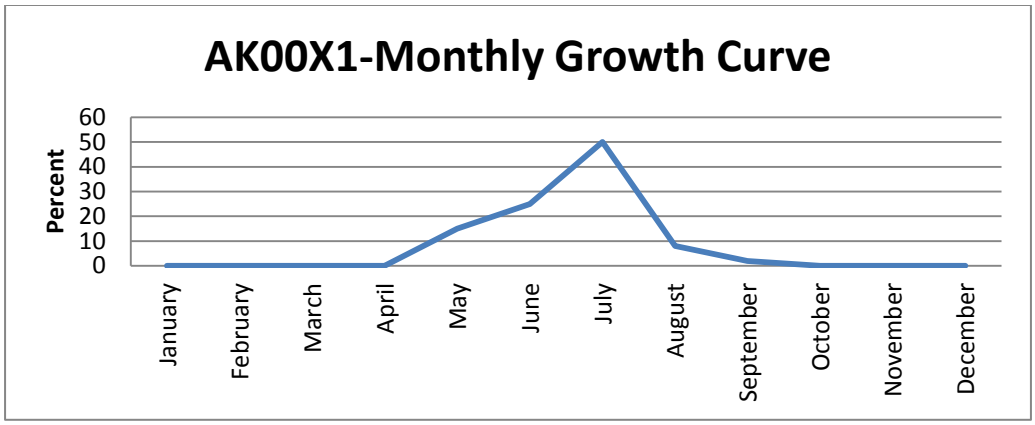
Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	1	-35	1
February	0	1	-29	12
March	0	1	-17	19
April	0	1	3	43
May	0	2	27	61
June	1	4	41	72
July	1	4	43	77
August	1	4	39	72
September	1	3	27	54
October	1	2	7	28
November	0	2	-17	10
December	0	2	-29	1

Plant Growth Curve

Growth Curve Number: AK00X1
Growth Curve Name: Interior
Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D32TL2—D32-Boreal taiga silty eolian slopes, frozen

Characteristics of Representative Soil Components

Soil Classification: Coarse-loamy, mixed, superactive, nonacid, subgelic Typic Haplorthels

Dominant Parent Material: Organic material over loamy colluvium

Representative Surface Texture: Slightly decomposed plant material

Subsurface Texture Group: Coarse-loamy

Saturated Hydraulic Conductivity: Moderately low to moderately high

AWC Total (cm):	Low	RV	High
	15	29	58

pH:	Low	RV	High
	3.4	7	7.7

Effective CEC (me/100g):	Low	High
	19.3	50

CEC (me/100g):	Min	RV	Max
	4.9	24.5	62

Organic Matter (percent):	Low	RV	High
	2	28	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.9	1.25

Plant Community Phases

Ecological Site Description ID:	F232XY227AK

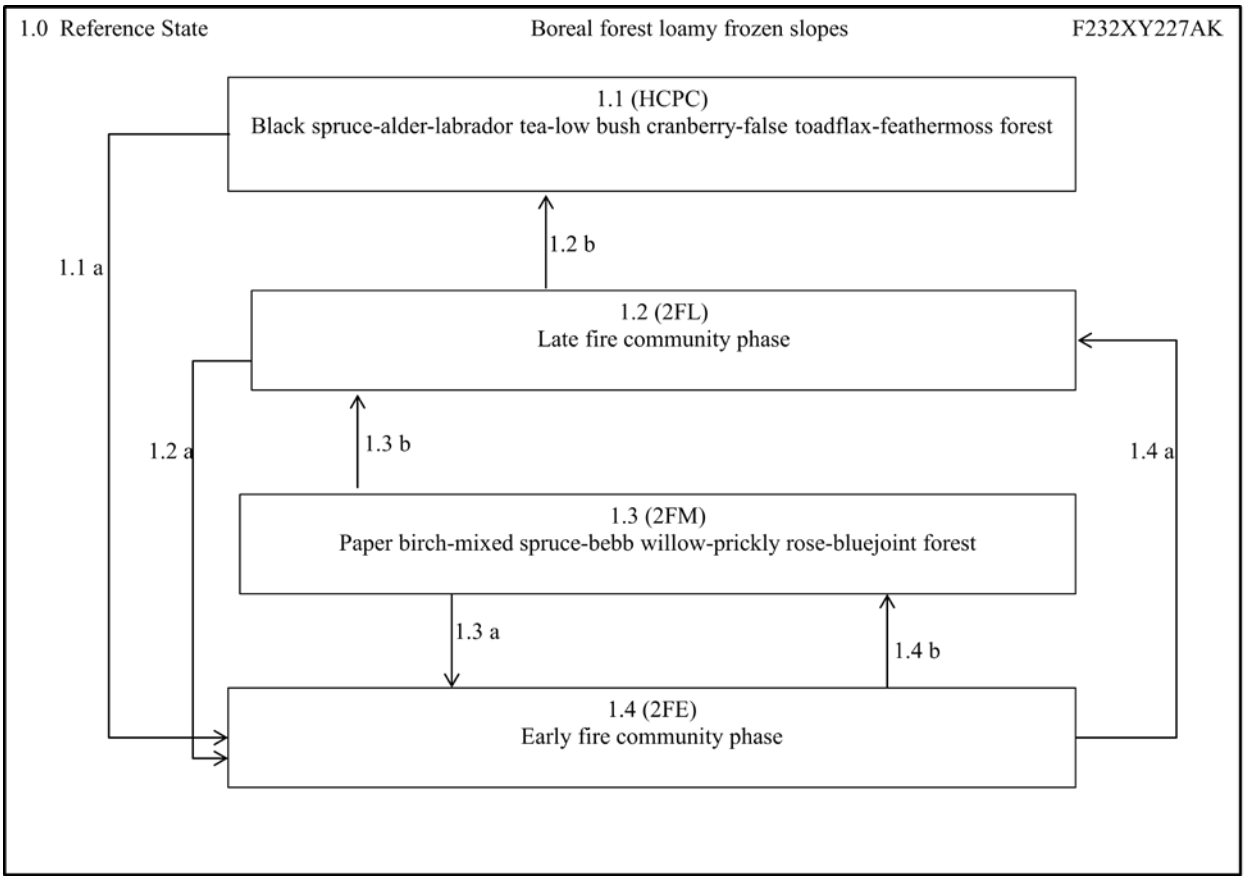
Ecological Dynamics of the Site:

This boreal ecological site is on escarpments adjacent to loess plains. The average slope is 13%, but it ranges from 10 to 20%. This ecological site is on all aspects. Fire resulted in two documented phases. As the sites progress from community phase 1.3 to 1.1, the surface organic matter increases and permafrost develops and/or rises in the soil profile. The soils in community phase 1.1 are classified as Haplorthels and are composed of organic matter over loamy colluvium.

Fire is a natural and typically unmanaged disturbance regime. The typical fire return interval for coniferous forests of interior Alaska is approximately 100 years. For this ecological site, it is presumed that both low-severity and high-severity fire events occur. Low-severity and high-severity fire events result in differences in the depth of organic material, the presence and/or depth of permafrost, and the present and potential vegetation.

Due to limited sampling, only two community phases were developed for this ecological site. Since this ecological site has an associated fire regime, there are likely numerous undocumented community phases, making the state-and-transition model incomplete.

State and Transition Diagram:



State and Transition Diagram:	1	State Name:	Reference
State Narrative:	Phases in the reference state were grouped on the basis of the structure and dominance of deciduous and coniferous trees, which are believed to be directly related to the severity of the burn and the time since the last fire event. During a low-severity fire, minimal proportions of the organic mat are consumed and mineral soils typically are not exposed. Permafrost typically remains in the soil profile, and water commonly perches above it. Graminoids and scrubs quickly recolonize and become dominant as a result of below-ground root reserves that were not consumed in the fire event. Because black spruce has semi-serotenous cones, it quickly reestablishes after fire events. With the absence of fire, early fire communities associated with this disturbance regime are thought to progress to community phase 1.2. During a high-severity fire, large proportions of the organic mat are consumed and mineral soils typically are exposed. Permafrost commonly drops out of the soil profile, and the sites become drier. Many pre-fire species likely will regenerate, but conditions are suitable for the establishment and growth of species from windblown seed (e.g., paper birch, fireweed, and willow). With the absence of fire, early fire sere communities associated with this disturbance regime are thought to progress to community phase 1.3. The fire return interval plays a substantial role in the structure of the forest. Longer fire return intervals favor development of community phase 1.1, and shorter fire return intervals favor development of community phases 1.2 and 1.3. The height of tall trees is defined as more than 40 feet, medium trees as 15 to 40 feet, and stunted and regenerative trees as less than 15 feet. The height of tall shrubs is defined as more than 10 feet, medium shrubs as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Black spruce-alder-Labrador tea-low bush cranberry-false toadflax-feathermoss forest
Community Phase Narrative:			
Picea mariana is the dominant tree species and is primarily in the medium tree stratum (total mature tree cover ~40%; average tree age 105 years). The shrub cover is primarily in the low and dwarf strata (total shrub cover ~80%), and common species are *Alnus viridis ssp. fruticosa*, *Ledum groenlandicum*, and *Vaccinium vitis-idaea*. Forbs are abundant (~30% cover), and the most common species is *Geocaulon lividum*. Lichen (30% cover) and moss (40% cover) form an extensive ground cover. Common species include *Cladina sp*., *Hylocomium splendens,* and *Pleurozium schreberi*. Three observations of this phase were conducted.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.1a	Fire. Refer to state narrative for differences in low- and high-severity fire regimes.		

Phase 1.2	n/a		
Community Phase Number:	1.2	Community Phase Name:	Late fire community phase

Community Phase Narrative:	
This community phase is theoretical, but it is based on field observations.	
Community Pathways	
Pathway Number:	Pathway Name & Description:
1.2a	Fire. Refer to state narrative for differences in low- and high-severity fire regimes.
1.2b	Normal time and growth. Phase 1.2 is thought to have a shorter fire return interval than phase 1.1 and a longer fire return interval than phase 1.4.

Phase 1.3			
			
Community Phase Number:	1.3	Community Phase Name:	Paper birch-mixed spruce-bebb willow-prickly rose-bluejoint forest
Community Phase Narrative:			
Betula neoalaskana is the dominant tree species, and *Picea mariana* and *Picea glauca* are also present in lower densities. Trees are primarily in the regenerative tree stratum. The tree cover is split among the tall, medium, and regenerative tree strata (total mature tree cover ~95%; average age of *Picea glauca* is 40 years). The shrub cover primarily is in the tall, medium, and low shrub strata (total shrub cover ~40%), and common species include *Salix bebbiana*, *Rosa acicularis*, *Ribes hudsonianum*, and *Spiraea stevenii*. Graminoids, forbs, and lichen are minor vegetative components, but common species are *Calamagrostis canadensis* and *Mertensia paniculata*. Moss is abundant (25% cover), and the most common species are *Dicranum sp.* and *Hylocomium splendens*. Two observations of this phase were conducted.			

Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.3a	Fire. Refer to state narrative for differences in low- and high-severity fire regimes. Due to limited organic material, fire events likely consume a large proportion of the organic mat and are probably high-severity fires.		
1.3b	Normal time and growth without fire. Organic material increases and permafrost migrates upward in the soil profile. Phase 1.3 is thought to have a shorter fire return interval than phase 1.1 and a longer fire return interval than phase 1.4. A long interval between fires would be needed for development of pathway 1.3b. This interval is likely longer than the typical interval for Interior Alaska, which is approximately 100 years.		
Phase 1.4	n/a		
Community Phase Number:	1.3	Community Phase Name:	Early fire community phase
Community Phase Narrative:			
This community phase is theoretical, but it is based on field observations.			
Community Pathways			
Pathway Number:	Pathway Name & Description:		
1.4a	Normal time and growth without fire. This pathway occurs as a result of a low-intensity fire regime.		
1.4b	Normal time and growth without fire. This pathway occurs as a result of a high-intensity fire regime.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2FM

Rooting Depth (cm): Min RV Max
89 108.5 128

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min RV Max
5 6.5 8

Texture: Slightly decomposed plant material

AWC (cm/cm): Min RV Max
0.35 0.35 0.35

pH: Min RV Max
4.4 5.2 6.1

Subsurface Layer

Thickness (cm): Min RV Max
84 102 120

Texture: Permanently frozen silt loam, silt loam

AWC (cm/cm): Min RV Max
0.25 0.25 0.25

pH: Min RV Max
6.5 7.3 7.7

Influencing Water Features

NWI Code: None

NWI Description: None

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-8	25-30	30-45	15-18	0-2	0-0	0-0

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GT (>24 inches)	7-7	---	---	---
FD (<4 inches)	---	10-2	---	---
FM (4-24 inches)	---	8-8	---	---
FT (>24 inches)	---	2-4	---	---
SD (<8 inches)	---	---	2-2	---
SL (8-36 inches)	---	---	2-5	---
ST (>10 feet)	---	---	12-12	---
TR (<15 feet)	---	---	---	4-4
TM (15-40 feet)	---	---	---	20-3
TT (>40 feet)	---	---	---	75-75

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CACA4	*Calamagrostis canadensis*	4-5.5-7	100	23.5

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
COCA13	*Cornus canadensis*	10-10-10	50	22.4
MOLA6	*Moehringia lateriflora*	2-2-2	50	10.0

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
EQPR	*Equisetum pratense*	8-8-8	50	20.0
EQSC	*Equisetum scirpoides*	2-2-2	50	10.0
EQAR	*Equisetum arvense*	2-2-2	50	10.0

Stratum—FT (>24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
MEPA	*Mertensia paniculata*	4-4.5-5	100	21.2
POAL11	*Polygonum alpinum*	2-2-2	50	10.0

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	4-4-4	50	14.1
LIBO3	*Linnaea borealis*	2-2-2	50	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
RIHU	*Ribes hudsonianum*	4-5.5-7	100	23.5
RUID	*Rubus idaeus*	5-5-5	50	15.8
LEGR	*Ledum groenlandicum*	4-4-4	50	14.1
SPST3	*Spiraea stevenii*	2-2-2	100	14.1
ROAC	*Rosa acicularis*	3-3-3	50	12.2

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ROAC	*Rosa acicularis*	20-20-20	50	31.6
RUID	*Rubus idaeus*	7-7-7	50	18.7

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	25-25-25	50	35.4
SABE2	*Salix bebbiana*	7-9.5-12	100	30.8

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIGL	*Picea glauca*	4-19.5-35	100	44.2
PIMA	*Picea mariana*	8-8-8	50	20.0

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	20-40-60	100	63.2
PIGL	*Picea glauca*	3-9-15	100	30.0
PIMA	*Picea mariana*	15-15-15	50	27.4

Stratum—TT (>40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
BENE4	*Betula neoalaskana*	10-42.5-75	100	65.2

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Betula neoalaskana	---	6-6-6	55-55-55	1	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
40-60-80	2

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
Moderate use	Other	Other	Unknown

Notable Plants: None observed

Species Richness: Number of stops—2; plant species per stop (min-avg-max)—22-23.5-25

Community Phase HCPC

Rooting Depth (cm): Min 20 RV 20 Max 20

Restrictive Feature: Permafrost

Drainage Class: Somewhat poorly drained

Surface Layer

Thickness (cm): Min 13 RV 13 Max 13

Texture: Peat

AWC (cm/cm): Min 0.35 RV 0.35 Max 0.35

pH: Min 4.2 RV 4.4 Max 4.7

Subsurface Layer

Thickness (cm): Min 7 RV 7 Max 7

Texture: Gravelly sandy loam

AWC (cm/cm):	Min	RV	Max
	0.13	0.13	0.13

pH:	Min	RV	Max
	4.9	4.9	4.9

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
20-45	40-65	5-15	5-15	0-3	0-0	0-2

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
FD (<4 inches)	---	10-2	---	---
FM (4-24 inches)	---	10-20	---	---
SD (<8 inches)	---	---	15-5	---
SL (8-36 inches)	---	---	3-5	---
SM (3-10 feet)	---	---	35-5	---
TR (<15 feet)	---	---	---	10-10
TM (15-40 feet)	---	---	---	30-30

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ERIOP	*Eriophorum*	8-8-8	33	16.3
CACA4	*Calamagrostis canadensis*	7-7-7	33	15.3

Stratum—FD (<4 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PYROL	*Pyrola*	10-10-10	33	18.3
EQSC	*Equisetum scirpoides*	10-10-10	33	18.3
PEFR5	*Petasites frigidus*	2-2.5-3	67	12.9

Stratum—FM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
GELI2	*Geocaulon lividum*	2-9.3-20	100	30.6
EQPR	*Equisetum pratense*	20-20-20	33	25.8
MEPA	*Mertensia paniculata*	10-10-10	33	18.3

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	15-17.3-22	100	41.6
VAOX	*Vaccinium oxycoccos*	2-3.5-5	67	15.3
EMNI	*Empetrum nigrum*	5-5-5	33	12.9
ARRU	*Arctostaphylos rubra*	5-5-5	33	12.9
RUCH	*Rubus chamaemorus*	3-3-3	33	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
LEGR	*Ledum groenlandicum*	17-25.7-35	100	50.7
BEGL	*Betula glandulosa*	10-10-10	33	18.3
VAUL	*Vaccinium uliginosum*	3-4-5	67	16.3
ROAC	*Rosa acicularis*	7-7-7	33	15.3
CHCA2	*Chamaedaphne calyculata*	5-5-5	33	12.9
BENA	*Betula nana*	5-5-5	33	12.9
RUCH	*Rubus chamaemorus*	3-3-3	33	10.0

Stratum—SM (3-10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	10-22.5-35	67	38.7
SAPU15	*Salix pulchra*	5-5-5	33	12.9

Stratum—ST (>10 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
ALVIF	*Alnus viridis ssp. fruticosa*	18-18-18	33	24.5

Stratum—TR (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-11.7-15	100	34.2

Stratum—TS (<15 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	10-10-10	33	18.3

Stratum—TM (15-40 feet)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
PIMA	*Picea mariana*	30-55-80	67	60.6

Site Tree Measurements:

Tree Species	Age (years)	Diameter (in)	Height (feet)	# of Trees	Measurement Height
Picea mariana	72-125-178	5-6-7.4	35-42-48	2	B

Tree Basal Area:

Min-Avg-Max	Number of Stands
18-18-18	1

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed
Slight use	Willows	Moose	Unknown

Notable Plants: None observed

Species Richness: Number of stops—3; plant species per stop (min-avg-max)—14-23.7-34

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

USDA, Natural Resources Conservation Service
Ecological Site Characterization Report

Ecological Classification Type Name: NRCS rangeland site
Ecological Classification Name: Boreal Moss Peat Depression
Ecological Classification ID: R232XY220AK
Major Land Resource Area: 231—Interior Alaska Highlands

Physiographic Features

Landform: Thermokarst depressions of loess plains

Slope (percent):	Min	Max
	0	0

Elevation (feet):	Min	Max
	1,083	1,640

Range of Aspect Direction: All aspects

Water Table Depth (cm):	Min	Max
	0	25

Flooding: None

Ponding:	Frequency	Duration
	Frequent	Very long

Runoff: Negligible

Frost-Free Days:	Min	Max
	75	110

Mean Annual Precipitation (inches):	Low	High
	9	14

Mean Annual Air Temperature (°F):	Low	High
	23	27

Monthly Data:

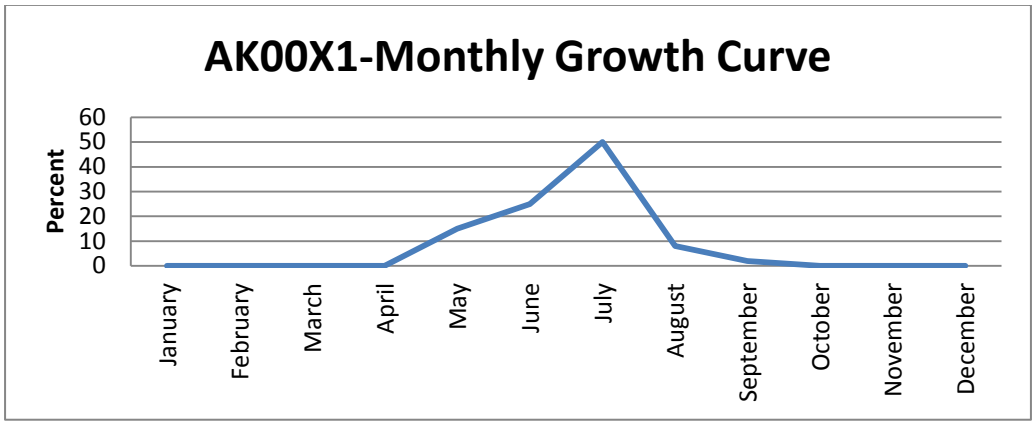
Month	Precipitation (in) Min	Precipitation (in) Max	Temperature (°F) Low	Temperature (°F) High
January	0	1	-35	1
February	0	1	-29	12
March	0	1	-17	19
April	0	1	3	43
May	0	2	27	61
June	1	4	41	72
July	1	4	43	77
August	1	4	39	72
September	1	3	27	54
October	1	2	7	28
November	0	2	-17	10
December	0	2	-29	1

Plant Growth Curve

Growth Curve Number: AK00X1

Growth Curve Name: Interior

Growth Curve Description: 30 to 120 days



Representative Soil Features

MLRA Map Unit Symbols and Components (Soil Names):

D32TL1—D32-Boreal moss organic depressions
D32TL4—D32-Boreal moss organic depressions

Characteristics of Representative Soil Components

Soil Classification: Dysic Hydric Cryofibrists

Dominant Parent Material: Mossy organic material

Representative Surface Texture: Peat

Subsurface Texture Group: Not applicable

Saturated Hydraulic Conductivity: Moderately high

AWC Total (cm):	Low	RV	High
	12	24	42

pH:	Low	RV	High
	5.0	5.9	7

Effective CEC (me/100g):	Low	High
	34.5	40

CEC (me/100g):	Min	RV	Max
	62	75.1	88.2

Organic Matter (percent):	Low	RV	High
	80	80	80

Bulk Density (1/3-Bar):	Min	RV	Max
	0.2	0.2	0.2

Plant Community Phases

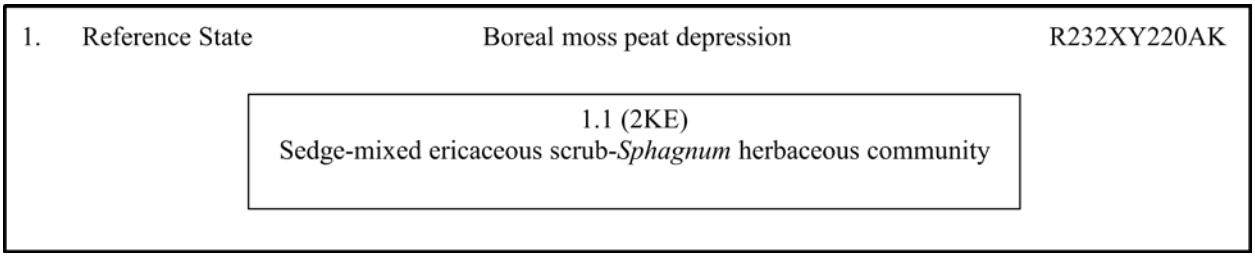
Ecological Site Description ID:	R232XY220AK

Ecological Dynamics of the Site:

This boreal ecological site is in depressions of loess plains that are attributed to thermokarst events. The underlying permafrost melts, causing the ground to slump and form wet depressions. These depressions are stable, open bodies of water with little or no hydrologic input. As a result, the succession is similar to that of a bog. With time and organic matter accumulation, permafrost likely will reform in the soil and the site progress from open water to a scrubland or black spruce woodland community. The soil in the sampled community is classified as a Cryofibrist and is composed of saturated organic matter.

Due to limited sampling, only one community phase was developed for this ecological site. There likely are numerous communities associated with thermokarst succession, so the state-and-transition model is considered incomplete. The sampled community is considered to be a thermokarst association.

State and Transition Diagram:



State ID Number:	1	State Name:	Reference
State Narrative:	The height of medium shrubs is defined as 3 to 10 feet, low shrubs as 8 inches to 3 feet, and dwarf shrubs as less than 8 inches.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Sedge-mixed ericaceous scrub-*Sphagnum* herbaceous community
Community Phase Narrative:			
Ponded water covers 40% of the surface. The dominant vegetation in this plant community is unknown species of *Carex* and *Sphagnum* (total combined cover ~70%). The shrub cover is primarily in the low and dwarf strata and is a minor vegetative component (~10% cover). The shrub species are *Chamaedaphne calyculata*, *Andromeda polifolia*, *Vaccinium vitis-idaea*, *Rubus chamaemorus*, and *Vaccinium oxycoccos*. Lichen and forbs are minor vegetative components.			
Community Pathways			
Pathway Number	Pathway Name & Description		
1.1a	Unknown at this time.		

Dynamic Soil Properties within Representative Rooting Depth

Community Phase 2KE

Rooting Depth (cm):	Min	RV	Max
	72	72	72

Restrictive Features: None recorded

Drainage Class: Very poorly drained

Surface Layer

Thickness (cm):	Min	RV	Max
	60	60	60

Texture: Peat

AWC (cm/cm):	Min	RV	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4	4	4

Subsurface Layer

Thickness (cm):	Min	RV	Max
	12	12	12

Texture: Mucky peat

AWC (cm/cm):	Min	Avg	Max
	0.35	0.35	0.35

pH:	Min	RV	Max
	4	4	4

Influencing Water Features

NWI Code: None recorded

NWI Description: None recorded

Rosgen Classification: None recorded

Structure and Cover

Ground Cover (%):

Lichen	Bryophytes	Herbaceous Litter and Mulch	Woody Litter and Debris >1 inch	Bare Soil	Surface Rock Fragments	Surface Water
5-5	50-50	5-5	0-0	0-0	0-0	40-40

Percent Canopy Cover by Height Class and Type:

Stratum Code	Grasses/Grasslike	Forbs	Shrubs	Trees
GM (4-24 inches)	40-40	---	---	---
SD (<8 inches)	---	---	1-2	---
SL (8-36 inches)	---	---	3-5	---

Plant Species Canopy Cover (%), Constancy (%) and Occurrence Index*:

Stratum—GM (4-24 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CAREX	*Carex*	40-40-40	100	63.2

Stratum—SD (<8 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
VAVI	*Vaccinium vitis-idaea*	2-2-2	100	14.1
RUCH	*Rubus chamaemorus*	2-2-2	100	14.1
VAOX	*Vaccinium oxycoccos*	1-1-1	100	10.0

Stratum—SL (8-36 inches)

Plant Symbol	Scientific Name	% Cover (Min-Avg-Max)	Constancy	Occurrence Index
CHCA2	*Chamaedaphne calyculata*	5-5-5	100	22.4
ANPO	*Andromeda polifol*ia	3-3-3	100	17.3

Site Tree Measurements: Not measured

Tree Basal Area: Not measured

Management Use Per Observation Site:

Use	Associated Plants	Associated Animals	Season
No observed use			Not grazed/browsed

Notable Plants: None observed

Species Richness: Number of stops—1; plant species per stop (min-avg-max)—13-13-13

*Only taxa with an occurrence index of higher than 9 are included in this report, because it was not feasible to list all of the species on the sites. Species that are indicative of a site may be present in small proportions, but they were not included in the tabular data. Any species that are indicative of the ecological dynamics on a site are represented in the State and Transition Model (STM).

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 Properties

Table 7 gives the engineering classifications and the range of engineering 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 U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added. For example, "gravelly."

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 7.6 centimeters 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, CL-ML.

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 7.6 centimeters 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.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number.

Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 250 millimeters in diameter and 75 to 250 millimeters 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 7.6 centimeters in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

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

Erosion Properties

Table 8 shows estimates of some erosion factors that affect the potential of the soil for different uses. These estimates are given for each layer for the K factor and for the soil as a whole for the T factor, wind erodibility group, and wind erodibility index. Values are given for each soil in the survey area. Estimates are based on field observations and on test data for these soils and similar soils.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Soil erosion factors (Kw) and (Kf) indicate soil detachment by runoff and raindrop impact. These factors are used to predict the long-term average soil loss from sheet and rill erosion when crop systems and conservation techniques are used. Factor K is one of six 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 Ksat. 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.

The procedure for determining the Kf factor is outlined in “Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation” (USDA, 1997).

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments. In layers that have a total rock fragment content of 15 percent or more, by volume, the Kw factor estimate is always less than the Kf factor estimate.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size. For soil layers that do not have rock fragments, the Kw and Kf factor estimates are the same.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/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. The groups are described in the “National Soil Survey Handbook.”

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.

Physical Properties

Table 9 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.

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. In the table, 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. In the table, 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. In the table, 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, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33-kPa or 10-kPa) 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 linear extensibility, 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 (Ksat) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity. The estimates in the table indicate the rate of water movement, in micrometers per second, 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 centimeters of water per centimeter 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.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly as a result of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design commonly is needed.

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

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, 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.

Chemical Properties

Table 10 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.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water.

Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity (Ksat) and aeration, and a general degradation of soil structure.

Soil Carbon

Table 11 gives estimates of soil organic carbon (SOC) and soil inorganic carbon (SIC). Both are reported in kilograms per square meter to a depth of 2 meters or to a representative depth of either hard bedrock or a cemented horizon. Values are on a whole soil basis, corrected for rock fragments.

Soil organic carbon (SOC) is carbon in soil that originated from a biological source, such as plants, animals, or micro-organisms. Soil inorganic carbon (SIC) is from a non-biological source. Calcium carbonate (CaCO3) is the most common inorganic form of carbon in soils. SOC is found in both organic and mineral soil layers. It refers only to the carbon in soil organic matter, and it makes up about one-half of the weight of soil organic matter. The rest of the soil organic matter is mostly oxygen, nitrogen, and hydrogen.

SOC can be an indicator of overall soil fertility and soil quality that affects ecosystem function. Soil organic matter is the main reservoir for most plant nutrients, such as phosphorus and nitrogen. Managing the SOC by managing for the soil organic matter increases the content of these elements and improves soil resiliency.

Soil organic matter, the source of SOC, binds soil particles together and thus increases soil porosity and water infiltration and allows better root penetration and waterflow into the soil. Greater inflow of water reduces the hazard of erosion and the rate of surface water runoff.

Higher SOC levels improve soil quality and air and water quality. Soil acts as a filter to improve water quality. Fertile soils that support plant life remove carbon dioxide (CO2) from the atmosphere and increase oxygen levels through photosynthesis. Maintaining the level of SOC reduces the release of carbon into the atmosphere and thus can lessen the effects of global warming.

Soil Features

Table 12 gives estimates of various soil features. The estimates are used in land use planning.

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 restricts roots or otherwise provides 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, saturated mineral soils of very low density, or soils with permafrost. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. In soils with permafrost, subsidence can result from the removal of the insulative organic matter due to natural disturbance such as fire, mechanical disturbance as a result of commercial development or use of agricultural practices, or long-term climatic warming. 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, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

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

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

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

Water Features

Table 13 gives estimates of various soil 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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table 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 a water table.

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.

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

Use and Management of the Soils

This section provides soil interpretations for recreational uses and suitability ratings of the major vegetation cover types for selected wildlife species and habitat elements.

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 about 152 to 213 centimeters. 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.

Land Management

In tables 14 through 17, interpretive ratings are given for various aspects of land management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified land management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the tables indicate 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 specified land management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for “fire damage” and “seedling mortality” are expressed as low, moderate, and high. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

Rating class terms for *hazard of erosion* are expressed as slight, moderate, severe, and very severe. The numerical ratings indicate gradations between the point at which the potential for erosion is highest (1.00) and the point at which the potential is lowest (0.00).

Land Management—Planting

In table 14, ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of planting equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Land Management—Hazard of Erosion and Suitability for Roads

In table 15, ratings in the column *hazard of erosion* are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in areas where 50 to 75 percent of the surface has been exposed by different kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and offsite damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erosion factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Land Management—Site Preparation

In table 16, ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 meter is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 30 centimeters is considered in the ratings.

Land Management—Site Restoration

In table 17, ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

Source of Reclamation Material, Roadfill, and Topsoil

Table 18 gives information about the soils as potential sources of reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good, fair,* or *poor* as potential sources of reclamation material, roadfill, and topsoil. The features that limit the soils as sources of these materials are specified in the table. Numerical ratings indicate the degree to which the features limit the soils as sources of reclamation material, roadfill, or topsoil. The ratings are shown as decimal fractions ranging from 0.00 to 0.99. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

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 1.8 meters high and less exacting in design than higher embankments. The ratings are for the whole soil, from the surface to a depth of about 152 centimeters. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 102 centimeters 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. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable

material. 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.

Source of Sand and Gravel

Table 19 gives information about the soils as potential sources of gravel and sand. Normal compaction, minor processing, and other standard construction practices are assumed.

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 likelihood 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 bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness. The ratings are for the whole soil, from the surface to a depth of about 183 centimeters.

The soils are rated *good, fair,* or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

Recreation

The soils in the survey area are rated in tables 20 and 21 according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate 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).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are

limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in these tables can be supplemented by other information in this survey.

Camp and Picnic Areas

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings in table 20 are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Trail Management

Foot traffic and equestrian trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings in table 21 are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Mountain bike and off-road vehicle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, depth to a water table, ponding, slope, flooding, and texture of the surface layer.

Hydric Soils

Table 22 lists the map unit components in the survey area that are rated as hydric soils. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site.

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 all 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, under natural conditions, 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 map unit components that normally are 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, 2010) and in the *Soil Survey Manual* (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time 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 are specified in *Field Indicators of Hydric Soils in the United States* (USDA, 2010).

Hydric soils are identified by examining and describing the soil to a depth of about 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.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

1. All Histels except for Folistels and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:

   A. are somewhat poorly drained and have a water table at the surface (0 centimeters) during the growing season, or
   B. are poorly drained or very poorly drained and have either:
      1) a water table at the surface (0 centimeters) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 50 centimeters, or
      2) a water table at a depth of 15 centimeters or less during the growing season if saturated hydraulic conductivity (Ksat) is equal to or greater than 42.3 micrometers per second in all layers within a depth of 50 centimeters, or
      3) a water table at a depth of 25 centimeters or less during the growing season if saturated hydraulic conductivity (Ksat) is less than 42.3 micrometers per second in any layer within a depth of 50 centimeters.

3. Soils that are frequently ponded for periods of long or very long duration during the growing season.
4. Soils that are frequently flooded for periods of long or very long duration during the growing season.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (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. The categories are defined in the following paragraphs.

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

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

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

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

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

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series. Series are not used in this survey.

Table 23 gives the classification of the soils in the survey area.

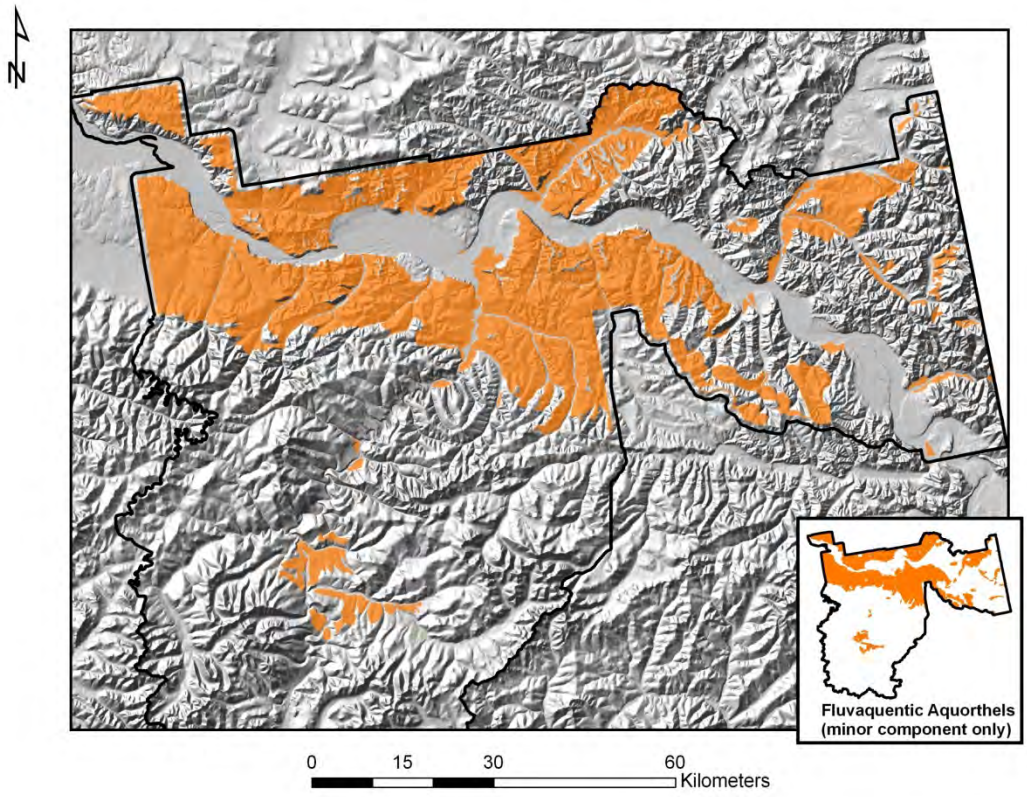
Taxonomic Units and Their Morphology

Descriptions for the higher level taxonomic units recognized in this survey area are in this section. Characteristics of the soil and the material in which it formed are identified for each taxonomic unit. A pedon, a small three-dimensional area of soil,

typical of the taxonomic unit in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (Soil Survey Staff, 1999) and in *Keys to Soil Taxonomy* (Soil Survey Staff, 2010). Unless otherwise indicated, colors in the descriptions are for moist soil.

Following the pedon description is the range of important characteristics of the soils in the taxonomic unit. This range is based on horizon data common to the taxonomic subgroup for the Interior Alaska Region, X1. In some cases, the pedon description contains horizons not noted in the taxonomic subgroup description. The pedon description should be considered as characteristic of the subgroup in this survey area, and it may be somewhat different than the regional taxonomic subgroup description.

Fluvaquentic Aquorthels



Taxonomic Classification

Fluvaquentic Aquorthels

Setting

Depth class: Shallow or moderately deep
Drainage class: Very poorly drained or poorly drained
Landform: Flood plains, drainageways
Parent material: Organic material over silty or loamy alluvium
Elevation: 100 to 220 meters
Slope: 1 to 7 percent
Annual precipitation: 254 to 356 millimeters
Annual temperature: -4.0 to –1 degrees C
Frost-free period: 80 to 120 days

Taxonomic Families

- Coarse-silty, mixed, superactive, acid, subgelic Fluvaquentic Aquorthels
- Coarse-silty, mixed, superactive, nonacid, subgelic Fluvaquentic Aquorthels

Representative Pedon Location

Location in the survey area: Latitude 65°25´22˝ north, longitude 141°4´17˝ west

Representative Pedon

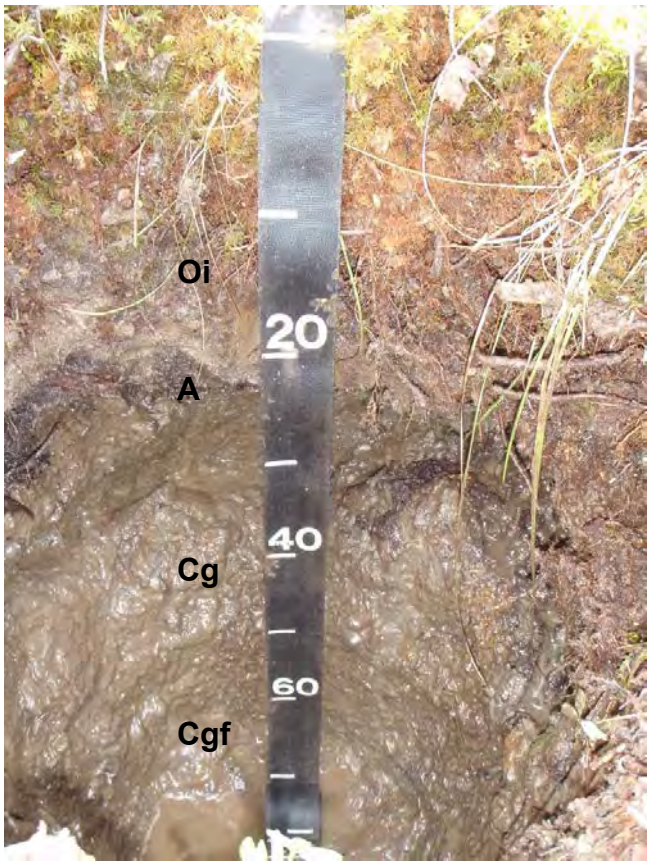
X1—Fluvaquentic Aquorthels; on a nearly level slope in a drainageway under mixed willow and alder shrub. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 3 centimeters; very dark grayish brown (10YR 3/2), stratified, slightly decomposed plant material; common fine roots throughout; noneffervescent; very strongly acid (pH 4.8); clear smooth boundary.

A—3 to 18 centimeters; 75 percent black (10YR 2/1), stratified silt loam; 4 percent clay; weak fine granular structure; very friable, slightly sticky and nonplastic; common medium, coarse, very coarse, very fine, and fine roots throughout; 10 percent fine distinct dendritic dark yellowish brown (10YR 4/6) masses of oxidized iron and 15 percent fine distinct dendritic dark gray (2.5Y 4/1) masses of reduced iron with clear boundaries on surface along root channels; noneffervescent; strongly acid (pH 5.1); gradual wavy boundary.

Cg—18 to 49 centimeters; 85 percent very dark gray (10YR 3/1), stratified silt loam; 4 percent clay; weak fine subangular blocky structure; very friable, slightly sticky and nonplastic; common fine roots throughout; 15 percent fine distinct irregular dark yellowish brown (10YR 4/6) masses of oxidized iron with clear boundaries in matrix; noneffervescent; strongly acid (pH 5.3).

Cgf—49 to 152 centimeters; dark grayish brown (2.5Y 4/2) and dark brown (10YR 3/3), permanently frozen, stratified fine sand to silt; strongly acid (pH 5.3).



Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: -0.2 to –1.0 degrees C
Depth to permafrost: 35 to 100 centimeters

O horizon:
- Color—hue of 5YR to 10YR, value of 2 or 3, chroma of 2 to 4
- Texture—slightly decomposed plant material, moderately decomposed plant material
- Organic matter content—60 to 90 percent
- Reaction—ultra acid to neutral

Cg/O horizon (where present) and Cg horizon:
- Cg color—hue of 7.5YR to 5Y, value of 3 or 4, chroma of 1 or 2
- Oa color—hue of 7.5YR to 5Y, value of 2 to 4, chroma of 1 or 2
- Texture—stratified silt loam to muck, mixed silt loam and muck, stratified mucky very fine sand to highly decomposed plant material, silt loam, very fine sandy loam
- Clay content—0 to 10 percent
- Silt content—40 to 75 percent
- Sand content—15 to 60 percent
- Organic matter content—10 to 20 percent
- Reaction—very strongly acid to neutral

Cgf horizon:
- Color—hue of 2.5Y to 5GY, value of 3 or 4, chroma of 1 or 2
- Texture—silt loam, stratified very fine sand to silt
- Clay content—0 to 10 percent

Silt content—40 to 75 percent
Sand content—15 to 60 percent
Reaction—very strongly acid to moderately acid

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Historthels on adjacent uplands
- X1—Typic Histoturbels on adjacent uplands
- X1—Typic Cryofluvents on higher flood plains
- X1—Aquic Cryofluvents on lower flood plains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Very poorly drained or poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high in the mixed mineral and organic layers, and very low in the permafrost

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Mixed alder and willow shrub

Distribution and Extent

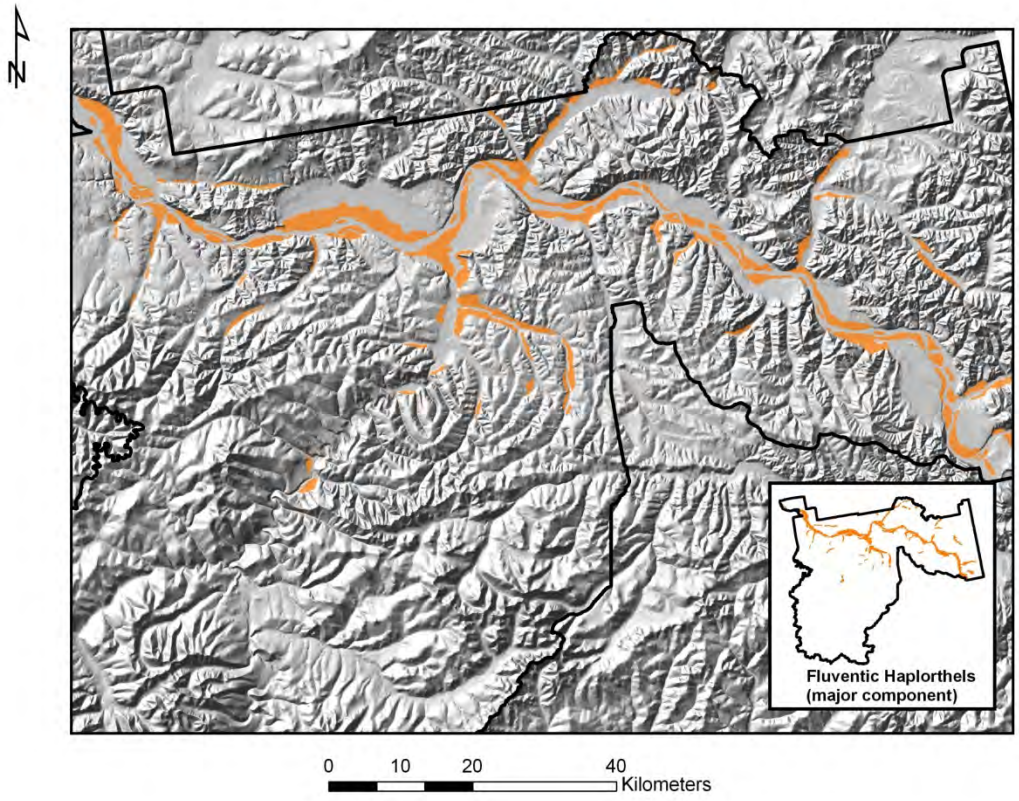
Distribution: Throughout major land resource region X1
Extent: Moderate throughout the boreal forests of interior Alaska

Remarks

Diagnostic horizons and features:
Aquic conditions—zone from 9 to 48 centimeters
Reduced matrix—zone from 9 to 48 centimeters
Redoximorphic concentrations—zone from 17 to 48 centimeters
Depth to permafrost—35 to 100 centimeters
Irregular decrease in organic carbon—9 to 48 centimeters
Soil temperature regime—gelic
Soil temperature class—subgelic

Note: Cg/O horizon has wavy or smooth topography associated with fluvial deposits, not cryoturbation.

Fluventic Haplorthels



Taxonomic Classification

Fluventic Haplorthels

Setting

Depth class: Shallow to deep
Drainage class: Moderately well drained or well drained
Landform: High flood plains
Parent material: Mossy organic material and/or woody organic material over sandy and silty alluvium
Elevation: 23 to 948 meters
Slope: 0 to 4 percent
Annual precipitation: 152 to 565 millimeters
Annual temperature: -7.3 to -1.5 degrees C
Frost-free period: 75 to 120 days

Taxonomic Families

• Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels
• Coarse-loamy, paramicaceous, superactive, nonacid, subgelic Fluventic Haplorthels
• Coarse-silty, mixed, superactive, nonacid, subgelic Fluventic Haplorthels

Representative Pedon Location

Location in the survey area: Latitude 65°24´31˝ north, longitude 142°24´8˝ west

Representative Pedon

X1—Fluventic Haplorthels; on a nearly level slope of a high flood plain with white spruce forest. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 7 centimeters; very dark grayish brown (2.5Y 3/2) slightly decomposed plant material; common fine, medium, and very fine roots; strongly acid (pH 5.3); clear smooth boundary.

Oi/C—7 to 14 centimeters; 96 percent very dark gray (2.5Y 3/1) and 4 percent dark gray (10YR4/1), stratified, slightly decomposed plant material to silt loam; 23 percent sand, 75 percent silt, and 2 percent clay; very friable, nonsticky and nonplastic; common fine, medium, and very fine roots; neutral (pH 6.9); abrupt smooth boundary.

C/Oe—14 to 27 centimeters; 95 percent very dark grayish brown (10YR 3/2) and 5 percent black (10YR 2/1) silt loam and mucky peat; 29 percent sand, 67 percent silt, and 4 percent clay; weak thin platy structure parting to weak fine subangular blocky; friable, nonsticky and nonplastic; common fine, medium, coarse, and very fine roots; neutral (pH 6.6); clear wavy boundary.

C—27 to 38 centimeters; 80 percent very dark grayish brown (10YR 3/2) silt loam; 27 percent sand, 68 percent silt, and 5 percent clay; weak fine subangular blocky structure; friable, nonsticky and nonplastic; common fine, medium, coarse, and very fine roots; 20 percent medium dark brown (7.5YR 3/3) masses of oxidized iron with clear boundaries; slightly acid (pH 6.4); gradual wavy boundary.

Cf—38 to 152 centimeters; dark gray (10YR 4/1), stratified permanently frozen silt loam; 25 percent sand, 71 percent silt, and 4 percent clay; nonsticky and nonplastic; common fine and very fine roots; neutral (pH 6.9).

Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -0.2 to –2.0 degrees C
Depth to permafrost: 31 to 110 centimeters

O horizon and O part of C/O horizon:
Color—hue of 5YR to 10YR, value of 2 to 3, chroma of 1 to 4
Texture—moderately decomposed plant material, slightly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—ultra acid to neutral

A horizon (where present):
Color—hue of 7.5YR or 10YR, value of 2 to 3, chroma of 1 to 3
Texture—silt loam or very fine sandy loam, commonly stratified
Clay content—0 to 10 percent
Silt content—35 to 75 percent
Sand content—15 to 60 percent
Organic matter content—2 to 4 percent
Reaction—extremely acid to neutral

B horizon (where present):
Color—hue of 2.5Y, value of 4 to 6, chroma of 2 to 3
Texture—silt loam or very fine sandy loam, commonly stratified
Clay content—0 to 10 percent
Silt content—35 to 75 percent
Sand content—15 to 60 percent
Organic matter content—2 to 4 percent
Reaction—extremely acid to neutral

C horizon and C part of C/O horizon:
Color—hue of 7.5YR to N 5/0, value of 2 to 4, chroma of 1 or 2
Texture—stratified silt loam to fine sandy loam
Clay content—0 to 5 percent
Silt content—20 to 40 percent
Sand content—55 to 75 percent
Organic matter content—8 to 12 percent
Rock fragment content—0 to 5 percent rounded indurated cobbles, 0 to 5 percent rounded indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—very strongly acid to moderately alkaline

Cf horizon:
Color—hue of 7.5YR to N 5/0, value of 2 to 4, chroma of 1 or 2
Texture—stratified silt loam to fine sandy loam
Clay content—0 to 5 percent
Silt content—20 to 40 percent
Sand content—55 to 75 percent
Organic matter content—0 to 2 percent
Rock fragment content—0 to 5 percent rounded indurated cobbles, 0 to 5 percent rounded indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Cryofluvents on lower flood plains
- X1—Typic Historthels on stream terraces
- X1—Terric Cryohemists in depressions of flood plains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Moderately well drained or well drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high or high in the mineral layers, very low or low in the permafrost

Use and Vegetation

Use: Wildlife habitat, source of forest products
Vegetation: Boreal white spruce forest with alder, horsetail, and feathermoss; balsam poplar, willow, red osier dogwood, and prickly rose after flooding and ice bulldozing

Distribution and Extent

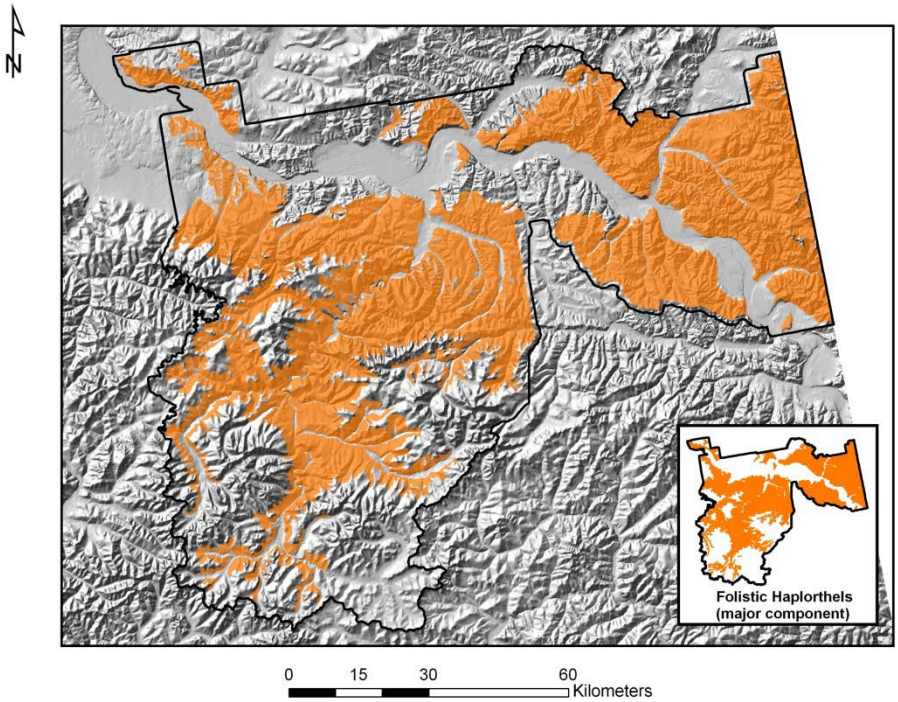
Distribution: Throughout major land resource region X1
Extent: Moderate on high flood plains throughout interior Alaska

Remarks

Diagnostic horizons and features:
Depth to permafrost—31 to 110 centimeters
Irregular decrease in organic carbon—7 to 152 centimeters as indicated by buried organic layers and stratified textures
Soil temperature regime—gelic
Soil temperature class—subgelic

Note: Oi/C and C/Oe horizons have wavy or smooth topography associated with fluvial deposition, not cryoturbation.

Folistic Haplorthels



Taxonomic Classification

Folistic Haplorthels

Setting

Depth class: Shallow to moderately deep
Drainage class: Poorly drained or somewhat poorly drained
Landform: Escarpments, hills, mountains
Parent material: Organic material over loess over gravelly colluviums, organic material over gravelly colluvium, organic material over silty colluvium
Elevation: 200 to 1,200 meters
Slope: 5 to 70 percent
Annual precipitation: 233 to 688 millimeters
Annual temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Taxonomic Families

- Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels
- Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
- Loamy-skeletal, mixed, superactive, acid, subgelic Folistic Haplorthels

Representative Pedon Location

Location in the survey area: Latitude 65°5´0˝ north, longitude 141°42´1˝ west

Representative Pedon

Folistic Haplorthels on a steep, north-facing hill slope with stunted black spruce/ericaceous woodland. (Colors are for moist soil; textures are apparent field textures.)

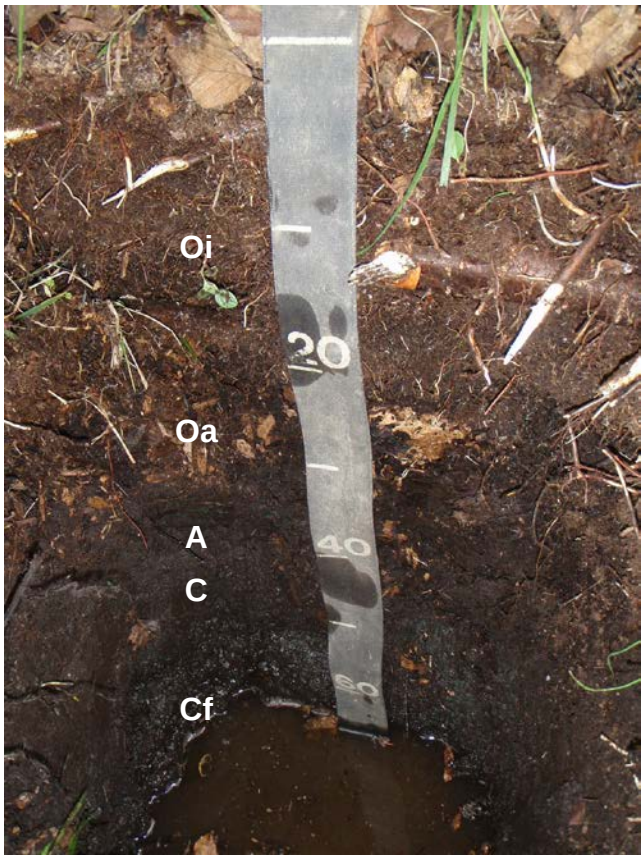
Oi—0 to 21 centimeters; brown (7.5YR 4/4) slightly decomposed plant material; common medium, coarse, very fine, and fine roots throughout; extremely acid (pH 4.0); clear smooth boundary.

Oa—21 to 29 centimeters; black (10YR 2/1) highly decomposed plant material; common medium and coarse, many very fine, and common fine roots throughout; strongly acid (pH 5.5); clear smooth boundary.

A—29 to 38 centimeters; very dark gray (2.5Y 3/1) silt loam; 4 percent clay; weak fine angular blocky structure; very friable, slightly sticky and nonplastic; common medium, very fine, and fine roots throughout; moderately acid (pH 5.7); clear wavy boundary.

C—38 to 61 centimeters; 72 percent dark grayish brown (10YR 4/2) silt loam; 5 percent clay; weak thin platy structure; very friable, slightly sticky and nonplastic; common medium, very fine, and fine roots throughout; 8 percent thin distinct platy dark gray (2.5Y 4/1) masses of reduced iron with clear boundaries in matrix and 20 percent fine distinct dendritic dark yellowish brown (10YR 4/6) masses of oxidized iron with clear boundaries on surface along root channels; 4 percent fine gravel; moderately acid (pH 5.7); clear smooth boundary.

Cf—61 to 152 centimeters; dark gray (2.5Y 4/1) permanently frozen silt loam; 5 percent clay; weak thin platy structure; very friable, slightly sticky and nonplastic; 4 percent fine gravel; neutral (pH 6.7).



Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: -0.2 to –2 degrees C
Depth to contrasting textural stratification: 33 to 68 centimeters
Depth to permafrost: 45 to 100 centimeters
Thickness of histic or folistic epipedon: 21 to 41 centimeters

O horizon:
Color—hue of 10YR, value of 1 to 4, chroma of 1 to 4
In lieu texture: Slightly decomposed plant material or moderately decomposed plant material
Organic matter content—60 to 90 percent
Rock fragment content—0 to 5 percent gravel
Reaction—extremely acid or very strongly acid

A horizon:
Color—hue of 10YR or 2.5Y, value of 3 or 4, chroma of 1 to 3
Texture (less than 2 millimeters)—silt, silt loam, loam, sandy loam
Clay content: 2 to 15 percent
Organic matter content—2 to 20 percent
Rock fragment content: 0 to 42 percent
Reaction—extremely acid to slightly alkaline

C horizon:
Color—hue of 10YR, 2.5Y, 5Y, or N; value of 1 to 4; chroma of 2 to 4
Texture (less than 2 millimeters)—fine sandy loam, silt loam, sandy loam, loam, very fine sandy loam

Clay content—2 to 15 percent
Rock fragment content—5 to 60 percent
Reaction—very strongly acid to slightly alkaline

Cf horizon:
Color—hue of 10YR, 2.5Y, or 5Y
Texture (less than 2 millimeters)—silt loam, silt, sandy loam, loam, fine sandy loam
Clay content—2 to 15 percent
Rock fragment content—5 to 88 percent
Reaction—very strongly acid to slightly alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Histoturbels in more gently sloping areas
- X1—Hydric Cryofibrists in depressions
- X1—Fluvaquentic Aquorthels in drainageways
- X1—Typic Haplocryepts and Typic Dystrocryepts on south-facing hill slopes and mountain slopes

Drainage and Saturated Hydraulic Conductivity

Drainage class: Poorly drained or somewhat poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high or high in the mineral layers, very low in the permafrost

Use and Vegetation

Use: Wildlife habitat, agriculture, urban development
Vegetation: Boreal taiga/ericaceous woodland and subalpine tall scrub. In the boreal life zone, wildfire and post-fire succession result in a variety of herbaceous, scrub, and hardwood vegetation types.

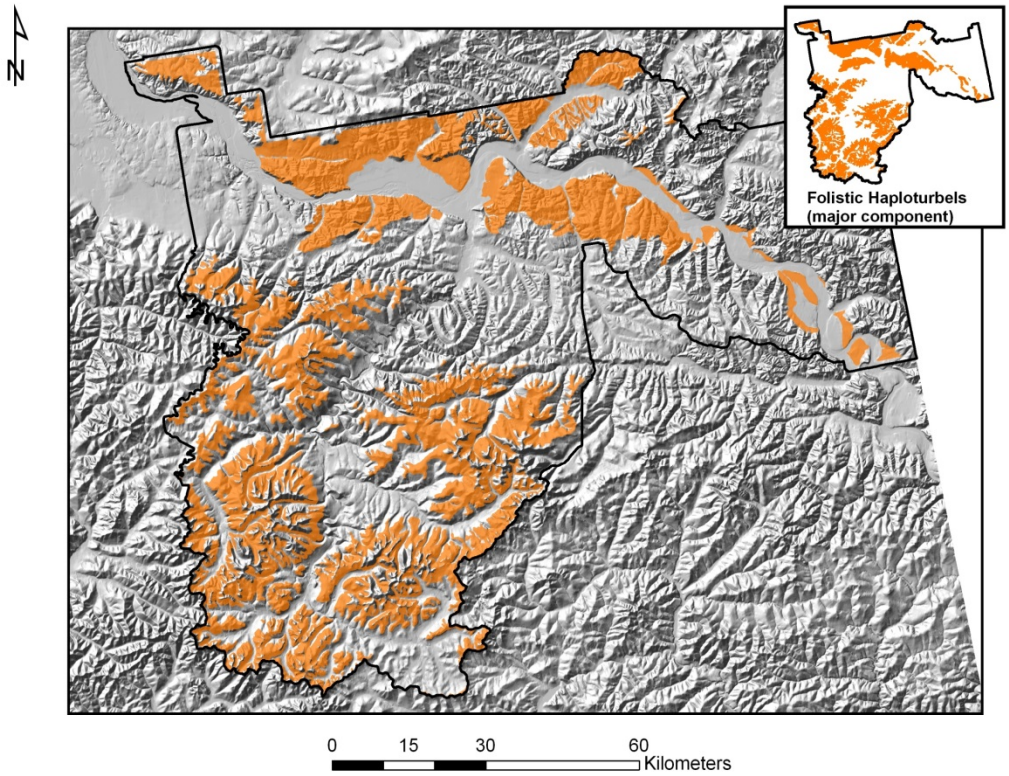
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Extensive throughout the boreal forests, moderately extensive in the subalpine life zones of interior Alaska

Remarks

Diagnostic horizons and features:
Aquic conditions—zone from 38 to 61 centimeters
Depth to permafrost—61 centimeters
Folistic epipedon—zone from surface to a depth of 29 centimeters
Soil temperature regime—gelic
Soil temperature class—subgelic

Folistic Haploturbels



Taxonomic Classification

Folistic Haploturbels

Setting

Depth class: Shallow or moderately deep
Drainage class: Poorly drained or somewhat poorly drained
Landform: Alpine turf hummocks on shoulders of mountains and forested footslopes and toeslopes of hills and mountains
Parent material: Organic material over loamy cryoturbate
Elevation: 250 to 1,500 meters
Slope: 1 to 20 percent
Annual precipitation: 244 to 824 millimeters
Annual temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Taxonomic Families

• Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haploturbels
• Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haploturbels

Representative Pedon

Folistic Haploturbels on a steep, north-facing hill slope with stunted black spruce/ericaceous woodland. (Colors are for moist soil; textures are apparent field textures.)

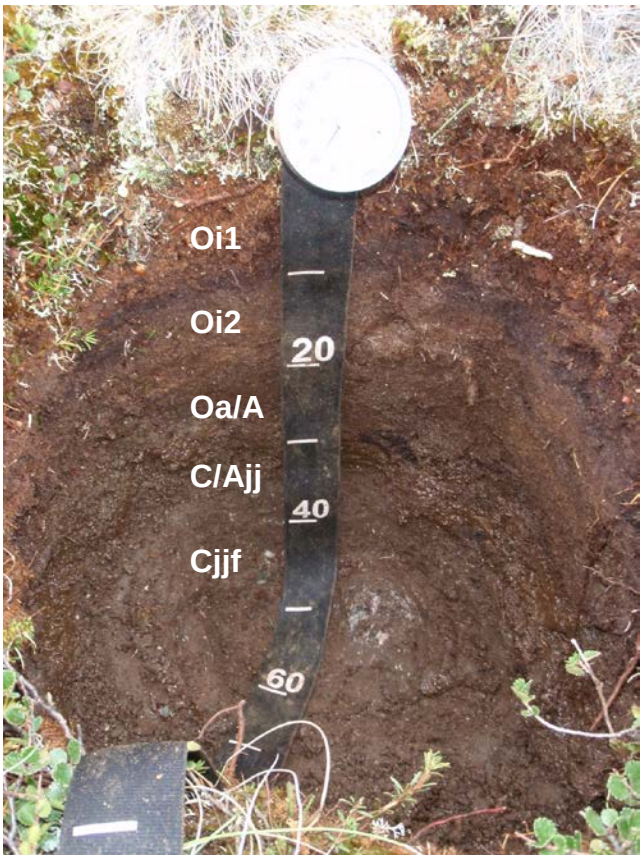
Oi1—0 to 12 centimeters; dark brown (7.5YR 3/2) slightly decomposed plant material; common medium and many very fine and fine roots; ultra acid (pH 3.4); clear smooth boundary.

Oi2—12 to 21 centimeters; black (7.5YR 2.5/1) slightly decomposed plant material; common medium, coarse, very fine, and fine roots; extremely acid (pH 4.3); clear smooth boundary.

Oa/A—21 to 24 centimeters; (Oa part) 85 percent very dark gray (10YR 3/1) highly decomposed plant material; and (A part) 15 percent very dark grayish brown (10YR 3/2) silt loam; 2 percent clay; massive; nonsticky and nonplastic; common medium, very fine, and fine roots; very strongly acid (pH 4.9); abrupt smooth boundary.

C/Ajj—24 to 39 centimeters; (C part) 82 percent dark grayish brown (10YR 4/2) and (A part) 15 percent very dark grayish brown (10YR 3/2) silt loam; 2 percent clay; and 3 percent black (10YR 2/1) highly decomposed plant material; massive, nonsticky and nonplastic; common very fine roots; very strongly acid (pH 4.9); clear wavy boundary.

Cjjf—39 to 152 centimeters; dark grayish brown (10YR 4/2) permanently frozen silt loam; 4 percent clay; massive, nonsticky and nonplastic; common very fine roots; strongly acid (pH 5.4).



Representative Pedon Location

Location in the survey area: Latitude 65°9´59˝ north, longitude 143°9´51˝ west

Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: -0.2 to –2 degrees C
Depth to contrasting textural stratification: 33 to 68 centimeters
Depth to permafrost: 35 to 90 centimeters
Thickness of the folistic epipedon: 21 to 41 centimeters

O horizon:
Color—hue of 7.5YR or 10YR, value of 2.5 to 4, chroma of 1 to 4
In lieu texture—slightly decomposed, moderately decomposed, or highly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—extremely acid to very strongly acid

A horizon (where present) and CAjj horizon:
Color—hue of 10YR or 2.5Y, value of 3 or 4, chroma of 1 to 3
Texture (less than 2 millimeters)—silt, silt loam, loam
Clay content—2 to 11 percent
Organic matter content—2 to 20 percent
Rock fragment content—0 to 5 percent
Reaction—extremely acid to neutral

Cjj horizon (where present) and Cjjf horizon:
Color—hue of 10YR, 2.5Y, or 5Y, or neutral; value of 1 to 4, chroma of 2 to 4
Texture (less than 2 millimeters)—silt loam, sandy loam, silt, coarse sandy loam
Clay content—2 to 11 percent
Rock fragment content—3 to 40 percent
Reaction—extremely acid to neutral

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Histoturbels in more gently sloping areas
- X1—Hydric Cryofibrists in depressions
- X1—Fluvaquentic Aquorthels in drainageways
- X1—Typic Haplocryepts and Typic Dystrocryepts on south-facing hill slopes and mountain slopes

Drainage and Saturated Hydraulic Conductivity

Drainage class: Poorly drained or somewhat poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high or high in the mineral layers, very low in the permafrost

Use and Vegetation

Use: Wildlife habitat
Vegetation: Boreal taiga/ericaceous woodland and subalpine tall scrub. In the boreal life zone, wildfire and post-fire succession result in a variety of herbaceous, scrub, and hardwood vegetation types.

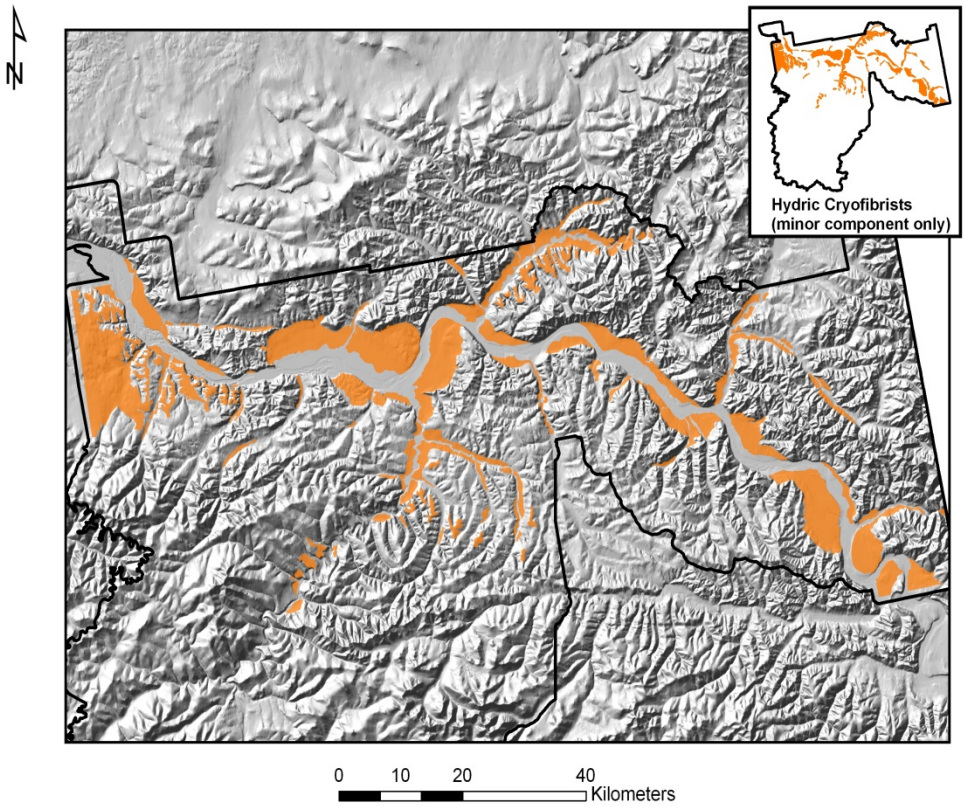
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Extensive throughout the boreal forests, minor in the alpine life zones of interior Alaska

Remarks

Diagnostic horizons and features:
Aquic conditions—zone from 26 to 39 centimeters
Depth to permafrost—39 centimeters
Folistic epipedon—zone from the surface to a depth of 24 centimeters
Soil temperature regime—gelic
Soil temperature class—subgelic

Hydric Cryofibrists



Taxonomic Classification

Hydric Cryofibrists

Setting

Depth class: Very deep
Drainage class: Very poorly drained
Landform: Depressions of hills and eolian plains
Parent material: Mossy organic material and/or grassy organic material
Elevation: 34 to 750 meters
Slope: 0 to 1 percent

Annual precipitation: 233 to 728 millimeters
Annual temperature: -5 to -1 degrees C
Frost-free period: 50 to 120 days

Taxonomic Families

• Dysic Hydric Cryofibrists
• Euic Hydric Cryofibrists

Representative Pedon Location

Location in the survey area: Latitude 65°6´7˝ north, longitude 142°40´37˝ west

Representative Pedon

Hydric Cryofibrists on a level slope in a depression of an eolian plain with sedge/sphagnum moss bog. (Colors are for saturated soil.)

Oi—0 to 62 centimeters; dark brown (7.5YR 3/4) peat; common fine and very fine roots throughout; noneffervescent; extremely acid (pH 3.8); clear smooth boundary.
Oe—62 to 72 centimeters; dark yellowish brown (10YR 4/4) mucky peat; common very fine roots throughout; noneffervescent; extremely acid (pH 4.1); clear smooth boundary.
W—72 to 103 centimeters; water; very strongly acid (pH 4.6).
Oe′—103 to 124 centimeters; dark yellowish brown (10YR 3/4) mucky peat; noneffervescent; extremely acid (pH 4.3); clear smooth boundary.
Oa—124 to 160 centimeters; very dark brown (10YR 2/2) muck; noneffervescent; extremely acid (pH 3.9); clear smooth boundary.
Cg—160 to 180 centimeters; 85 percent dark gray (10YR 4/1) silt loam; 35 percent sand, 61 percent silt, and 4 percent clay; moderate medium subangular blocky structure; friable, nonsticky and nonplastic; 5 percent fine distinct irregular dark gray (2.5Y 4/1) masses of reduced iron and 10 percent fine distinct irregular brown (7.5YR 4/4) masses of oxidized iron with clear boundaries in matrix; noneffervescent; strongly acid (pH 5.3).

Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: 1.5 to 3.5 degrees C
Depth to water layer: 45 to 110 centimeters
Depth to mineral layer: 82 to 152 centimeters or more
Thickness of histic epipedon: 45 to 110 centimeters

Oi horizon:
Color—hue of 7.5YR or 10YR, value of 3 to 5, chroma of 2 to 6
Organic matter content—70 to 95 percent
Reaction—extremely acid to slightly acid

C horizon:
Color—hue of 10YR or 2.5Y, value of 3 or 4, chroma of 1 or 2
Clay content—0 to 10 percent
Sand content—30 to 40 percent
Silt content—50 to 70 percent
Organic matter content—0 to 1 percent
Reaction—extremely acid to slightly acid

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Histoturbels on uplands adjacent to depressions
- X1—Glacic Folistels on rims and mounds of depressions
- X1—Typic Historthels on uplands adjacent to depressions

Drainage and Saturated Hydraulic Conductivity

Drainage class: Very poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately low to moderately high in the mineral layers

Use and Vegetation

Use: Wildlife habitat
Vegetation: Sedge-Sphagnum moss herbaceous and riparian community

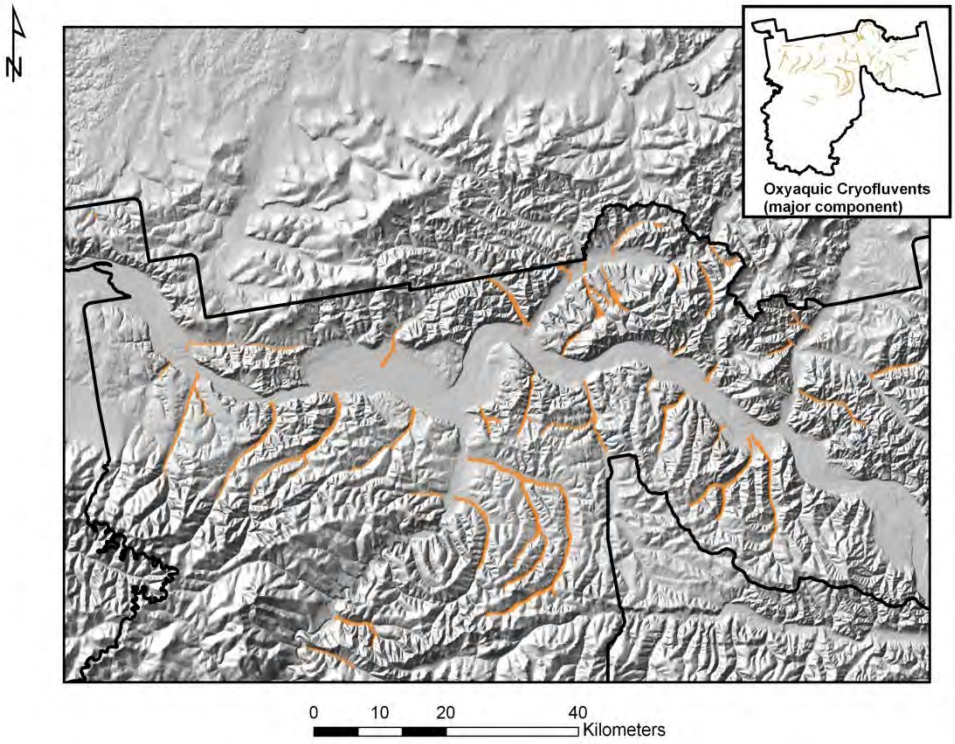
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Moderate throughout interior Alaska

Remarks

Diagnostic horizons and features:
Fibric soil material—zone from surface to a depth of 62 centimeters
Histic epipedon—zone from surface to a depth of 72 centimeters
Hemic soil material—zones from 62 to 72 centimeters and 103 to 124 centimeters
Sapric soil material—zone from surface to a depth of 124 to 160 centimeters
Aquic conditions—zone from surface to a depth of 180 centimeters
Redoximorphic concentrations—zone from 160 to 180 centimeters
Redoximorphic depletions with chroma of 2 or less—zone from 160 to 180 centimeters

Oxyaquic Cryofluvents



Taxonomic Classification

Oxyaquic Cryofluvents

Setting

Depth class: Very deep
Drainage class: Moderately well drained or somewhat poorly drained
Landform: Flood plains, drainageways
Parent material: Loamy alluvium over sandy and gravelly alluvium
Elevation: 307 to 970 meters
Slope: 3 to 20 percent
Annual precipitation: 244 to 688 millimeters
Annual temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Taxonomic Families

• Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryofluvents
• Sandy-skeletal, mixed Oxyaquic Cryofluvents

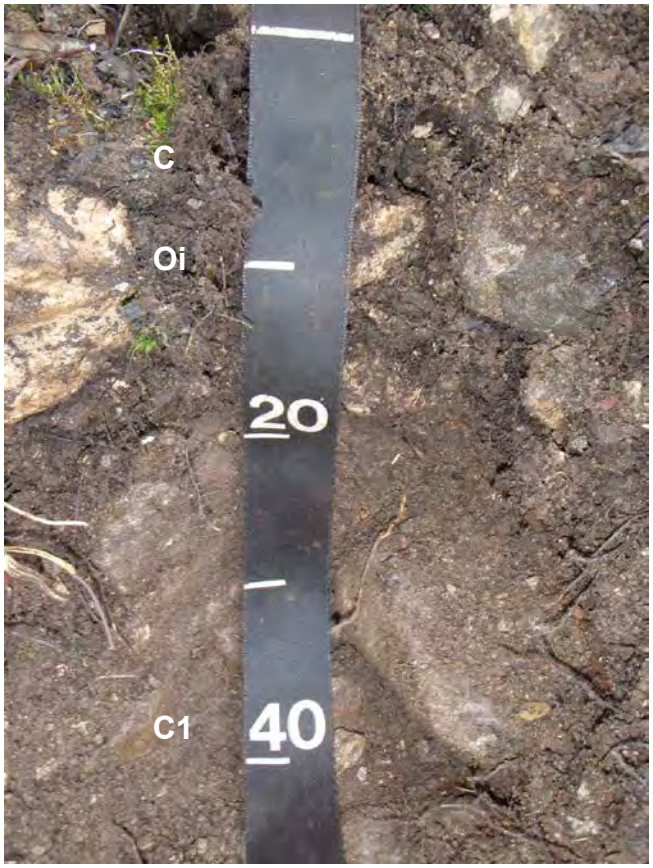
Representative Pedon Location

Location in the survey area: Latitude 65°21´44˝ north, longitude 141°41´27˝ west

Representative Pedon

Oxyaquic Cryofluvents in a sloping drainageway under mixed willow and alder shrub. (Colors are for moist soil; textures are apparent field textures.)

C—0 to 32 centimeters; very dark gray (2.5Y 3/1) fine sandy loam; 1 percent clay; massive; very friable; common very coarse, very fine, and fine roots throughout; noneffervescent; neutral (pH 7.2); abrupt smooth boundary.
Oi—32 to 35 centimeters; black (10YR 2/1), stratified peat; common very coarse, very fine, and fine roots throughout; noneffervescent; neutral (pH 7.2); abrupt smooth boundary.
C1—35 to 54 centimeters; black (2.5Y 2.5/1), stratified silt loam; 3 percent clay; massive; very friable; common very fine roots throughout; noneffervescent; neutral (pH 7.1).
C2—54 to 152 centimeters; very dark gray (2.5Y 3/1), stratified very gravelly sandy loam; 5 percent clay; massive; very friable; common very fine roots throughout; noneffervescent; neutral (pH 7.1).



Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -0.2 to 1.0 degrees C
Depth to contrasting textural stratification: 0 to 25 centimeters or more
Thickness of ochric epipedon: 0 to 25 centimeters

O horizon (where present):
Color—value of 2 or 3, chroma of 1 to 4
Texture—moderately decomposed plant material, slightly decomposed plant material

Organic matter content—60 to 90 percent
Reaction—strongly acid to neutral

AC horizon (where present):
Color—hue of 10YR to 5Y, value of 2 to 7, chroma of 1 to 6
Texture—stratified sand to silt, extremely cobbly coarse sand, extremely gravelly loamy coarse sand, stratified very fine sand to silt, stratified highly decomposed plant material to sand to silt
Clay content—0 to 10 percent
Silt content—0 to 30 percent
Sand content—60 to 95 percent
Organic matter content—0 to 2 percent
Rock fragment content—0 to 60 percent rounded indurated cobbles, 0 to 35 percent rounded indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 1.5
Reaction—very strongly acid to moderately alkaline

2C horizon (where present) and C horizon:
Color—hue of 10YR to 5Y, value of 2.5 to 7, chroma of 1 to 4
Texture—extremely cobbly coarse sand, extremely gravelly loamy coarse sand, extremely cobbly sand, extremely cobbly loamy coarse sand, extremely cobbly loamy sand
Clay content—0 to 5 percent
Silt content—0 to 15 percent
Sand content—75 to 95 percent
Rock fragment content—0 to 35 percent rounded indurated cobbles, 20 to 65 percent rounded indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 6
Reaction—strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

• X1—Typic Histoturbels on adjacent uplands
• X1—Typic Haplocryepts on more steeply sloping, south aspects
• X1—Hydric Cryofibrists in depressions of gently sloping uplands

Drainage and Saturated Hydraulic Conductivity

Drainage class: Moderately well drained or somewhat poorly drained
Saturated hydraulic conductivity: Very high in the organic layers (where present), moderately high to very high in the stratified sandy and silty surface layer (where present), very high in the sandy and gravelly substratum

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Mixed medium to tall alder and willow scrub and white spruce woodland

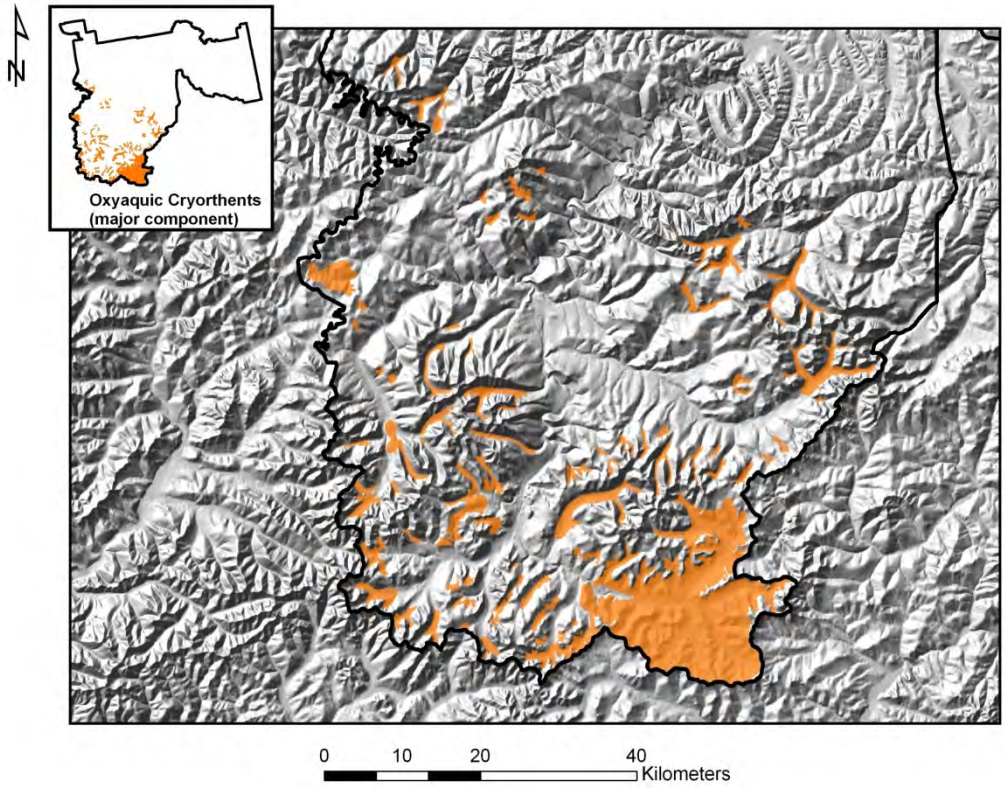
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Moderately extensive throughout the boreal forest life zones in interior Alaska

Remarks

Diagnostic horizons and features:
Soil temperature regime—cryic
Organic carbon—irregular decrease assumed based on buried organic layers and stratification
Oxyaquic conditions—within 1 meter of the surface

Oxyaquic Cryorthents



Taxonomic Classification

Oxyaquic Cryorthents

Setting

Depth class: Very deep
Drainage class: Moderately well drained or somewhat poorly drained
Landform: Flood plains, drainageways
Parent material: Loamy alluvium over sandy and gravelly alluvium
Elevation: 91 to 989 meters
Slope: 0 to 20 percent
Annual precipitation: 244 to 989 millimeters
Annual temperature: -7 to -1 degrees C
Frost-free period: 20 to 110 days

Taxonomic Family

• Sandy-skeletal, mixed Oxyaquic Cryorthents

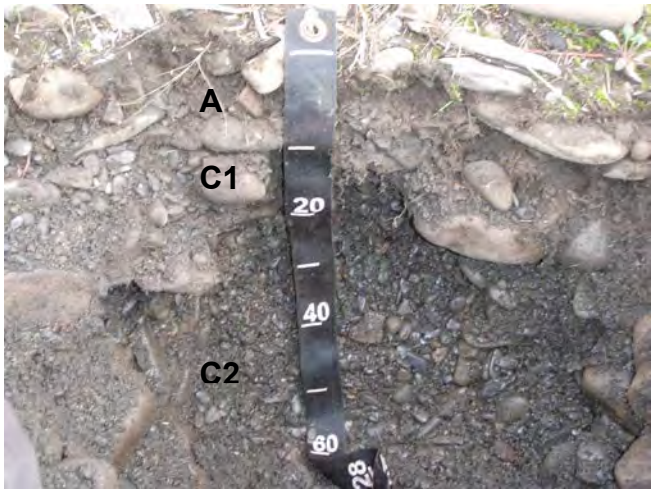
Representative Pedon

Oxyaquic Cryorthents on a nearly level slope of a flood plain under mixed willow and alder shrub. (Colors are for moist soil; textures are apparent field textures.)

A—0 to 3 centimeters; black (10YR 2/1) silt loam; 40 percent sand, 57 percent silt, and 3 percent clay; weak fine subangular blocky structure; very friable, nonsticky and nonplastic; common fine roots; electrical conductivity 6.4 millimhos per centimeter; noneffervescent; neutral (pH 6.6); clear wavy boundary.

C1—3 to 23 centimeters; very dark gray (5Y 3/1), stratified very cobbly loamy coarse sand; 83 percent sand, 14 percent silt, and 3 percent clay; weak fine angular blocky structure; very friable, nonsticky and nonplastic; common fine, medium, and very fine roots; 45 percent flat angular 2- to 150-millimeter unspecified fragments; electrical conductivity 5.6 millimhos per centimeter; very slightly effervescent; neutral (pH 6.8); gradual wavy boundary.

C2—23 to 152 centimeters; very dark gray (5Y 3/1), stratified extremely cobbly loamy coarse sand; 83 percent sand, 14 percent silt, and 3 percent clay; weak fine granular structure; very friable, nonsticky and nonplastic; common fine and very fine roots; 10 percent flat angular 150- to 380-millimeter unspecified fragments and 55 percent flat angular 2- to 150-millimeter unspecified fragments; electrical conductivity 5.9 millimhos per centimeter; very slightly effervescent; neutral (pH 7.2).



Representative Pedon Location

Location in the survey area: Latitude 65°24´14˝ north, longitude 142°38´38˝ west

Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -0.2 to 1.0 degree C
Depth to contrasting textural stratification: 0 to 25 centimeters or more
Thickness of ochric epipedon: 0 to 25 centimeters

O horizon (where present):
Color—value of 2 or 3, chroma of 1 to 4
Texture—moderately decomposed plant material, slightly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—strongly acid to neutral

AC horizon:
Color—hue of 10YR to 5Y, value of 2 to 7, chroma of 1 to 6
Texture—stratified sand to silt, extremely cobbly coarse sand, extremely gravelly loamy coarse sand, stratified very fine sand to silt, stratified highly decomposed plant material to sand to silt
Clay content—0 to 10 percent
Silt content—0 to 30 percent
Sand content—60 to 95 percent
Organic matter content—0 to 2 percent
Rock fragment content—0 to 60 percent rounded indurated cobbles, 0 to 35 percent rounded indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 1.5
Reaction—very strongly acid to moderately alkaline

2C horizon (where present) and C horizon:
Color—hue of 10YR to 5Y, value of 2.5 to 7, chroma of 1 to 4
Texture—extremely cobbly coarse sand, extremely gravelly loamy coarse sand, extremely cobbly sand, extremely cobbly loamy coarse sand, extremely cobbly loamy sand
Clay content—0 to 5 percent
Silt content—0 to 15 percent
Sand content—75 to 95 percent
Rock fragment content—0 to 35 percent rounded indurated cobbles, 20 to 65 percent rounded indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 6
Reaction—strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Cryorthents on slightly higher flood plains
- X1—Typic Cryofluvents on higher flood plains
- X1—Fluventic Haplorthels on highest flood plains
- X1—Terric Cryofibrists in depressions of flood plains

Drainage and Saturated Hydraulic Conductivity

Drainage: Moderately well drained or somewhat poorly drained
Saturated hydraulic conductivity: Very high in the organic layers (where present), moderately high to very high in the stratified sandy and silty surface layers (where present), very high in the gravelly substratum

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Mixed medium to tall alder and willow scrub and white spruce woodland

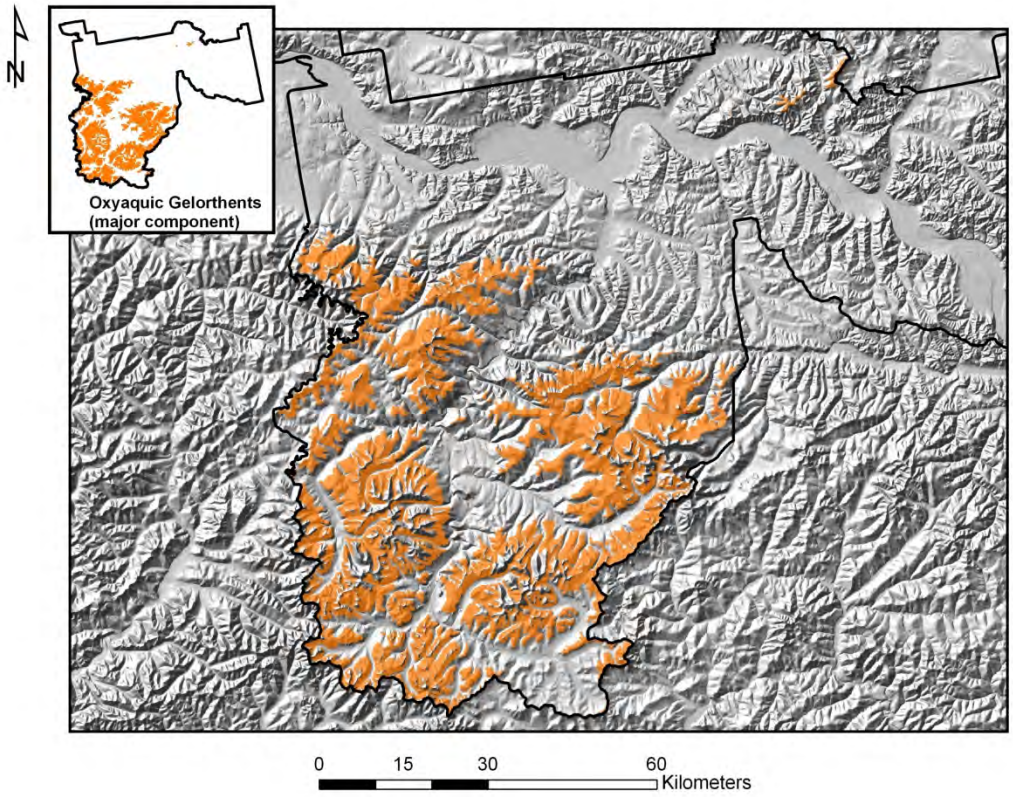
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Moderately extensive throughout the boreal forest life zones in interior Alaska

Remarks

Diagnostic horizons and features:
Ochric epipedon—0 to 3 centimeters
Soil temperature regime—cryic
Oxyaquic conditions—zone from 75 to 152 centimeters (estimated)

Oxyaquic Gelorthents



Taxonomic Classification

Oxyaquic Gelorthents

Setting

Depth class: Very deep
Drainage class: Somewhat poorly drained
Landform: Flood plains, solifluction lobes on mountains
Parent material: Sandy and gravelly alluvium, sandy and silty alluvium over sandy and gravelly alluvium, gravelly cryoturbate
Elevation: 609 to 1,500 meters
Slope: 0 to 5 percent
Annual precipitation: 372 to 1,229 millimeters

Annual temperature: -8 to -2 degrees C
Frost-free period: 50 to 80 days

Taxonomic Families

- Sandy-skeletal, mixed, subgelic Oxyaquic Gelorthents
- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, subgelic Oxyaquic Gelorthents
- Loamy-skeletal, mixed, superactive, nonacid, subgelic Oxyaquic Gelorthents
- Loamy-skeletal, mixed, superactive, acid, subgelic Oxyaquic Gelorthents

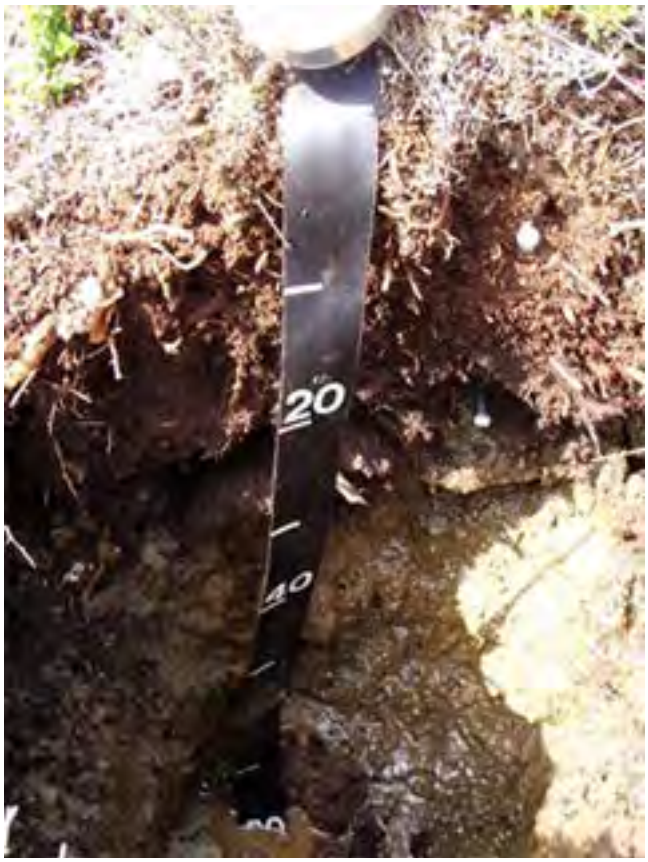
Representative Pedon Location

Location in the survey area: Latitude 65°5´34˝ north, longitude 143°23´15˝ west

Representative Pedon

Oxyaquic Gelorthents on a nearly level slope of a flood plain under mixed willow and alder shrub. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 3 centimeters; slightly decomposed plant material; clear irregular boundary.
AOa—3 to 17 centimeters; slightly decomposed plant material and very fine sandy loam; 55 percent sand, 40 percent silt, and 5 percent clay; friable; noneffervescent; slightly acid (pH 6.5); clear irregular boundary.
2C—17 to 152 centimeters; dark olive gray (5Y 3/2) extremely cobbly loamy coarse sand; 85 percent sand, 12 percent silt, and 3 percent clay; loose; 5 percent nonflat 250- to 600-millimeter granite fragments, 30 percent nonflat 2- to 75-millimeter granite fragments, and 30 percent nonflat 75- to 250-millimeter granite fragments; noneffervescent; neutral (pH 6.7).



Range in Characteristics

Soil moisture class: Oxyaquic
Depth to contrasting textural stratification: 2 to 12 centimeters

O horizon and O part of O/A and C/O horizons (where present):
Color—hue of 2.5YR to 10YR, value of 2 to 3, chroma of 1 to 4
Texture—moderately decomposed or slightly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—extremely acid to neutral

A/C and A horizons and A part of O/A horizon (where present):
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, chroma of 1 to 4
Texture—stratified sand to silt, silt loam
Clay content—0 to 10 percent
Silt content—10 to 75 percent
Sand content—15 to 85 percent
Organic matter content—2 to 6 percent
Rock fragment content—0 to 5 percent rounded indurated gravel
Electrical conductivity (millimhos per centimeter)—0 to 0.5
Reaction—extremely acid to slightly alkaline

C horizon and C part of C/O horizon (where present):
Color—hue of 7.5YR to 5Y, value of 2.5 to 7, chroma of 1 to 6
Texture—stratified sand to silt
Clay content—0 to 10 percent
Silt content—10 to 35 percent
Sand content—60 to 85 percent
Organic matter content—1 to 4 percent
Rock fragment content—0 to 5 percent rounded indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—very strongly acid to moderately alkaline

2C horizon (where present):
Color—hue of 10YR to 5Y, value of 2.5 to 7, chroma of 1 to 6
Texture—very cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly sand, extremely gravelly loamy coarse sand, extremely cobbly sand, very cobbly sand, very cobbly loamy coarse sand
Clay content—0 to 5 percent
Silt content—0 to 15 percent
Sand content—75 to 95 percent
Rock fragment content—20 to 65 percent rounded indurated gravel, 0 to 45 percent rounded indurated cobbles
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Gelorthents on flood plains
- X1—Typic Gelifluvents on flood plains
- X1—Typic Haplogelepts on mountains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Somewhat poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, where present; moderately high to very high in the silty or stratified sandy and silty layers; moderately low to high in the gravelly cryoturbate, where present; and very high in the sandy and gravelly substratum, where present

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Alpine willow scrub along flood plains, alpine shrub birch and ericaceous shrub scrub on solifluction lobes of mountains

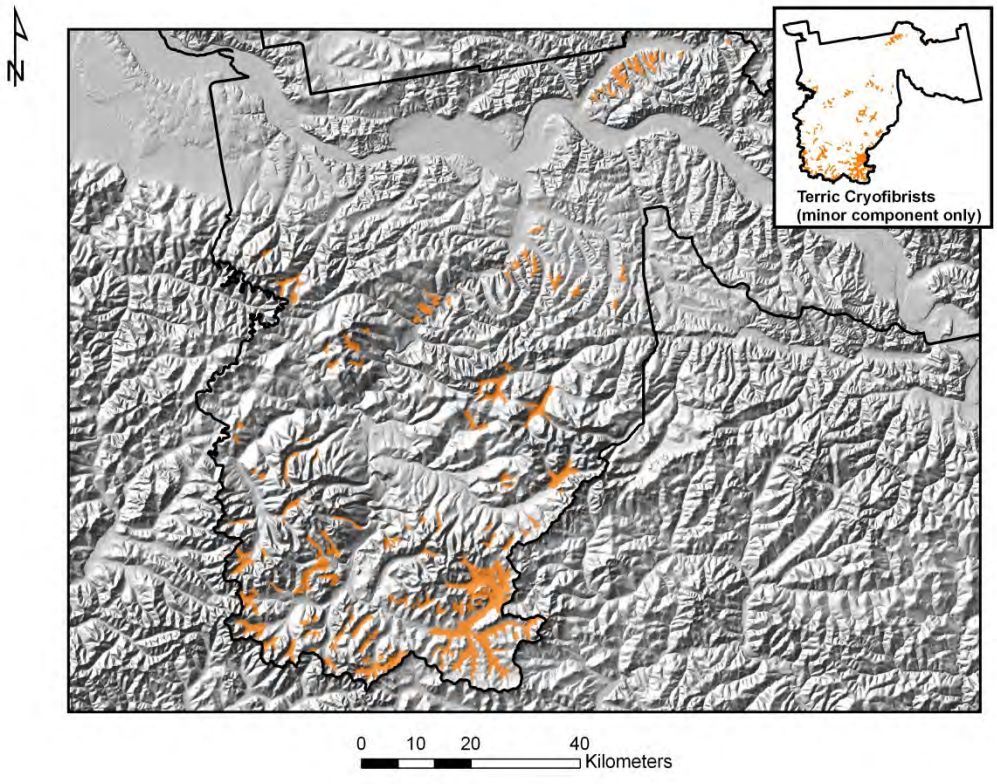
Distribution and Extent

Distribution: Throughout alpine areas of major land resource region X1
Extent: Minor in the alpine life zones in interior Alaska

Remarks

Diagnostic horizons and features:
Ochric epipedon—zone from surface to a depth of 20 centimeters
Assumed irregular decrease in organic carbon based on stratification—0 to 20 centimeters
Soil temperature regime—gelic
Soil temperature class—subgelic

Terric Cryofibrists



Taxonomic Classification

Terric Cryofibrists

Setting

Depth class: Very deep
Drainage class: Very poorly drained
Landform: Depressions of flood plains, alluvial fans, and stream terraces; toeslopes of mountains and hills; thermokarst depressions of plains
Parent material: Organic material over silty alluvium or eolian deposits, organic material over gravelly till or outwash deposits
Elevation: 121 to 366 meters
Slope: 0 to 1 percent
Annual precipitation: 254 to 356 millimeters
Annual temperature: -4 to -2 degrees C
Frost-free period: 60 to 135 days

Taxonomic Families

• Loamy, mixed, euic Terric Cryofibrists
• Loamy, mixed, dysic Terric Cryofibrists

Representative Pedon Location

Location in the survey area: Latitude 64°33´25˝ north, longitude 143°9´3˝ west

Representative Pedon

X1—Terric Cryofibrists; in a swale on a toeslope of a hill with graminoid wet meadow vegetation. (Colors are for saturated soil; textures are apparent field textures.)

Oi—0 to 44 centimeters; very dark grayish brown (10YR 3/2) peat; common fine, medium, and coarse roots throughout and many very fine roots throughout; noneffervescent; neutral (pH 6.7); clear smooth boundary.

Oe/Cg—44 to 63 centimeters; olive brown (2.5Y 4/3), stratified silt loam to mucky peat; common fine, medium, and very fine roots throughout; noneffervescent; neutral (pH 6.6); clear smooth boundary.

Cg—63 to 152 centimeters; dark gray (5Y 4/1) silt loam; 35 percent sand, 60 percent silt, and 5 percent clay; slightly sticky and nonplastic; common fine and very fine roots throughout; 10 percent nonflat 76- to 250-millimeter unspecified fragments; noneffervescent; neutral (pH 6.7).

Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: 1.5 to 2.5 degrees C
Depth to mineral soil: 41 to 100 centimeters
Thickness of histic epipedon: 41 to 100 centimeters

O horizon and O part of Cg/O horizon (where present):
Color—hue of 7.5YR to N 3/0, value of 2 to 4, chroma of 1 to 4
Texture—peat, peat with small amounts of very fine sandy loam or silt loam
Organic matter content—70 to 95 percent
Reaction—extremely acid to neutral

Cg horizon and Cg part of Cg/O horizon (where present):
Color—hue of 2.5Y to N 4/0, value of 2 to 4, chroma of 1 or 2
Texture—silt loam, very fine sandy loam, stratified fine sand to silt
Clay content—0 to 10 percent
Silt content—55 to 75 percent
Sand content—15 to 35 percent
Organic matter content—0 to 2 percent
Reaction—very strongly acid to slightly acid

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

• X1—Typic Cryofluvents on flood plains
• X1—Oxyaquic Cryorthents on flood plains

• X1—Typic Historthels on stream terraces
• X1—Typic Histoturbels on stream terraces, plains, mountains, and hills

Drainage and Saturated Hydraulic Conductivity

Drainage class: Very poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high to very high in the mineral soil

Use and Vegetation

Use: Wildlife habitat
Vegetation: Sedge-Sphagnum moss herbaceous and riparian community

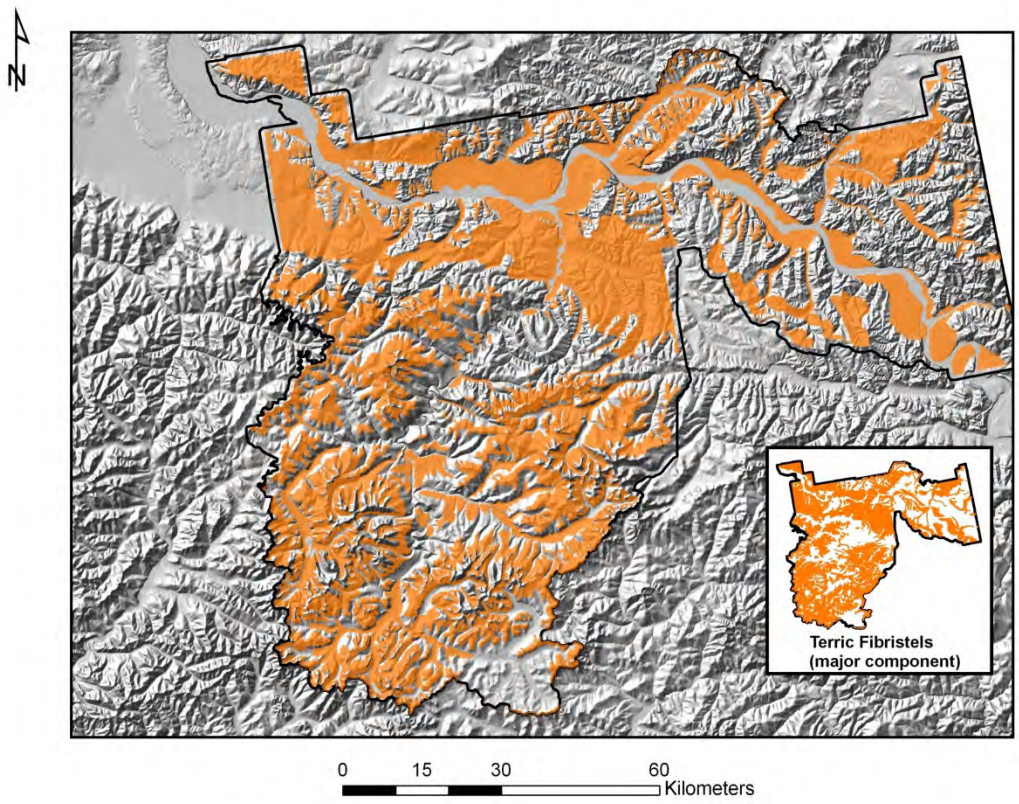
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Minor throughout interior Alaska

Remarks

Diagnostic horizons and features:
Histic epipedon—zone from surface to a depth of 63 centimeters
Gleyed matrix—zone from 63 to 152 centimeters
Soil temperature regime—cryic
Depth to mineral soil—63 centimeters

Terric Fibristels



Taxonomic Classification

Terric Fibristels

Setting

Depth class: Shallow or moderately deep
Drainage class: Very poorly drained
Landform: Drainageways and depressions of alluvial plains, glacial plains, eolian plains, fan terraces, and stream terraces
Parent material: Organic material over silty alluvium or eolian deposits, organic material over gravelly till or outwash deposits
Elevation: 203 to 1,200 meters
Slope: 0 to 20 percent
Annual precipitation: 234 to 705 millimeters
Annual temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Taxonomic Families

• Loamy, mixed, euic, subgelic Terric Fibristels
• Loamy, mixed, dysic, subgelic Terric Fibristels

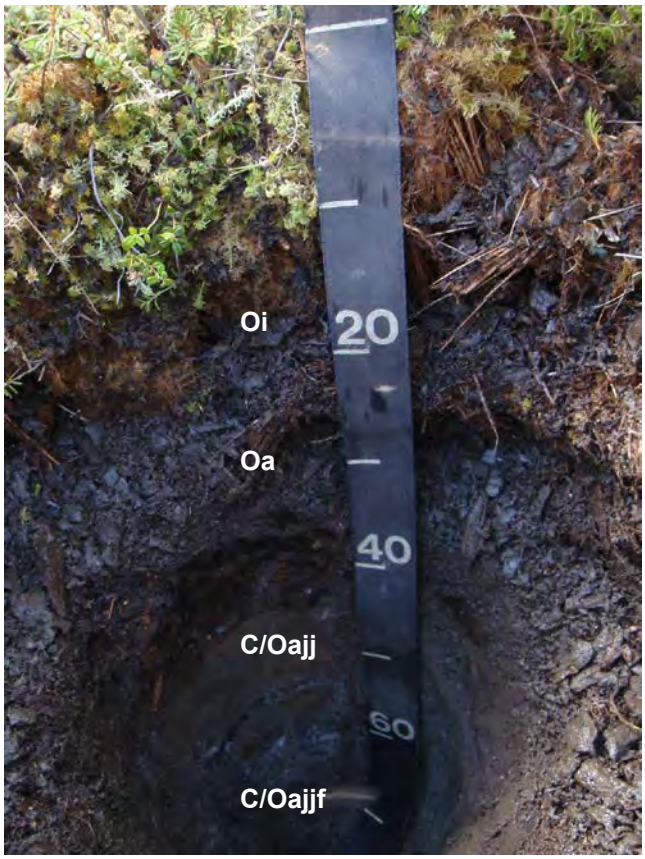
Representative Pedon Location

Location in the survey area: Latitude 65°9′16″ north, longitude 142°25′45″ west

Representative Pedon

X1—Terric Fibristels, on a fan terrace of an alluvial fan under black spruce and ericaceous shrub. (Colors are for saturated soil; textures are apparent field textures.)

Oi—0 to 29 centimeters; brown (7.5YR 4/4) peat, moist; common coarse, medium, fine, and very fine roots throughout; noneffervescent; strongly acid (pH 5.1); abrupt wavy boundary.
Oa—29 to 43 centimeters; black (10YR 2/1) muck, moist; common medium, fine, and very fine roots throughout; noneffervescent; strongly acid (pH 5.3); 5 percent coarse woody fragments; abrupt wavy boundary.
C/Oajj—43 to 67 centimeters; 80 percent dark gray (2.5Y 4/1) silt loam, moist; 35 percent sand, 61 percent silt, and 4 percent clay; weak thin platy structure; very friable, slightly sticky and nonplastic; common fine roots throughout; noneffervescent; strongly acid (pH 5.1); gradual irregular boundary.
C/Oajjf—67 to 72 centimeters; 90 percent dark gray (2.5Y 4/1) permanently frozen silt loam, moist; 35 percent sand, 61 percent silt, and 4 percent clay; weak thin platy structure; very friable, slightly sticky and nonplastic; noneffervescent; strongly acid (pH 5.2).



Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: -0.2 to –3.0 degrees C
Depth to contrasting textural stratification: 54 to 63 centimeters
Depth to permafrost: 54 to 63 centimeters
Thickness of histic epipedon: 54 to 63 centimeters

Oi horizon:
- Color—hue of 5YR to 10YR, value of 2 to 4, chroma of 1 to 4
- Rock fragment content—0 to 10 percent total, with 0 to 10 percent cobbles and 0 to 10 percent gravel
- Organic matter content—70 to 95 percent
- Reaction—extremely acid to slightly acid

A/Cgf horizon:
- Color of A part—hue 7.5YR to 2.5Y, value of 2 or 3, chroma of 1 to 3
- Color of Cgf part—hue 10YR to 5Y, value of 3 to 5, chroma of 1 or 2
- Texture—mucky silt loam, silt loam, very fine sandy loam
- Clay content—0 to 10 percent
- Silt content—45 to 75 percent
- Sand content—15 to 55 percent
- Rock fragment content—0 to 10 percent total, with 0 to 10 percent cobbles and 0 to 10 percent gravel
- Organic matter content—8 to 14 percent
- Reaction—very strongly acid to slightly acid

2Cf and 2Cg horizons (where present):
Color—hue 2.5Y or 5Y, value of 4 or 5, chroma of 1 to 3
Texture—fine sandy loam, loam
Clay content—3 to 10 percent
Silt content—35 to 55 percent
Sand content—35 to 55 percent
Rock fragment content—0 to 20 percent total, with 0 to 10 percent cobbles and 0 to 20 percent gravel
Organic matter content—8 to 14 percent
Reaction—very strongly acid to slightly acid

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Folistic Glacistels in adjacent convex positions
- X1—Folistic Haplorthels on adjacent uplands
- X1—Typic Histoturbels on adjacent uplands

Drainage and Saturated Hydraulic Conductivity

Drainage class: Very poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, very low in the permafrost

Use and Vegetation

Use: Wildlife habitat
Vegetation: Black spruce, mixed ericaceous shrubs, tussocks, Sphagnum moss, lichen

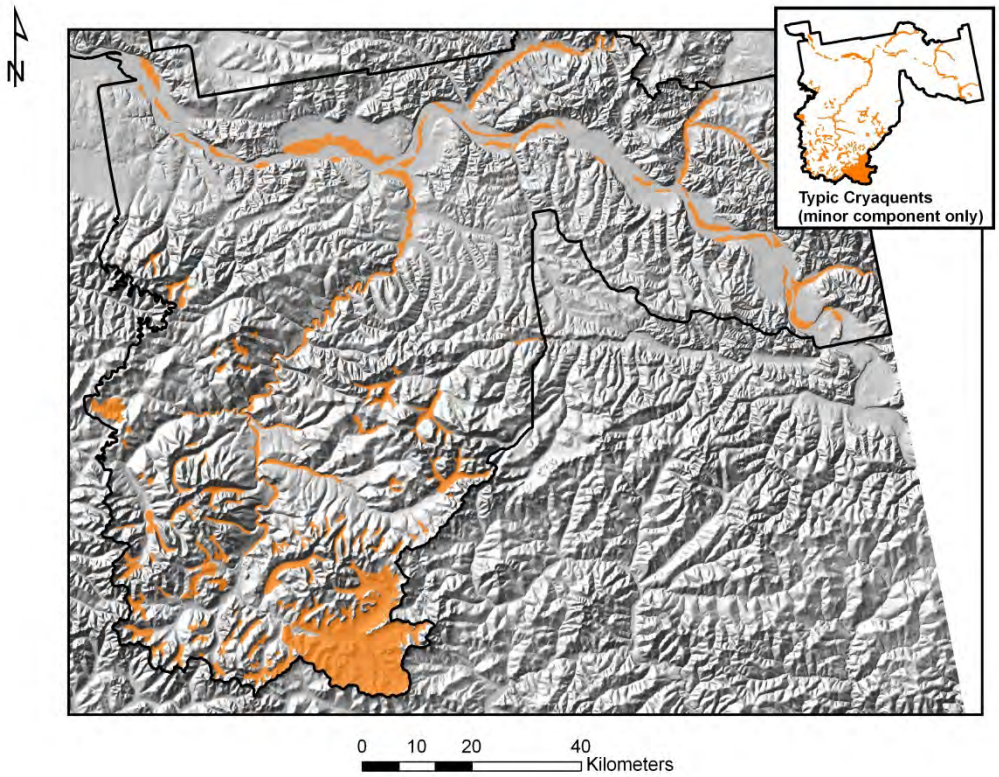
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Minor throughout interior Alaska

Remarks

Diagnostic horizons and features:
Histic epipedon—zone from surface to a depth of 59 centimeters
Gleyed matrix—zone from 59 to 152 centimeters
Depth to permafrost—54 to 63 centimeters
Soil temperature regime—gelic
Soil temperature class—subgelic
Depth to mineral soil—59 centimeters

Typic Cryaquents



Taxonomic Classification

Typic Cryaquents

Setting

Depth class: Very deep
Drainage class: Very poorly drained
Landform: Flood plains, drainageways
Parent material: Silty alluvium, stratified sandy to silty alluvium, stratified sandy to silty alluvium over sandy and gravelly alluvium
Elevation: 121 to 366 meters
Slope: 0 to 5 percent
Annual precipitation: 254 to 356 millimeters
Annual temperature: -4 to -2 degrees C
Frost-free period: 80 to 120 days

Taxonomic Families

- Coarse-silty, mixed, superactive, nonacid Typic Cryaquents
- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid Typic Cryaquents
- Sandy-skeletal, mixed Typic Cryaquents

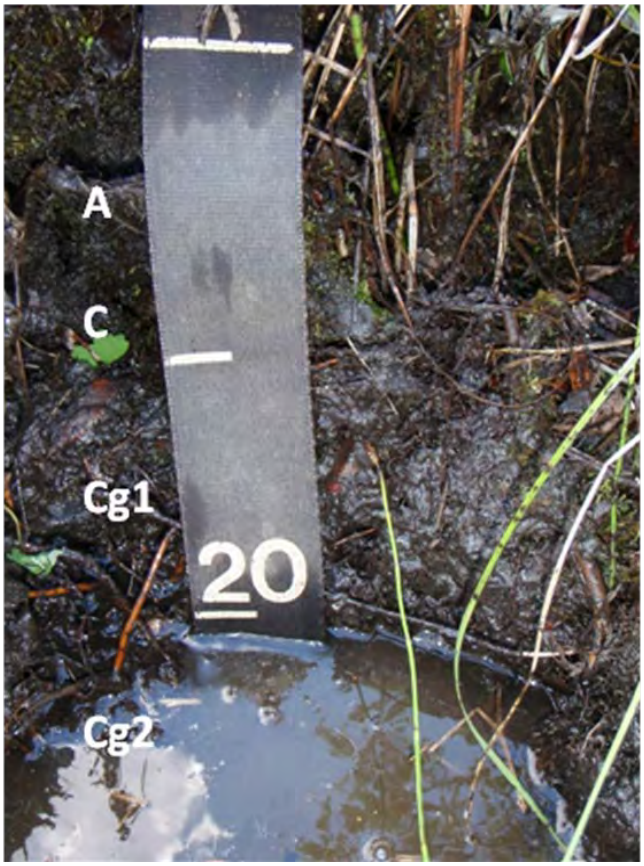
Representative Pedon Location

Location in the survey area: Latitude 64°32′42″ north, longitude 143°6′46″ west

Representative Pedon

Typic Cryaquents in a drainageway with willow and herbaceous vegetation. (Colors are for moist soil; textures are apparent field textures.)

A—0 to 6 centimeters; dark grayish brown (10YR 4/2) silt loam; 5 percent clay; nonsticky and nonplastic; common very fine and fine roots; slightly alkaline (pH 7.8); clear smooth boundary.
C—6 to 10 centimeters; brown (10YR 4/3) coarse sandy loam; 2 percent clay; nonsticky and nonplastic; common very fine and fine roots; moderately alkaline (pH 8.0); abrupt broken boundary.
Cg1—10 to 21 centimeters; 35 percent dark greenish gray (10Y 3/1) fine sandy loam and 65 percent dark greenish gray (10Y 4/1) very fine sandy loam; 5 percent clay; nonsticky and nonplastic; many very fine and fine roots; slightly alkaline (pH 7.7); clear wavy boundary.
Cg2—21 to 152 centimeters; black (N 2.5/0) silt loam; 5 percent clay; nonsticky and nonplastic; common very fine and fine roots; slightly alkaline (pH 7.8).



Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: 1 to 2 degrees C

O horizon (where present):
Color—hue of 7.5YR or 10YR, value of 2.5 to 4, chroma of 1 to 4
In lieu texture—slightly decomposed, moderately decomposed, or highly decomposed plant material

Organic matter content—60 to 90 percent
Reaction—strongly acid to neutral

A horizon:
Color—hue of 10YR, 2.5Y, or 5Y, value of 2, 3, or 4, chroma of 1 or 2
Reaction—slightly acid to slightly alkaline

Cg horizon:
Color—hue of 2.5Y, 5Y, or 10Y or neutral, value of 2.5 to 4, chroma of 1 to 3
Texture (less than 2 millimeters)—silt, silt loam, or sand, commonly stratified
Clay content—0 to 10 percent
Reaction—slightly acid to slightly alkaline

2Cg horizon (where present):
Color—variegated
Texture—sand, loamy sand, coarse sand, loamy coarse sand
Rock fragment content—0 to 65 percent gravel and cobbles
Reaction—slightly acid to slightly alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Histoturbels on adjacent uplands
- X1—Fluvaquentic Aquorthels in steeper drainageways
- X1—Typic Haplocryepts on adjacent upland, south-facing hill slopes and mountain slopes
- X1—Typic Dystrocryepts on adjacent upland, south-facing hill slopes and mountain slopes

Drainage and Saturated Hydraulic Conductivity

Drainage class: Very poorly drained
Saturated hydraulic conductivity: Moderately low to moderately high in the stratified or silty upper mineral layers, high in the underlying sand and gravel (where present)

Use and Vegetation

Use: Wildlife habitat
Vegetation: Boreal riparian scrub and riparian forests

Distribution and Extent

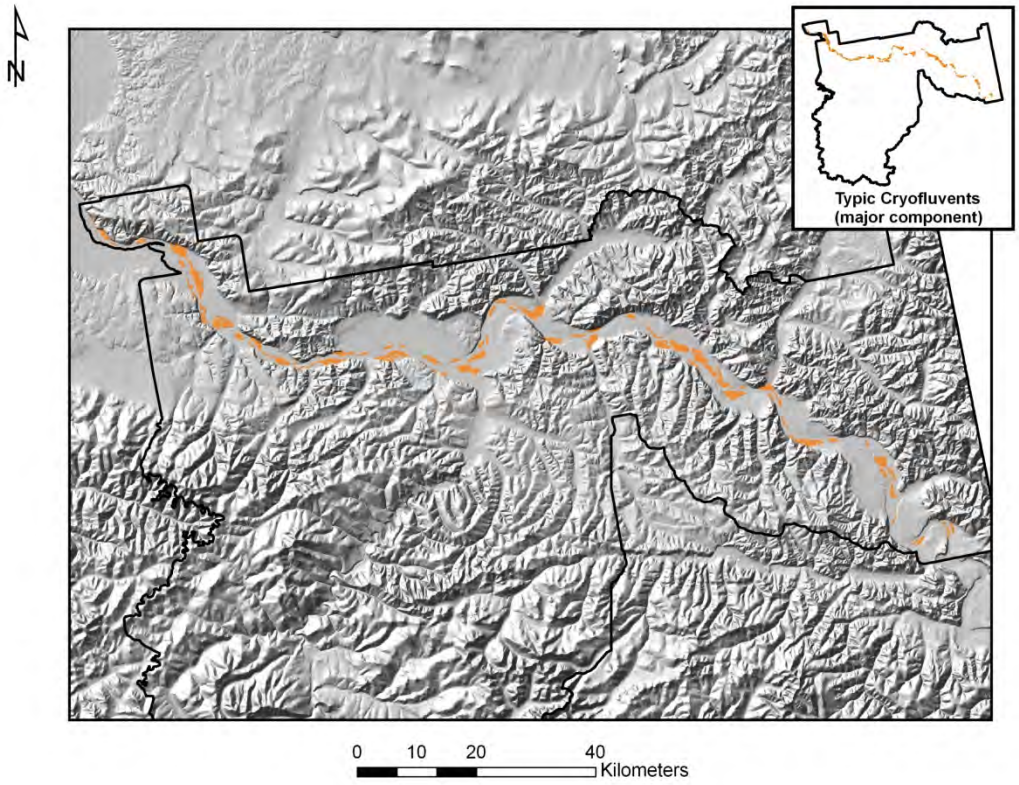
Distribution: Throughout major land resource region X1
Extent: Moderately extensive throughout the boreal forests and subalpine life zones of interior Alaska

Remarks

Diagnostic horizons and features:
Aquic conditions—zone from 4 to 152 centimeters
Soil temperature regime—cryic

Note: Irregular decrease in organic carbon throughout, based on stratification of sand, silt, and organic matter.

Typic Cryofluvents



Taxonomic Classification

Typic Cryofluvents

Setting

Depth class: Very deep
Drainage class: Somewhat excessively drained to moderately well drained
Landform: Flood plains
Parent material: Sandy and silty alluvium, sandy and silty alluvium over sandy and gravelly alluvium, gravelly alluvium
Elevation: 190 to 1,812 meters
Slope: 0 to 15 percent
Annual precipitation: 207 to 397 millimeters
Annual temperature: -5 to -3 degrees C
Frost-free period: 75 to 135 days

Taxonomic Families

- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid Typic Cryofluvents
- Coarse-loamy, mixed, superactive, nonacid Typic Cryofluvents
- Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents
- Coarse-silty, mixed, superactive, nonacid Typic Cryofluvents
- Sandy, mixed Typic Cryofluvents
- Sandy-skeletal, mixed Typic Cryofluvents
- Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous Typic Cryofluvents

Representative Pedon Location

Location in the survey area: Latitude 65°21´18˝ north, longitude 143°12´28˝ west.

Representative Pedon

Typic Cryofluvents on a nearly level slope of a flood plain under balsam poplar forest. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 3 centimeters; very dark grayish brown (10YR 3/2) slightly decomposed plant material; noneffervescent; neutral (pH 7.2; abrupt smooth boundary.

C—3 to 4 centimeters; dark gray (2.5Y 4/1) very fine sandy loam; 65 percent sand, 30 percent silt, and 5 percent clay; massive; very friable, nonsticky and nonplastic; common fine and very fine roots; very slightly effervescent; slightly alkaline (pH 7.5); abrupt smooth boundary.

Oi′—4 to 6 centimeters; dark brown (10YR 3/3) slightly decomposed plant material; common medium, fine, and very fine roots; noneffervescent; neutral (pH 7.0); abrupt smooth boundary.

C′—6 to 28 centimeters; very dark gray (2.5Y 3/1) very fine sandy loam; 60 percent sand, 35 percent silt, and 5 percent clay; massive; very friable, nonsticky and nonplastic; many coarse and medium and common very fine and fine roots; slightly effervescent; slightly alkaline (pH 7.6); clear smooth boundary.

Ab—28 to 33 centimeters; very dark grayish brown (2.5Y 3/2) very fine sandy loam, moist; 60 percent sand, 34 percent silt, and 6 percent clay; weak very fine subangular blocky structure; very friable, nonsticky and nonplastic; common very coarse, many coarse, and common medium, fine, and very fine roots; very slightly effervescent; slightly alkaline (pH 7.8); clear smooth boundary.

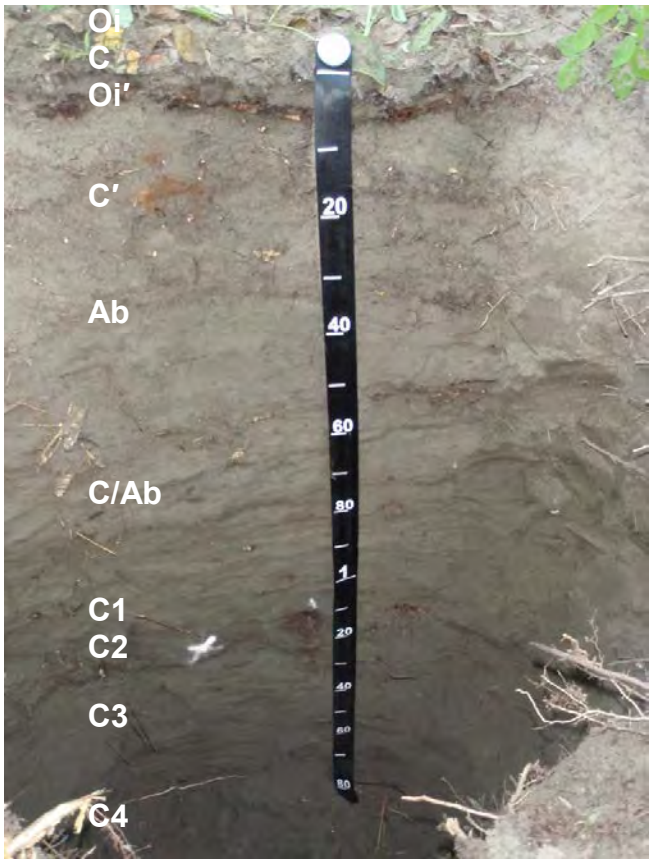
C″—33 to 51 centimeters; dark grayish brown (2.5Y 4/2) very fine sandy loam; 60 percent sand, 35 percent silt, and 5 percent clay; massive; very friable, nonsticky and nonplastic; common very coarse, coarse, medium, fine, and very fine roots; very slightly effervescent; moderately alkaline (pH 8); abrupt smooth boundary.

C/Ab—51 to 84 centimeters; 90 percent dark grayish brown (2.5Y 4/2) fine sandy loam and 10 percent very dark gray (2.5Y 3/1) very fine sandy loam; 60 percent sand, 35 percent silt, and 5 percent clay; massive; very friable, nonsticky and nonplastic; common very coarse, coarse, medium, fine, and very fine roots; very slightly effervescent; slightly alkaline (pH 7.7); abrupt smooth boundary.

C1—84 to 127 centimeters; dark gray (5Y 4/1) very fine sandy loam; 55 percent sand, 39 percent silt, and 6 percent clay; massive; friable, nonsticky and nonplastic; common coarse, medium, fine, and very fine roots; 1 percent well rounded 5- to 75-millimeter mixed rock fragments; slightly effervescent; moderately alkaline (pH 8.1); abrupt smooth boundary.

C2—127 to 132 centimeters; very dark gray (5Y 3/1) sandy loam; 70 percent sand, 27 percent silt, and 3 percent clay; massive; very friable, nonsticky and nonplastic; common coarse, medium, fine, and very fine roots; very slightly effervescent; moderately alkaline (pH 8.1); abrupt smooth boundary.

C3—132 to 152 centimeters; 82 percent dark olive gray (5Y 3/2) and 15 percent light olive gray (5Y 6/2), stratified fine sandy loam; 70 percent sand, 26 percent silt, 4 percent clay; massive; friable, nonsticky and nonplastic; common coarse, medium, fine, and very fine roots; 3 percent (common) fine olive yellow (2.5Y 6/8) masses of oxidized iron sharp; 2 percent well rounded 5- to 75-millimeter mixed rock fragments and 3 percent well rounded 2- to 5-millimeter mixed rock fragments; very slightly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary.



Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -0.2 to 1.0 degree C
Depth to contrasting textural stratification: 0 to 152 centimeters or more
Thickness of ochric epipedon: 0 to 3 centimeters

O horizon and O part of O/A and C/O horizons (where present):
Color—hue of 2.5YR to 10YR, value of 2 to 3, chroma of 1 to 4
Texture—moderately decomposed or slightly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—extremely acid to neutral

AC and A horizons and A part of O/A horizon (where present):
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, chroma of 1 to 4
Texture—stratified sand to silt, silt loam, stratified fine sand to silt
Clay content—0 to 10 percent
Silt content—10 to 75 percent
Sand content—15 to 85 percent
Organic matter content—2 to 6 percent
Rock fragment content—0 to 5 percent rounded, indurated gravel
Electrical conductivity (millimhos per centimeter)—0 to 0.5
Reaction—extremely acid to slightly alkaline

C horizon and C part of C/O horizon (where present):
Color—hue of 7.5YR to 5Y, value of 2.5 to 7, chroma of 1 to 6
Texture—stratified sand to silt, stratified fine sand to silt
Clay content—0 to 10 percent

Silt content—10 to 35 percent
Sand content—60 to 85 percent
Organic matter content—1 to 4 percent
Rock fragment content—0 to 5 percent rounded, indurated gravel
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—very strongly acid to moderately alkaline

2C horizon (where present):
Color—hue of 10YR to 5Y, value of 2.5 to 7, chroma of 1 to 6
Texture—very cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly sand, extremely gravelly loamy coarse sand, extremely cobbly sand, very cobbly sand, very cobbly loamy coarse sand
Clay content—0 to 5 percent
Silt content—0 to 15 percent
Sand content—75 to 95 percent
Rock fragment content—20 to 65 percent rounded, indurated gravel; 0 to 45 percent rounded, indurated cobbles
Calcium carbonate equivalent—0 to 5 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Cryorthents on lower flood plains
- X1—Oxyaquic Cryorthents on lower flood plains
- X1—Terric Cryofibrists in depressions of flood plains
- X1—Fluventic Haplorthels on higher flood plains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Somewhat excessively drained to moderately well drained
Saturated hydraulic conductivity: Very high in the organic layers (where present), moderately high to very high in the stratified sandy and silty layers, very high in the sandy and gravelly substratum (where present)

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Mixed alder and willow shrub and white spruce and balsam poplar forests

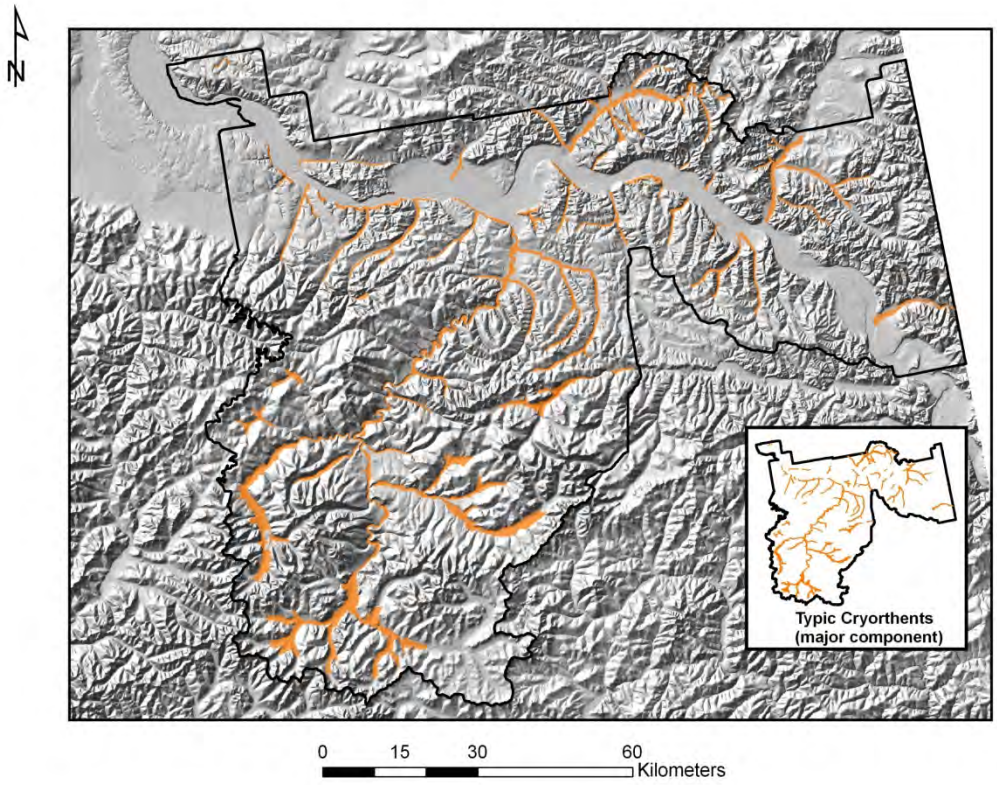
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Extensive throughout interior Alaska

Remarks

Diagnostic horizons and features:
Ochric epipedon—zone from 5 to 25 centimeters
Assumed irregular decrease in organic carbon (based on stratification and buried organic horizons)—5 to 92 centimeters
Soil temperature regime—cryic

Typic Cryorthents



Taxonomic Classification

Typic Cryorthents

Setting

Depth class: Shallow to very deep
Drainage class: Excessively drained to well drained
Landform: Flood plains, mountains, escarpments
Parent material: Sandy and silty alluvium, sandy and silty alluvium over sandy and gravelly alluvium, gravelly alluvium, gravelly colluvium
Elevation: 50 to 1,320 meters
Slope: 0 to 80 percent
Annual precipitation: 207 to 967 millimeters
Annual temperature: -15 to 2.5 degrees C
Frost-free period: 60 to 135 days

Taxonomic Families

- Sandy-skeletal, mixed Typic Cryorthents
- Fragmental, mixed, superactive, nonacid Typic Cryorthents
- Loamy-skeletal, mixed, superactive, nonacid Typic Cryorthents
- Coarse-loamy, mixed, superactive, nonacid Typic Cryorthents
- Loamy-skeletal, mixed, superactive, calcareous Typic Cryorthents

Representative Pedon Location

Location in the survey area: Latitude 65°20′57″ north, longitude 143°5′57″ west.

Representative Pedon

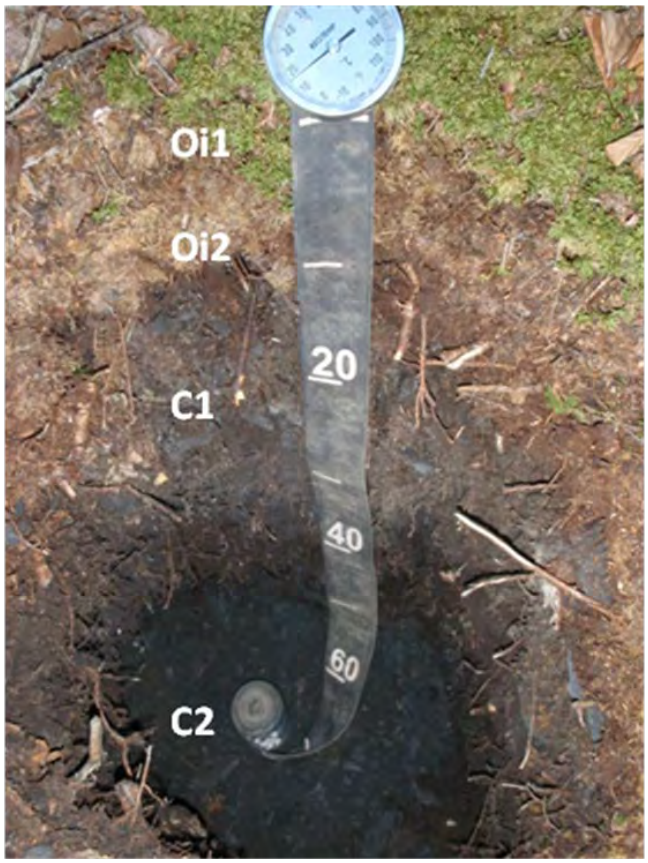
Typic Cryorthents on an escarpment with an 84-percent slope under mixed willow, alder, and balsam poplar shrub. (Colors are for moist soil; textures are apparent field textures.)

Oi1—0 to 9 centimeters; dark brown (10YR 3/3) slightly decomposed plant material; strongly acid (pH 5.5); clear smooth boundary.

Oi2—9 to 16 centimeters; very dark brown (10YR 2/2) slightly decomposed plant material; very strongly acid (pH 4.5); abrupt smooth boundary.

C1—16 to 31 centimeters; black (2.5Y 2.5/1) extremely cobbly coarse sandy loam; 60 percent sand, 38 percent silt, and 2 percent clay; massive; very friable; common coarse and medium, many fine, and common very fine roots; 20 percent rounded 5- to 75-millimeter unspecified fragments and 65 percent flat 2- to 150-millimeter unspecified fragments; noneffervescent; slightly acid (pH 6.3); gradual irregular boundary.

C2—31 to 152 centimeters; black (5Y 2.5/1) extremely cobbly coarse sandy loam; 65 percent sand, 26 percent silt, and 9 percent clay; massive; friable; common coarse, medium, fine, and very fine roots; 15 percent rounded 5- to 75-millimeter unspecified fragments and 55 percent flat 2- to 150-millimeter unspecified fragments; noneffervescent; slightly acid (pH 6.3).



Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -0.2 to 1.0 degrees C
Depth to contrasting textural stratification: 2 to 152 centimeters or more
Depth to paralithic bedrock: 25 to 152 centimeters or more
Depth to lithic bedrock: 50 to 152 centimeters or more
Thickness of ochric epipedon: 0 to 31 centimeters

O horizon and O part of O/A and C/O horizons (where present):
Color—hue of 2.5YR to 10YR, value of 2 or 3, chroma of 1 to 4
Texture—moderately decomposed or slightly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—extremely acid to neutral

AC and A horizons and A part of O/A horizon (where present):
Color—hue of 7.5YR to 2.5Y, value of 2 to 6, chroma of 1 to 4
Texture—stratified sand to silt, silt loam, loam
Clay content—0 to 10 percent
Silt content—10 to 75 percent
Sand content—15 to 85 percent
Organic matter content—2 to 6 percent
Rock fragment content—0 to 5 percent rounded, indurated gravel
Electrical conductivity (millimhos per centimeter)—0 to 0.5
Reaction—extremely acid to slightly alkaline

C horizon, and C part of C/O horizon (where present):
Color—hue of 7.5YR to 5Y, value of 2.5 to 7, chroma of 1 to 6
Texture—stratified sand to silt, stratified fine sand to silt
Clay content—0 to 10 percent
Silt content—10 to 35 percent
Sand content—60 to 85 percent
Organic matter content—1 to 4 percent
Rock fragment content—0 to 5 percent rounded, indurated gravel
Calcium carbonate equivalent—0 to 10 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—very strongly acid to moderately alkaline

2C horizon (where present):
Color—hue of 10YR to 5Y, value of 2.5 to 7, chroma of 1 to 6
Texture—very cobbly loamy coarse sand, extremely gravelly coarse sand, extremely cobbly sand, extremely gravelly loamy coarse sand, extremely cobbly sand, very cobbly sand, very cobbly loamy coarse sand, silty clay, clay
Clay content—0 to 65 percent
Silt content—0 to 40 percent
Sand content—25 to 95 percent
Rock fragment content—0 to 65 percent rounded, indurated gravel; 0 to 45 percent rounded, indurated cobbles
Calcium carbonate equivalent—0 to 12 percent
Electrical conductivity (millimhos per centimeter)—0 to 2
Reaction—strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Cryofluvents on flood plains
- X1—Oxyaquic Cryorthents on flood plains
- X1—Terric Cryofibrists in depressions of flood plains
- Rock outcrop and Rubble land on steep mountains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Excessively drained to well drained
Saturated hydraulic conductivity: Very high in the organic layers (where present), moderately high to very high in the loamy surface layer (where present), high to very high in the gravelly substratum

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Mixed alder and willow shrub and white spruce and balsam poplar forests on flood plains, alder and sparse vegetation on slopes of escarpments and steep mountains

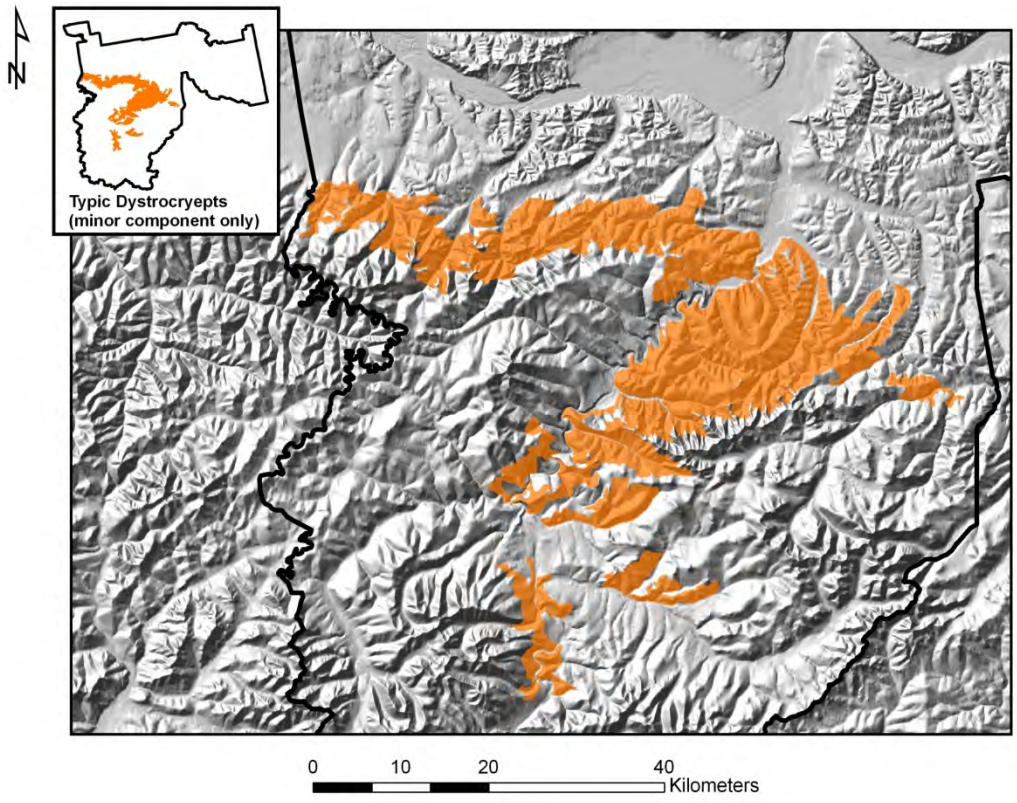
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Extensive throughout interior Alaska

Remarks

Diagnostic horizons and features:
Diagnostic horizons—none
Soil temperature regime—cryic

Typic Dystrocryepts



Taxonomic Classification

Typic Dystrocryepts

Setting

Depth class: Very shallow to very deep
Drainage class: Well drained
Landform: Hills, mountains
Parent material: Colluvium, loess over colluvium and/or residuum, loess over residuum derived from schist or granite
Elevation: 152 to 890 meters
Slope: 3 to 70 percent
Aspect: Slopes of less than 15 percent—non-influencing, slopes of more than 15 percent—southeast, south, southwest
Annual precipitation: 254 to 486 millimeters
Annual temperature: -7 to 2 degrees C
Frost-free period: 75 to 120 days

Taxonomic Families

• Loamy-skeletal, mixed, superactive, shallow Typic Dystrocryepts
• Coarse-loamy, mixed, superactive Typic Dystrocryepts

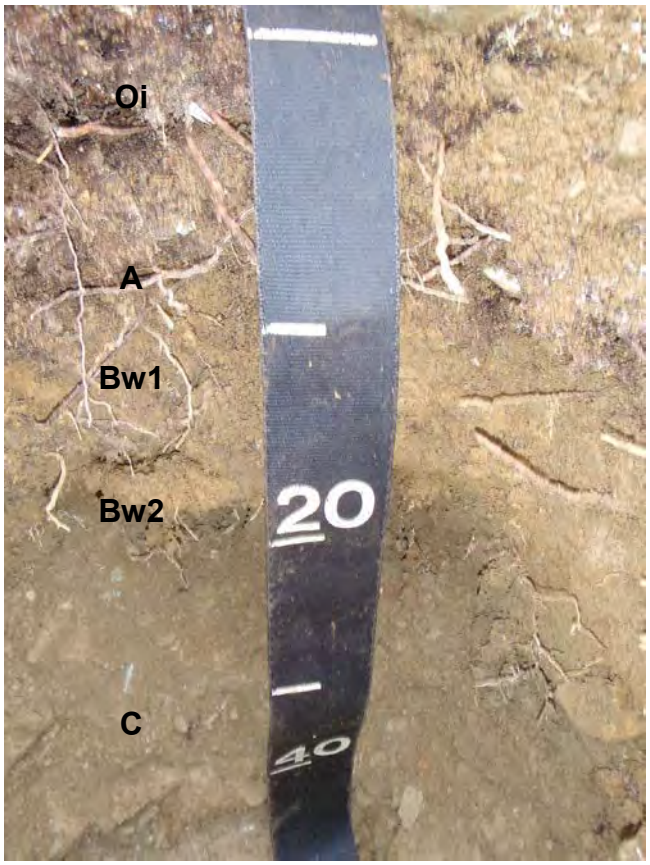
Representative Pedon Location

Location in the survey area: Latitude 65°13´20˝ north, longitude 142°53´23˝ west

Representative Pedon

X1—Typic Dystrocryepts on a nearly level slope of a high flood plain with white spruce forest. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 4 centimeters; very dark grayish brown (10YR 3/2) slightly decomposed plant material; common medium, very fine, and fine roots; extremely acid (pH 4.3); clear smooth boundary.
A—4 to 6 centimeters; very dark brown (10YR 2/2) gravelly silt loam; 3 percent clay; weak very fine granular structure; very friable, nonsticky and nonplastic; common medium, coarse, very fine, and fine roots; 10 percent fine gravel; extremely acid (pH 4.4); clear smooth boundary.
Bw1—6 to 16 centimeters; yellowish brown (10YR 5/6) very gravelly sandy loam; 2 percent clay; weak very fine angular blocky structure; very friable, nonsticky and nonplastic; common medium, very fine, and fine roots; 30 percent fine gravel; very strongly acid (pH 4.6); gradual smooth boundary.
Bw2—16 to 23 centimeters; light olive brown (2.5Y 5/6) very gravelly sandy loam; 2 percent clay; weak very fine granular structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 30 percent fine gravel; strongly acid (pH 5.2); gradual smooth boundary.
C—23 to 152 centimeters; light yellowish brown (2.5Y 6/4) extremely gravelly sandy loam; 2 percent clay; massive; friable, nonsticky and nonplastic; common fine roots; 40 percent fine gravel; strongly acid (pH 5.1).



Range in Characteristics

Soil moisture class: Udic
Soil temperature regime: Cryic
Depth to lithic bedrock: 50 to 152 centimeters or more
Depth to paralithic bedrock: 22 to 152 centimeters or more

O horizon:
Color—hue of 2.5YR to 10YR, value of 2 to 3, chroma of 1 to 4
Texture—moderately decomposed plant material or slightly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—ultra acid to very strongly acid

A horizon, and AE horizon (where present):
Color—hue of 7.5YR or 10YR, value of 2 to 4, chroma of 1 to 3
Texture—silt loam, very fine sandy loam
Clay content—3 to 14 percent
Organic matter content—2 to 4 percent
Reaction—extremely acid to very strongly acid

Bw horizon, and 2Bw horizon (where present):
Color—hue of 7.5YR to 2.5Y, value of 3 to 5, chroma of 3 to 6
Texture—silt loam, silt, sandy loam, very fine sandy loam
Clay content—3 to 14 percent
Rock fragment content—0 to 60 percent gravel, cobbles, channers, and flagstones
Reaction—strongly acid or moderately acid

BC and 2BC horizons (where present):
Texture (less than 2 millimeters)—silt loam, loam, sandy loam
Clay content—1 to 14 percent
Rock fragment content—0 to 75 percent gravel, cobbles, channers, and flagstones
Reaction—strongly acid or moderately acid

C horizon, and 2C horizon (where present):
Color—hue of 7.5YR to 2.5Y, value of 3 to 6, chroma of 3 or 4
Texture—loam, very fine sandy loam, silt loam, sandy loam, coarse sandy loam
Clay content—2 to 15 percent
Rock fragment content—35 to 85 percent gravel, cobbles, channers, and flagstones
Reaction—strongly acid to slightly acid

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Histoturbels on more gently sloping footslopes and toeslopes
- X1—Folistic Haplorthels on steep, north aspects

Drainage and Saturated Hydraulic Conductivity

Drainage class: Well drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately slow in the mineral layers

Use and Vegetation

Use: Wildlife habitat, source of forest products
Vegetation: Subalpine spruce, dwarf birch, mixed dwarf shrub woodland

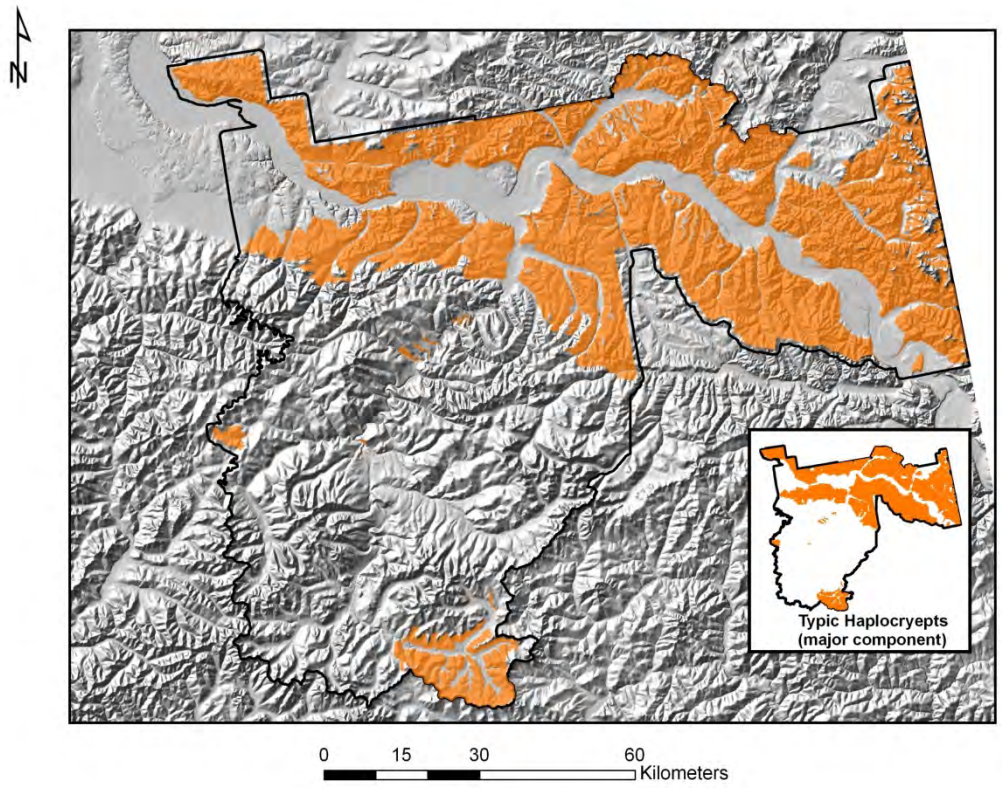
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Moderate throughout interior Alaska in areas underlain by schist, granite, and other acid bedrock

Remarks

Diagnostic horizons and features:
Ochric epipedon—zone from 4 to 6 centimeters
Cambic horizon—zone from 6 to 23 centimeters
Soil temperature regime—cryic
Soil moisture regime—udic

Typic Haplocryepts



Taxonomic Classification

Typic Haplocryepts

Setting

Depth class: Moderately deep to very deep
Drainage class: Well drained to somewhat excessively drained
Landform: Hills, mountains
Parent material: Gravelly colluvium, silty eolian deposits over gravelly colluvium
Elevation: 240 to 1,275 meters
Slope: 1 to 85 percent
Annual precipitation: 245 to 688 millimeters
Annual temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Taxonomic Families

• Loamy-skeletal, mixed, superactive Typic Haplocryepts
• Fragmental, mixed Typic Haplocryepts

Representative Pedon Location

Location in the survey area: Latitude 65°36´29˝ north, longitude 143°44´29˝ west

Representative Pedon

Typic Haplocryepts on a backslope of a hill with a slope of 14 percent and under white spruce forest. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 8 centimeters; slightly decomposed plant material.
A—8 to 15 centimeters; very dark gray (10YR 3/1) silt loam; 28 percent sand, 69 percent silt, and 3 percent clay; 1 percent nonflat 75- to 250-millimeter schist fragments, 2 percent flat 2- to 150-millimeter schist fragments, and 10 percent nonflat 2- to 75-millimeter schist fragments; strongly acid (pH 5.2).
2Bw—15 to 31 centimeters; dark grayish brown (10YR 4/2) gravelly silt loam; 30 percent sand, 66 percent silt, and 4 percent clay; moderate medium subangular blocky structure; 2 percent flat 2- to 50-millimeter schist fragments, 3 percent nonflat 75- to 250-millimeter schist fragments, and 15 percent nonflat 2- to 75-millimeter schist fragments; strongly acid (pH 5.4).
2C1—31 to 63 centimeters; 95 percent grayish brown (10YR 5/2) gravelly very fine sandy loam; 65 percent sand, 30 percent silt, and 5 percent clay; 5 percent fine masses of oxidized iron; 16 percent nonflat 2- to 75-millimeter schist fragments; slightly acid (pH 6.1).
2C2—63 to 152 centimeters; dark grayish brown (10YR 4/2) very gravelly very fine sandy loam; 72 percent sand, 20 percent silt, and 8 percent clay; 4 percent flat 2- to 150-millimeter schist fragments and 48 percent nonflat 2- to 75-millimeter schist fragments; slightly acid, (pH 6.5).

Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: 1 to 2 degrees C
Depth to bedrock: 50 to more than 152 centimeters
Thickness of ochric epipedon: 2 to 9 centimeters
Thickness of cambic horizon: 5 to 58 centimeters

Oi horizon:
Color—hue of 5YR to 10YR, value of 2 or 3, chroma of 1 to 4
Texture—slightly decomposed plant material, moderately decomposed plant material
Organic matter content—60 to 90 percent
Reaction—extremely acid to moderately acid

A horizon:
Color—hue of 7.5YR to 2.5Y, value of 2 to 5, chroma of 1 to 3
Texture—silt loam, loam, silt, sandy loam
Textural modifiers (where present): Gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, extremely cobbly
Clay content—2 to 15 percent
Silt content—30 to 75 percent
Sand content—25 to 50 percent
Organic matter content—4 to 12 percent
Rock fragment content—0 to 60 percent gravel, 0 to 25 percent cobbles, 0 to 5 percent boulders
Reaction—ultra acid to very strongly acid

2Bw horizon, and Bw horizon (where present):
Color—hue of 7.5YR to 2.5Y, value of 3 to 5, chroma of 3 or 4
Texture—silt loam, sandy loam, loam
Textural modifiers—gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, extremely cobbly
Clay content—0 to 15 percent
Silt content—20 to 60 percent
Sand content—35 to 80 percent
Organic matter content—1 to 4 percent
Rock fragment content—0 to 35 percent cobbles, 0 to 60 percent gravel, 0 to 60 percent channers, 0 to 25 percent stones, 0 to 15 percent flagstones
Reaction—extremely acid to strongly acid

C and Ck horizons (where present) and 2C horizon:
Color—hue of 10YR to 5Y, value of 2 to 5, chroma of 1 to 4
Texture—silt loam, sandy loam, coarse sandy loam, loam, loamy very fine sand
Clay content—0 to 15 percent
Silt content—20 to 60 percent
Sand content—35 to 80 percent
Rock fragment content—0 to 35 percent cobbles, 0 to 60 percent gravel, 0 to 30 percent flagstones, 0 to 60 percent channers, 0 to 25 percent stones
Reaction—very strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Historthels on hills
- X1—Typic Histoturbels on hills, plains, and terraces
- X1—Folistic Haplorthels on steep, north aspects of mountains and hills

Drainage and Saturated Hydraulic Conductivity

Drainage class: Well drained
Saturated hydraulic conductivity: Very high in the organic mat, moderately high or high in the mineral soil layers

Use and Vegetation

Use: Wildlife habitat, agriculture, forestry, urban development
Vegetation: Native late succession—primarily spruce forest; wildfire and post-fire succession—variety of herbaceous, scrub, and hardwood communities

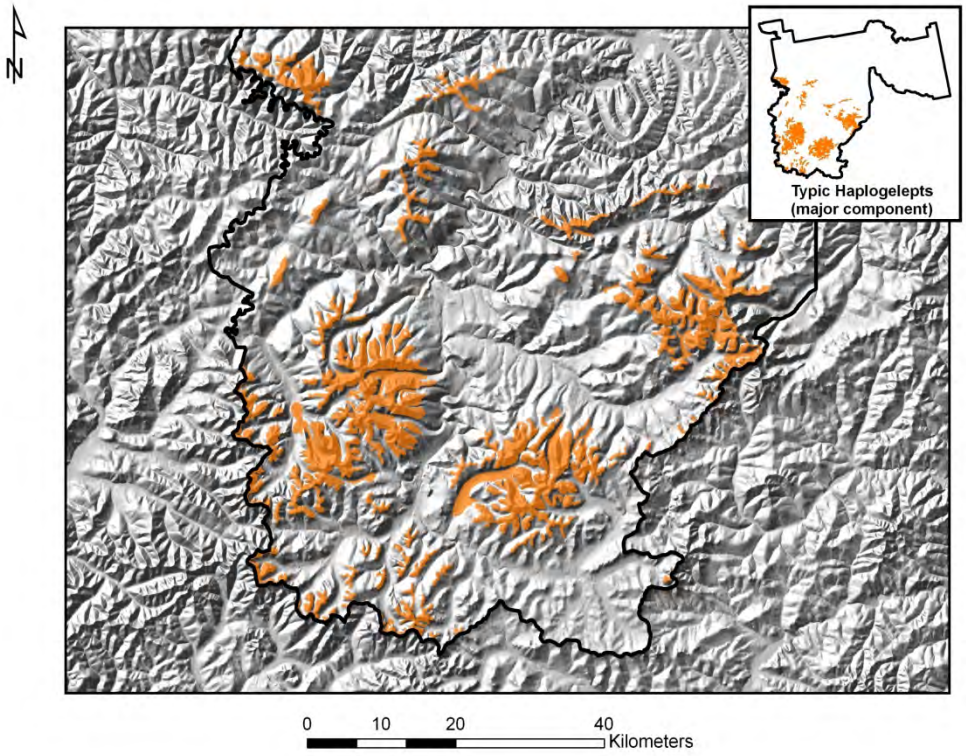
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Extensive throughout interior Alaska

Remarks

Diagnostic horizons and features:
Ochric epipedon—zone from 8 to 15 centimeters
Cambic horizon—zone from 15 to 31 centimeters
Soil temperature regime—cryic
Soil moisture regime—udic

Typic Haplogelepts



Taxonomic Classification

Typic Haplogelepts

Setting

Depth class: Shallow to very deep
Drainage class: Well drained or somewhat excessively drained
Landform: Mountains
Parent material: Gravelly cryoturbate, organic material over gravelly cryoturbate, gravelly colluvium derived from acid igneous rock

Elevation: 1,000 to 2,300 meters
Slope: 1 to 70 percent
Annual precipitation: 372 to 824 millimeters
Annual temperature: -7 to -2 degrees C
Frost-free period: 30 to 70 days

Taxonomic Families

• Loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts
• Loamy-skeletal, mixed, superactive, nonacid, subgelic Typic Haplogelepts

Representative Pedon Location

Location in the survey area: Latitude 64°43´43″ north, longitude 142°53´41″ west

Representative Pedon

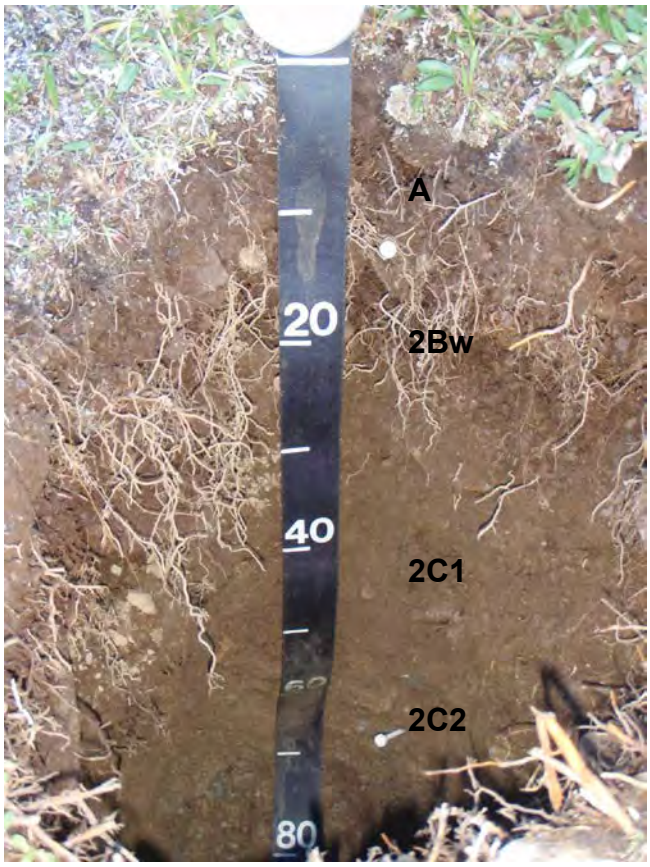
Typic Haplogelepts on the backslope of a glaciated hill with a 16-percent slope and alpine scrub vegetation

Oi—0 to 3 centimeters; dark brown (10YR 3/3) slightly decomposed plant material; common medium, very fine, and fine roots throughout; noneffervescent; very strongly acid (pH 4.8); clear smooth boundary.

A—3 to 12 centimeters; very dark gray (10YR 3/1) silt loam; 5 percent clay; weak fine granular structure; very friable, slightly sticky and nonplastic; common medium, very fine, and fine roots throughout; 9 percent fine gravel; noneffervescent; very strongly acid (pH 5.0); clear smooth boundary.

2Bw—12 to 30 centimeters; brown (10YR 4/3) very cobbly silt loam; 5 percent clay; moderate fine subangular blocky structure; friable, slightly sticky and nonplastic; common medium, very fine, and fine roots throughout; 10 percent fine gravel and 15 percent cobbles; noneffervescent; moderately acid (pH 5.8); gradual wavy boundary.

2C—30 to 152 centimeters; dark grayish brown (2.5Y 4/2) very gravelly silt loam; 5 percent clay; weak fine granular structure; very friable, nonsticky and nonplastic; common very fine and fine roots throughout; 15 percent fine gravel and 15 percent cobbles; noneffervescent; moderately acid (pH 5.6).



Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -0.2 to –3 degrees C
Thickness of ochric epipedon: 1 to 15 centimeters
Thickness of cambic horizon: 10 to 67 centimeters

Oi horizon:
- Texture—slightly decomposed plant material, moderately decomposed plant material
- Organic matter content—60 to 90 percent
- Rock fragment content—0 to 2 percent cobbles, channers, flagstones, and gravel
- Reaction—extremely acid to moderately acid

A horizon:
- Color—hue of 10R to 10YR, value of 2 to 4, chroma of 1 to 4
- Texture—silt loam, highly organic silt loam, loam
- Clay content—2 to 15 percent
- Organic matter content—4 to 12 percent
- Rock fragment content—5 to 35 percent gravel, cobbles, channers, flagstones, and stones
- Reaction—extremely acid to slightly acid

2Bw horizon, and Bw horizon (where present):
- Color—hue of 7.5YR to 2.5Y, value of 3 to 5, chroma of 3 to 6
- Texture—coarse sandy loam, sandy loam, silt loam, loam
- Clay content—2 to 15 percent
- Organic matter content—0 to 6 percent

Rock fragment content—15 to 65 percent gravel, cobbles, channers, flagstones, and stones
Reaction—extremely acid to slightly acid

2C horizon, and C horizon (where present):
Color—hue of 10YR to 5Y, value of 2.5 to 6, chroma of 1 to 8
Texture—silt loam, sandy loam, coarse sandy loam, fine sandy loam
Clay content—2 to 15 percent
Rock fragment content—35 to 80 percent gravel, cobbles, channers, flagstones, and stones
Calcium carbonate equivalent—0 to 1 percent
Electrical conductivity (millimhos per centimeter)—0 to 0.5
Reaction—very strongly acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Terric Cryofibrists in depressions
- X1—Typic Historthels on broad summits and toeslopes of hills and mountains
- X1—Typic Histoturbels on broad summits and toeslopes of hills and mountains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Well drained or somewhat excessively drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high to very high in the mineral soil layers

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Alpine dwarf or medium scrub communities, commonly with a high percentage of lichen

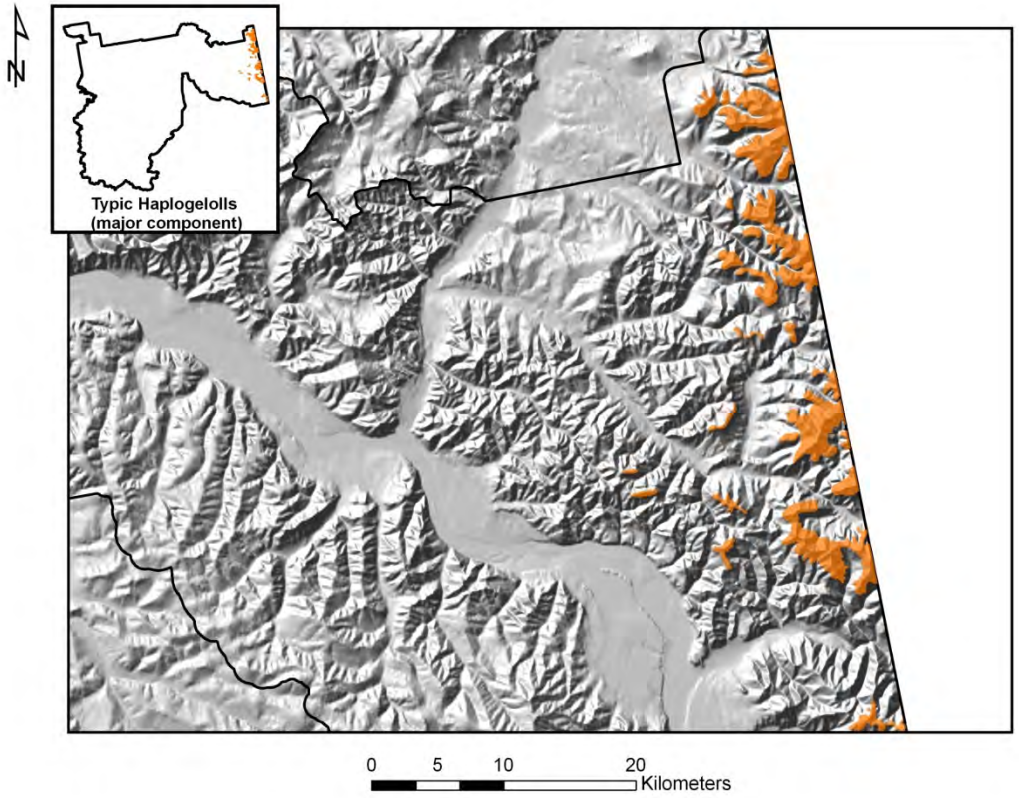
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Extensive throughout the alpine life zones in interior Alaska

Remarks

Diagnostic horizons and features:
Ochric epipedon—zone from 3 to 12 centimeters
Cambic horizon—zone from 12 to 30 centimeters
Moisture regime—udic
Temperature regime—gelic
Temperature class—subgelic

Typic Haplogelolls



Taxonomic Classification

Typic Haplogelolls

Setting

Depth class: Very deep
Drainage class: Well drained
Landform: Mountains
Microfeatures (where present): Nonsorted circles, solifluction lobes, stripes
Parent material: Loess over gravelly cryoturbate derived from limestone
Elevation: 2,950 to 4,920 meters
Slope: 25 to 70 percent
Annual precipitation: 384 to 519 millimeters
Annual temperature: -6 to -4 degrees C
Frost-free period: 50 to 80 days

Taxonomic Family

• Loamy-skeletal, mixed, superactive, subgelic Typic Haplogelolls

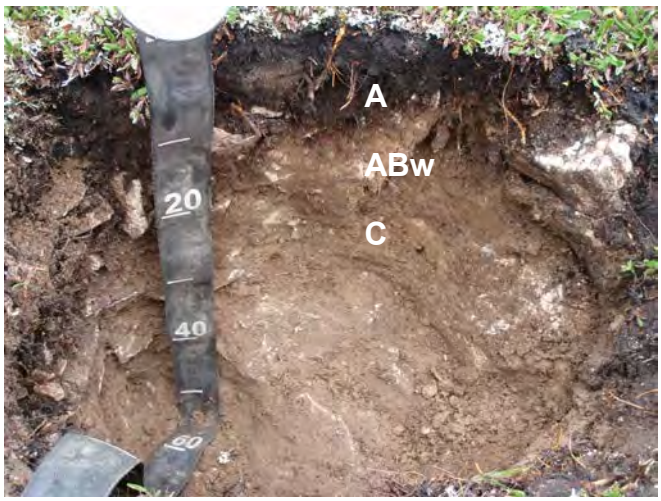
Representative Pedon Location

Location in the survey area: Latitude 65°22´6˝ north, longitude 141°4´1˝ west

Representative Pedon

Typic Haplogelolls on a 26-percent mountain backslope under alpine dwarf shrub vegetation. (Colors are for moist soil; textures are apparent field textures.)

A—0 to 10 centimeters; black (10YR 2/1) silt loam; 2 percent clay; fine single grain structure; very friable; common medium and many very fine and fine roots; 2 percent cobbles; noneffervescent; slightly acid (pH 6.5); clear irregular boundary.
ABw—10 to 21 centimeters; dark brown (10YR 3/3) cobbly fine sandy loam; 6 percent clay; moderate fine angular blocky structure; friable; many very fine and common fine roots; 3 percent fine gravel and 17 percent cobbles; noneffervescent; neutral (pH 7.1); clear broken boundary.
C—21 to 152 centimeters; dark yellowish brown (10YR 4/4) very stony fine sandy loam; 5 percent clay; massive; very friable; common fine roots; 14 percent cobbles and 23 percent stones; noneffervescent; slightly alkaline (pH 7.5).



Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -2 to -0.2 degrees C
Depth to contrasting textural stratification: 0 to 20 centimeters
Depth to paralithic bedrock: 53 to 152 centimeters
Thickness of mollic epipedon: 20 to 50 centimeters

O horizon (where present):
Color—hue of 2.5YR to 10YR, value of 2 to 5, chroma of 1 to 4
Texture—slightly decomposed and moderately decomposed plant material
Organic matter content—60 to 90 percent
Rock fragment content—0 to 2 percent gravel, channers, and flagstones
Reaction—extremely acid to slightly alkaline

A horizon:
Color—hue of 7.5YR or 10YR, value of 2 or 3, chroma of 1 or 2
Texture—silt, silt loam, loam
Textural modifiers (where present)—very channery, extremely channery, extremely flaggy
Clay content—5 to 10 percent
Silt content—50 to 70 percent
Sand content—20 to 40 percent
Organic matter content—6 to 12 percent
Rock fragment content—2 to 20 percent channers and flagstones
Calcium carbonate equivalent—0 to 1 percent
Electrical conductivity (millimhos per centimeter)—0 to 0.1
Reaction—moderately acid to moderately alkaline

ABw horizon, and 2A horizon (where present):
Color—hue of 10YR to 5Y, value of 2 to 3, chroma of 1 to 3
Texture—loam, silt loam
Textural modifiers—very channery, extremely channery, extremely flaggy
Clay content—5 to 15 percent
Organic matter content—4 to 8 percent
Rock fragment content—20 to 50 percent channers and flagstones
Calcium carbonate equivalent—0 to 2 percent
Electrical conductivity (millimhos per centimeter)—0 to 0.5
Reaction—moderately acid to moderately alkaline

C horizon, and 2C horizon (where present):
Color—hue of 10YR to neutral, value of 2.5 or 3, chroma of 1 or 2
Texture—loam, silt loam
Textural modifiers—very channery, extremely channery, extremely flaggy
Clay content—10 to 15 percent
Silt content—35 to 50 percent
Sand content—35 to 50 percent
Rock fragment content—30 to 80 percent channers, flagstones, and stones
Calcium carbonate equivalent—0 to 10 percent
Electrical conductivity (millimhos per centimeter)—0 to 0.5
Reaction—moderately acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

• X1—Oxyaquic Haplogelolls in swales of mountains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Well drained
Saturated hydraulic conductivity: Very high in the organic layers (where present), moderately high to very high in the mineral soil layers

Use and Vegetation

Use: Wildlife habitat
Native vegetation: Alpine dwarf scrub communities

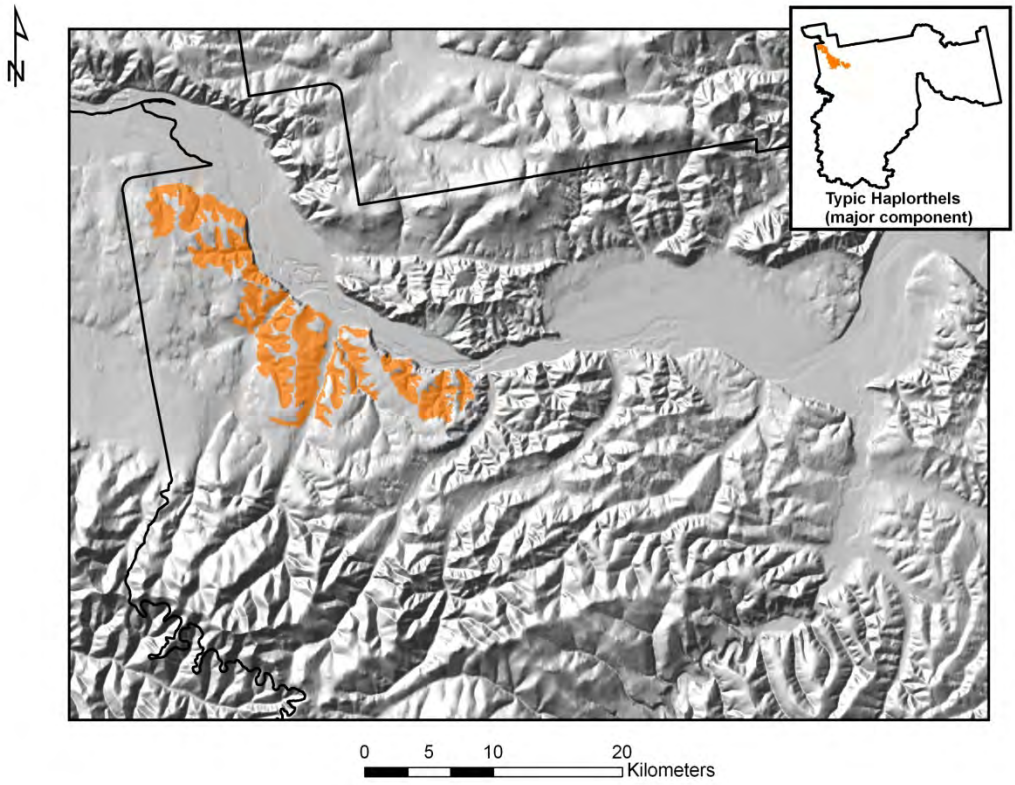
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Moderately extensive throughout the alpine life zones in interior Alaska, in areas of limestone and calcareous sedimentary deposits

Remarks

Diagnostic horizons and features:
Mollic epipedon—zone from 3 to 48 centimeters
Depth to paralithic contact—72 centimeters
Moisture regime—udic
Temperature regime—gelic
Temperature class—subgelic

Typic Haplorthels



Taxonomic Classification

Typic Haplorthels

Setting

Depth class: Moderately deep to deep
Drainage class: Moderately well drained
Landform: Hills
Parent material: Loess
Elevation: 100 to 330 meters
Slope: 20 to 35 percent
Annual precipitation: 152 to 254 millimeters
Annual temperature: -10 to -5 degrees C
Frost-free period: 70 to 100 days

Taxonomic Families

• Coarse-silty, mixed, superactive, nonacid, subgelic Typic Haplorthels

Representative Pedon Location

Location in the survey area: Latitude 65°2´4 ˝ north, longitude 141°37´40˝ west

Representative Pedon

X1—Typic Haplorthels, on a 20-percent slope of an escarpment with white spruce forest. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 3 centimeters; dark yellowish brown (10YR 4/4) slightly decomposed plant material; common medium, very fine, and fine roots throughout; noneffervescent; strongly acid (pH 5.5); clear smooth boundary.
A—3 to 12 centimeters; very dark gray (2.5Y 3/1) loam; 16 percent clay; moderate coarse granular structure; friable, slightly sticky and slightly plastic; common medium, coarse, very fine, and fine roots throughout; 3 percent fine gravel; noneffervescent; strongly acid (pH 5.4); clear smooth boundary.
C1—12 to 35 centimeters; dark gray (5Y 4/1) loam; 18 percent clay; moderate fine angular blocky structure; friable, slightly sticky and slightly plastic; common medium, coarse, very fine, and fine roots throughout; 5 percent fine gravel; noneffervescent; slightly acid (pH 6.5); gradual smooth boundary.
C2—35 to 100 centimeters; 90 percent dark gray (5Y 4/1) loam; 18 percent clay; moderate very thick platy structure; friable, slightly sticky and slightly plastic; common medium, very fine, and fine roots throughout; 10 percent fine prominent dendritic yellowish brown (10YR 5/6) masses of oxidized iron with clear boundaries on surfaces along root channels; 5 percent fine gravel; noneffervescent; moderately acid (pH 6.0).
C3f—100 to 152 centimeters; 90 percent dark gray (5Y 4/1) loam; 18 percent clay; massive; cemented; 10 percent fine prominent dendritic yellowish brown (10YR 5/6) masses of oxidized iron with clear boundaries on surfaces along root channels; 5 percent fine gravel; noneffervescent; moderately acid (pH 6.0).

Range in Characteristics

Soil moisture class: Udic
Mean annual soil temperature: -0.2 to –2.0 degrees C
Depth to permafrost: 50 to 120 centimeters

O horizon:
Color—hue of 7.5YR or 10YR, value of 2 to 4, chroma of 1 to 4
Texture—moderately decomposed plant material, slightly decomposed plant material, highly decomposed plant material
Organic matter content—60 to 90 percent
Reaction—ultra acid to neutral

A horizon (where present):
Color—hue of 10YR or 2.5Y, value of 2 to 4, chroma of 1 to 3
Texture—silt, silt loam, loam
Clay content—2 to 10 percent
Reaction—very strongly acid to neutral

Bw horizon (where present):
Color—hue of 10YR or 2.5Y, value of 3 to 5, chroma of 2 to 6
Texture—silt, silt loam, loam
Clay content—2 to 10 percent
Rock fragment content—0 to 15 percent gravel
Reaction—extremely acid to neutral

C horizon:
Color—hue of 10YR to 5Y, value of 2.5 to 5, chroma of 1 or 2
Texture—silt, silt loam, loam
Clay content—2 to 10 percent
Rock fragment content—0 to 15 percent gravel
Reaction—moderately acid to slightly alkaline

Cf horizon:
Color—hue of 10YR to 5Y, value of 2.5 to 5, chroma of 1 or 2
Texture—silt, silt loam, loam
Clay content—2 to 10 percent
Rock fragment content—0 to 15 percent gravel
Reaction—moderately acid to slightly alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Cryofluvents on lower flood plains
- X1—Typic Historthels on plains
- X1—Hydric Cryofibrists in depressions of plains

Drainage and Saturated Hydraulic Conductivity

Drainage class: Moderately well drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high or high in the mineral soil layers; moderately slow in the permafrost

Use and Vegetation

Use: Wildlife habitat
Vegetation: Black spruce, mixed ericaceous shrubs, cottongrass, lichen

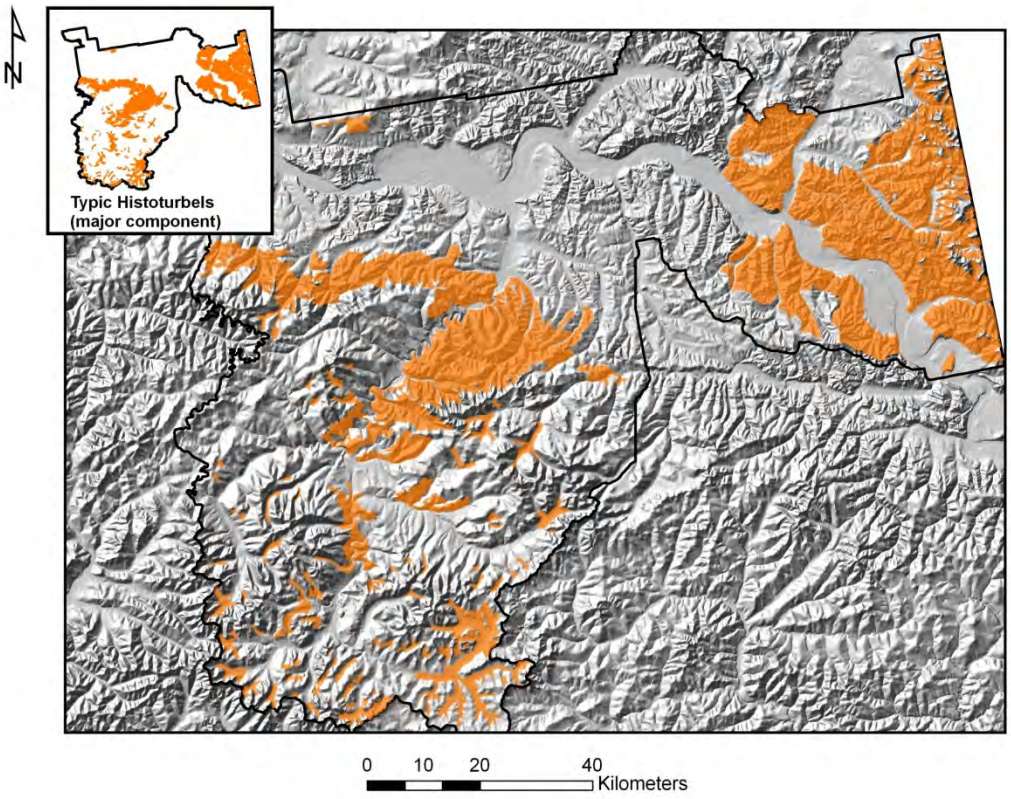
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Moderate throughout interior Alaska

Remarks

Diagnostic horizons and features:
Depth to permafrost—100 to 152 centimeters
Soil temperature regime—gelic
Soil temperature class—subgelic

Typic Histoturbels



Taxonomic Classification

Typic Histoturbels

Setting

Depth class: Shallow to deep
Drainage class: Very poorly drained or poorly drained
Landform: Loess plains and hills, mountains
Parent material: Organic material over silty, loamy, or gravelly cryoturbate
Elevation: 279 to 1,350 meters
Slope: 0 to 30 percent
Annual precipitation: 245 to 824 millimeters
Annual temperature: -7 to -2 degrees C
Frost-free period: 20 to 110 days

Taxonomic Families

• Loamy-skeletal, mixed, superactive, acid, subgelic Typic Histoturbels
• Coarse-silty, mixed, superactive, acid, subgelic Typic Histoturbels

• Coarse-loamy, mixed, superactive, acid, subgelic Typic Histoturbels
• Loamy-skeletal, mixed, superactive, acid, subgelic Typic Histoturbels

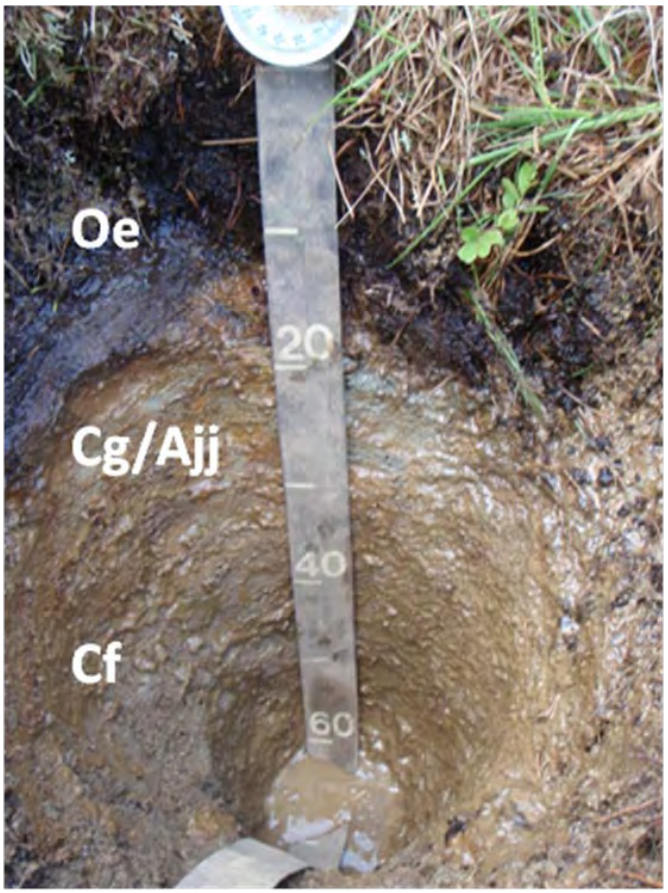
Representative Pedon Location

Location in the survey area: Latitude 65°49´32˝ north, longitude 149°32´30˝ west

Representative Pedon

Typic Histoturbels on a gently sloping eolian plain with cottongrass tussock vegetation. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 12 centimeters; very dark brown (7.5YR 2.5/2) peat; many medium, common coarse, and many fine roots; slightly acid (pH 6.5); clear wavy boundary.
Oe—12 to 22 centimeters; black (7.5YR 2.5/1) mucky peat; many medium, common coarse, and many fine roots; slightly acid (pH 6.5); abrupt wavy boundary.
Cg/Ajj—22 to 35 centimeters; 35 percent very dark brown (7.5YR 2.5/3) and 60 percent dark gray (5Y 4/1) silt loam; 5 percent clay; massive; firm, nonsticky and nonplastic; common medium and many fine roots; 5 percent fine strong brown (7.5YR 4/6) masses of oxidized iron with sharp boundaries; neutral (pH 6.7); clear wavy boundary.
Cf—35 to 152 centimeters; very dark gray (5Y 3/1) permanently frozen silt loam; neutral (pH 6.8).



Range in Characteristics

Soil moisture class: Aquic
Mean annual soil temperature: -0.2 to –1 degree C

Depth to permafrost: 30 to 90 centimeters
Thickness of histic epipedon: 20 to 36 centimeters

O horizon, and O part of Oa/Cgjj and Cg/Oajjf horizons:
Color—hue of 10R to 10YR, value of 2 to 4, chroma of 1 to 4
Organic matter content—60 to 90 percent
Reaction—ultra acid to slightly acid

A horizon and A part of Cg/Ajj horizon:
Color—hue of 5YR to 10YR, value of 2 to 4, chroma of 1 to 3
Texture—silt loam, mucky silt loam, loam
Clay content—0 to 15 percent
Silt content—55 to 75 percent
Sand content—25 to 35 percent
Organic matter content—10 to 20 percent
Reaction—very strongly acid to moderately acid

C and Cg horizons and Cg part of Cg/Oafjj horizon (where present):
Color of C horizon—hue of 10YR to 5GY, or neutral; value of 3 to 5; chroma of 1 or 2
Redoximorphic concentrations—hue of 7.5YR to 2.5Y, value of 3 or 4, chroma of 4 to 6
Texture—silt, silt loam, very fine sandy loam, fine sandy loam, loam, stratified sand to silt
Clay content—0 to 8 percent
Silt content—30 to 85 percent
Sand content—10 to 65 percent
Organic matter content—0 to 5 percent
Rock fragment content—0 to 65 percent gravel and cobbles
Reaction—very strongly acid to neutral

Cf horizon, and 2Cgf horizon (where present):
Color—hue of 10YR to 5Y, value of 2 to 4, chroma of 1 to 3
Redoximorphic concentrations—hue of 7.5YR to 2.5Y, value of 3 or 4, chroma of 4 to 6
Texture—silt, silt loam, very fine sandy loam, fine sandy loam, loam, stratified sand to silt
Clay content—0 to 8 percent
Silt content—30 to 80 percent
Sand content—10 to 65 percent
Organic matter content—0 to 2 percent
Rock fragment content—0 to 65 percent gravel and cobbles
Reaction—strongly acid to neutral

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Historthels on similar landscapes in the boreal life zones
- X1—Hydric Cryofibrists in depressions in the boreal life zones
- X1—Typic Haplogelepts on plane or convex mountain slopes
- X1—Typic Dystrogelepts on convex or plane mountain slopes

Drainage and Saturated Hydraulic Conductivity

Drainage class: Very poorly drained or poorly drained
Saturated hydraulic conductivity: Very high in the organic layers, moderately high or high in the mineral soil layers, very low in the permafrost

Use and Vegetation

Use: Wildlife habitat, agriculture, urban development

Native vegetation: Stunted spruce/cottongrass tussock woodland, cottongrass tussock meadow, stunted spruce-tamarack/cottongrass tussock woodland, stunted spruce/ericaceous woodland, alpine cottongrass tussock meadow, and alpine scrub types. In the boreal life zones, wildfire and post-fire succession results in a variety of herbaceous, scrub, and hardwood vegetation types.

Distribution and Extent

Distribution: Throughout major land resource region X1

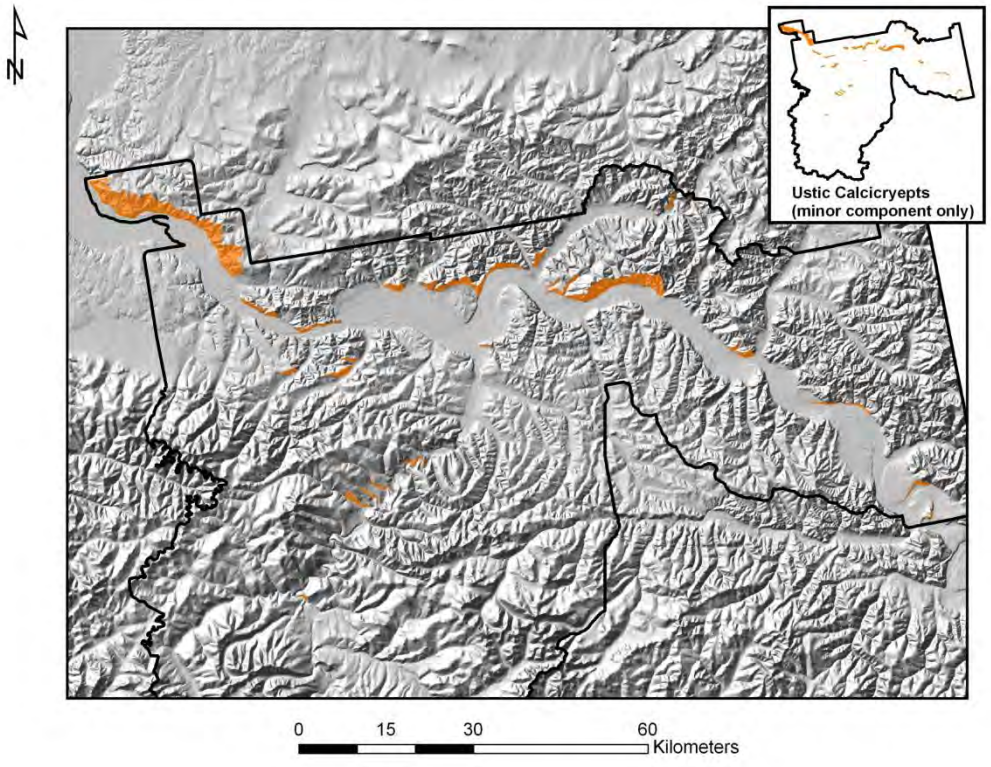
Extent: Extensive throughout the boreal forests, moderately extensive in the subalpine and alpine life zones of interior Alaska

Remarks

Diagnostic horizons and features:

Histic epipedon—meets requirement when mixed from 0 to 22 centimeters
Gelic material—zone from 22 to 35 centimeters
Depth to permafrost—35 to 152 centimeters
Aquic conditions—zone from 28 to 35 centimeters
Depleted matrix—zone from 22 to 35 centimeters
Redoximorphic concentrations—zone from 22 to 35 centimeters

Ustic Calcicryepts



Taxonomic Classification

Ustic Calcicryepts

Setting

Depth class: Deep or very deep
Drainage class: Excessively drained
Landform: Escarpments
Parent material: Gravelly colluvium derived from argillite
Elevation: 190 to 425 meters
Slope: 50 to 100 percent
Aspect: South
Annual precipitation: 245 to 519 millimeters
Annual temperature: -5 to -2 degrees C
Frost-free period: 20 to 110 days

Taxonomic Family

• Loamy-skeletal, mixed, superactive Ustic Calcicryepts

Representative Pedon Location

Location in the survey area: Latitude 65°12´20˝ north, longitude 141°44´19˝ west

Representative Pedon

Ustic Calcicryepts on a steep, south-facing backslope of an escarpment with artemisia and aspen. (Colors are for moist soil; textures are apparent field textures.)

A—0 to 13 centimeters; very dark brown (10YR 2/2) sandy loam; moderate fine granular structure; very friable; many very fine roots; noneffervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bk1—13 to 60 centimeters; dark grayish brown (2.5Y 4/2) very gravelly sandy loam; moderate very fine subangular blocky structure; friable; common very fine and medium roots; 30 percent gravel and 7 percent cobbles; 25 percent carbonate coatings on rock fragments; finely disseminated carbonate in matrix; violently effervescent; moderately alkaline (pH 8.1); clear wavy boundary.

Bk2—60 to 152 centimeters; dark gray (2.5Y 4/1) very gravelly sandy loam; moderate fine subangular blocky structure; friable; common very fine and medium roots; 30 percent gravel and 7 percent cobbles; finely disseminated carbonate in matrix; slightly effervescent; strongly alkaline (pH 8.6).

Range in Characteristics

Soil moisture class: Ustic
Mean annual soil temperature: 1 to 5 degrees C

A horizon:
Color—value of 2 to 4, chroma of 1 to 3
Texture—silt loam, loam, silt, sandy loam
Clay content—2 to 15 percent
Silt content—47 to 83 percent
Sand content—9 to 49 percent
Organic matter content—1 to 11 percent
Rock fragment content—0 to 30 percent total, including 0 to 20 percent stones, 0 to 70 percent channers, and 0 to 40 percent flagstones
Calcium carbonate equivalent—0 to 4 percent
Electrical conductivity (millimhos per centimeter)—2.5 to 6
Reaction—neutral to moderately alkaline

Bk horizon:
Color—hue of 10YR or 2.5Y, value of 3 to 5, chroma of 1 to 3
Texture—loam, silt loam
Clay content—2 to 15 percent
Silt content—30 to 53 percent
Sand content—33 to 55 percent
Organic matter content—0 to 8 percent

Rock fragment content—25 to 50 percent total, with 0 to 20 percent stones, 0 to 70 percent channers, and 0 to 40 percent flagstones
Calcium carbonate equivalent—5 to 9 percent
Electrical conductivity (millimhos per centimeter)—4 to 8
Reaction—moderately alkaline to strongly alkaline

BC and CBk horizons (where present):
Color—hue of 10YR or 5Y, value of 3 to 4, chroma of 1 or 2
Texture—silt loam, sandy loam
Clay content—0 to 5 percent
Silt content—20 to 40 percent
Sand content—55 to 75 percent
Organic matter content—0 to 6 percent
Rock fragment content—55 to 85 percent total, with 0 to 20 percent stones, 0 to 70 percent channers, and 0 to 40 percent flagstones
Calcium carbonate equivalent—4 to 6 percent
Electrical conductivity (millimhos per centimeter)—3 to 6
Reaction—moderately alkaline to strongly alkaline

C, Cr, and Ck horizons (where present):
Color—value of 2.5 to 4, chroma of 1 to 4
Texture—silt loam, sandy loam, channers
Clay content—1 to 10 percent
Silt content—17 to 74 percent
Sand content—24 to 74 percent
Organic matter content—0 to 4 percent
Rock fragment content—55 to 97 percent total, with 0 to 20 percent stones, 0 to 70 percent channers, and 0 to 40 percent flagstones
Calcium carbonate equivalent—3 to 5 percent
Electrical conductivity (millimhos per centimeter)—2.5 to 6
Reaction—slightly alkaline or moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Cryorthents on north-facing backslopes
- X1—Ustic Haplocryepts proximal to the Yukon River
- X1—Typic Haplocryepts distal from the Yukon River

Drainage and Saturated Hydraulic Conductivity

Drainage class: Somewhat excessively drained or excessively drained
Saturated hydraulic conductivity: Moderately high or high in the mineral soil layers

Use and Vegetation

Use: Wildlife habitat
Vegetation: Sagebrush, moss, lichen

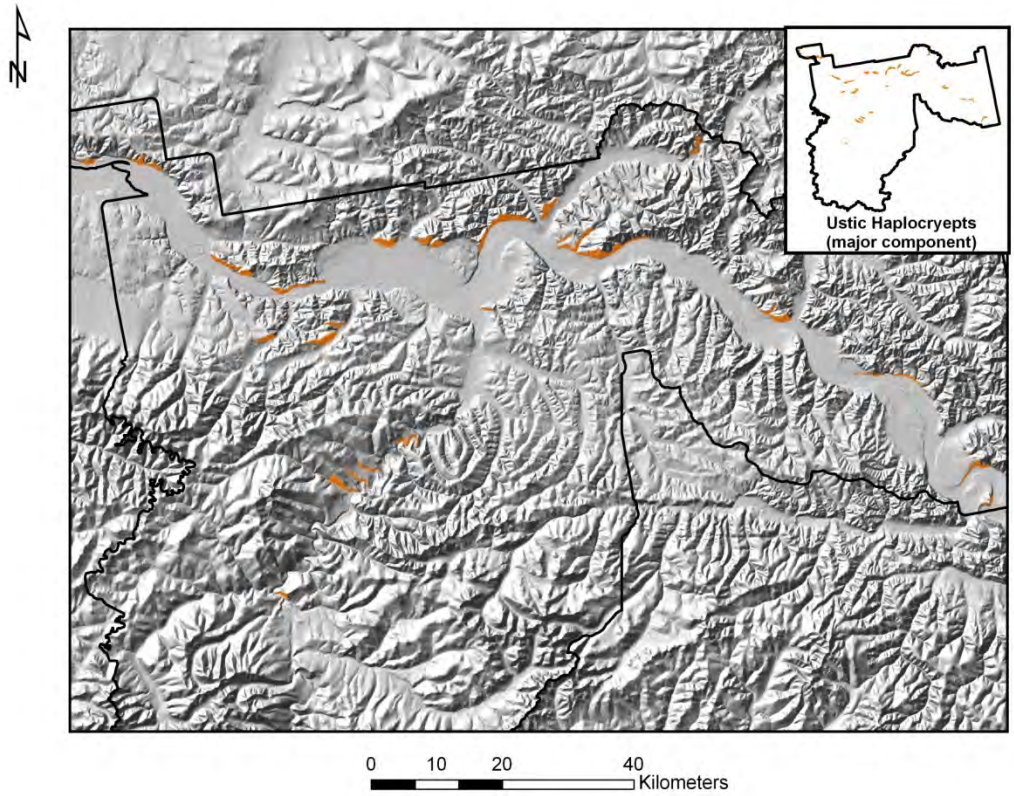
Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Limited throughout interior Alaska

Remarks

Diagnostic horizons and features:
Ochric epipedon—zone from surface to a depth of 13 centimeters
Secondary carbonates—zone from 13 to 93 centimeters
Calcic horizon—zone from 13 to 93 centimeters
Soil temperature regime—cryic

Ustic Haplocryepts



Taxonomic Classification

Ustic Haplocryepts

Setting

Depth class: Very deep
Drainage class: Excessively drained
Landform: Escarpments
Parent material: Organic material over gravelly colluvium
Elevation: 259 to 667 meters
Slope: 55 to 85 percent
Aspect: South
Annual precipitation: 250 to 519 millimeters
Annual air temperature: -5 to -3 degrees C
Frost-free period: 20 to 110 days

Taxonomic Family

• Loamy-skeletal, mixed, superactive Ustic Haplocryepts

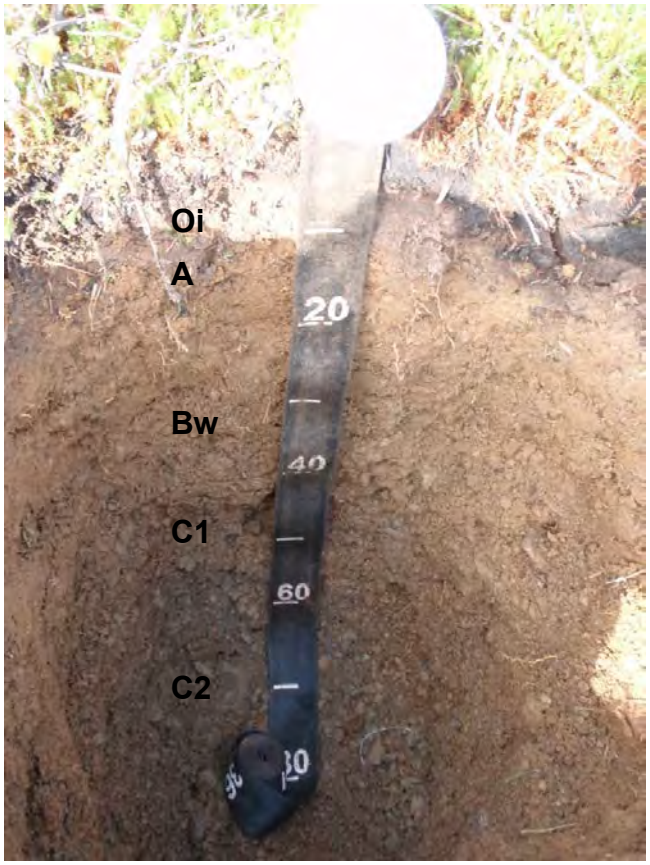
Representative Pedon Location

Location in the survey area: Latitude 65°18´18˝ north, longitude 143°9´39˝ west

Representative Pedon

Ustic Haplocryepts on a steep, south-facing backslope of an escarpment with artemisia and aspen. (Colors are for moist soil; textures are apparent field textures.)

Oi—0 to 5 centimeters; dark yellowish brown (10YR 3/4) slightly decomposed plant material; common medium, very fine, and fine roots; noneffervescent; neutral (pH 7.2); clear smooth boundary.
A—5 to 8 centimeters; dark brown (10YR 3/3) channery silt loam; 8 percent clay; weak very fine granular structure; very friable, nonsticky and nonplastic; common medium, very fine, and fine roots; 15 percent channers; noneffervescent; slightly alkaline (pH 7.4); clear smooth boundary.
Bw—8 to 45 centimeters; dark yellowish brown (10YR 4/4) channery silt loam; 8 percent clay; weak fine granular structure; very friable, nonsticky and nonplastic; common very fine and fine roots; 30 percent channers; noneffervescent; neutral (pH 7.3); clear smooth boundary.
C1—45 to 57 centimeters; dark yellowish brown (10YR 4/6) very channery silt loam; 3 percent clay; massive; loose, nonsticky and nonplastic; common fine roots; 45 percent channers; noneffervescent; neutral (pH 7.2); clear smooth boundary.
C2—57 to 152 centimeters; light olive brown (2.5Y 5/4) extremely channery silt loam; massive; loose, nonsticky and nonplastic; 82 percent channers; noneffervescent; neutral (pH 7.1).



Range in Characteristics

Soil moisture class: Ustic
Mean annual soil temperature: 1 to 5 degrees C

O horizon:
Rock fragment content—0 to 3 percent stones, 5 to 35 percent flagstones, 10 to 58 percent channers

A horizon:
Color—value of 2 to 4, chroma of 1 to 3
Texture—silt loam, loam, silt, sandy loam
Clay content—2 to 15 percent
Organic matter content—1 to 11 percent
Rock fragment content—30 to 60 percent total, including 0 to 3 percent stones, 5 to 35 percent flagstones, and 10 to 58 percent channers
Calcium carbonate equivalent—0 to 4 percent
Reaction—strongly acid to moderately alkaline

Bw horizon:
Texture (less than 2 millimeters)—silt loam, sandy loam, loam
Clay content—2 to 15 percent
Rock fragment content—35 to 88 percent total, including 0 to 3 percent stones, 5 to 35 percent flagstones, and 10 to 58 percent channers
Calcium carbonate equivalent—4 to 6 percent
Reaction—strongly acid to moderately alkaline

C horizon:
Texture (less than 2 millimeters)—silt loam, sandy loam, loam
Clay content—2 to 15 percent
Rock fragment content—55 to 95 percent total, including 0 to 3 percent stones, 5 to 35 percent flagstones, and 10 to 58 percent channers
Calcium carbonate equivalent—4 to 6 percent
Reaction—moderately acid to moderately alkaline

Geographically Associated Soils in the Interior Alaska Resource Region (X1)

- X1—Typic Cryorthents on north-facing backslopes
- X1—Ustic Calcicryepts on adjacent slopes proximal to the Yukon River

Drainage and Saturated Hydraulic Conductivity

Drainage class: Somewhat excessively drained or excessively drained
Saturated hydraulic conductivity: Moderately high or high in the mineral soil layers

Use and Vegetation

Use: Wildlife habitat
Vegetation: White spruce, russet buffaloberry, common juniper, kinnikinnick

Distribution and Extent

Distribution: Throughout major land resource region X1
Extent: Limited extent throughout interior Alaska

Remarks

Diagnostic horizons and features:
Ochric epipedon—zone from 5 to 8 centimeters
Cambic horizon—zone from 8 to 45 centimeters
Soil temperature regime—cryic

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). Many physical, chemical, and morphological properties and characteristics of soil differ from the material in which it was derived. 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 material into the soil horizons of a specific soil cannot be determined with certainty. Soil processes are best described as a group of soil-forming factors with associated characteristics that may be observed in the field. The fluvial process, described in the section “Soil Processes and Indicators,” provides an example of a group of soil-forming factors. The individual soil-forming factors, including climate, parent material, topography, living organisms, and time, are discussed in this section with reference to important processes associated with each factor. A discussion on the major soil and geomorphic processes identified for the survey area and on permafrost and soil formation are also provided.

Climate

The climate of the survey area, which is described in greater detail in the section “General Nature of the Survey Area,” is characterized by a distinctive climatic zone corresponding to the Polar Domain (Bailey and others, 1994). The climate of the Polar Domain of the Alaska Range, commonly referred to as the interior climatic zone, is continental and is characterized by long, cold winters; short, warm summers; relatively low precipitation; and a moisture deficit during the growing season.

The interior climatic zone is within the zone of discontinuous permafrost (Péwé, 1975). Permafrost, though extensive in the lowlands of interior Alaska, is less common in the upland mountainous areas and constitutes. A more complete description of the complex relationship between soils and permafrost is provided in the section “Permafrost and Soil Formation.”

Periodic winds in winter are also a distinctive climatic characteristic of the area. Winds distribute snow disproportionately across the landscape, resulting in large drifts on leeward slopes and extensive areas of barren, windswept ridges and flats. Areas clear of snow have deep seasonal frost or permafrost. The microrelief in these areas includes periglacial features such as circles, solifluction lobes, and turf hummocks within the alpine biome. In swales and on leeward slopes where snow accumulates, the thick insulating blanket of snow prevents the formation of deep frost in winter and the slow release of water saturates the soils in these areas and downslope of the drifts into summer.

The interior climatic zone is subject to a significant moisture deficit in most summers (evapotranspiration exceeds precipitation). As a result, the amount of water available for weathering and translocation of soil minerals is low. Soil horizon expression generally is weak to moderate in medium textured material, and braunification is the dominant soil process in well drained soils that are free of permafrost. An exception is areas of coarse-textured material on uplands in which more weathering and

translocation of minerals takes place, such as in the soil component D31—Boreal forest rocky colluvial slopes.

The terminology used to describe and classify the soils in the survey area reflects the cold climate of interior Alaska (See “Classification of the Soils.”). In the gravelly alpine mountainous areas, the most extensive soil order is Inceptisols. Within this order, Gelepts is the most common suborder. “Gel” indicates the coldest suborder in the order. Definitive characteristics of the suborder include a mean annual soil temperature of less than 0 degrees C and a lack of permafrost within about 2 meters of the surface. The highly conductive gravelly soils are subject to major seasonal swings in soil temperature. The soil temperature in winter at a depth of about 51 centimeters may be -18 degrees or lower late in February and peak at 15 degrees or higher in mid-August, as illustrated by soil temperature measurements from soils in this survey area as well as similar soils in Denali National Park (Clark and Duffy, 2005). The mean annual soil temperature typically is below -1 degrees.

The presence of permafrost in the soils underscores the cold nature of the regional climate. Gelisols (soils with permafrost within a depth of 2 meters) is the next most common soil order in the area. These soils are the product of a cold climate in conjunction with the insulating effect of a thick organic mat overlying loamy or silty mineral soils with characteristic low conductivity properties. In contrast to Gelepts, Gelisols have only slight seasonal changes in soil temperature and the mean annual soil temperature is slightly below 0 degrees C. Permafrost is at a shallow to moderate depth in these soils.

Parent Material

Soil parent material includes organic and mineral material. Organic material consists dominantly of nonliving, partially decomposed to highly decomposed plant material. A surface mat of organic material covers most of the soils in the survey area, with the exception of exposed bedrock, active talus slopes, and soils on low flood plains. The thickness of the organic material varies greatly. On steep metastable mountain slopes, the organic mat is discontinuous and generally less than 2.5 centimeters thick. On plains and hills in the alpine and boreal biomes, the mat generally is 2.5 to 40.5 centimeters thick, and in wet depressions it ranges from about 50 centimeters to several meters thick. The origin of the organic material that forms these mats is tied to three specific soil processes—braunification, podzolization, and hydromorphism.

On well drained mineral soils, a dynamic equilibrium exists between organic material production and decomposition. Percolation of water through mineral soils removes soil bases and acidifies the soils. Acidic surface conditions favor both the establishment of moss and the preservation of surface litter from vascular plants. Long-term preservation of organic material is enhanced by the low soil temperatures, which suppress microbial activity. Significant accumulations of organic material are rare in well drained soils, however, because of the high turnover of organic material from oxidation. The organic mat on well drained soils typically is only a few centimeters thick and is rarely more than 20 centimeters thick. The soil processes associated with soil acidification and organic mat establishment on well drained soils are braunification and podzolization.

Thicker organic deposits commonly are associated with saturated soil conditions, where organic material accumulates under acidic, saturated, anaerobic conditions. These conditions are represented by the process of hydromorphism. Though not extensive in the survey area, most soils that have a moderately thick hydromorphic organic surface mat (20 to 50 centimeters thick) are in more gently sloping areas where a shallow water table is perched over permafrost. Soils that have thick hydromorphic organic deposits (50 to 150 centimeters thick or more) and do not have

permafrost are in depressions on all landscapes throughout the area, but they are of minor extent.

Mineral parent material includes colluvial, glacial, fluvial, and eolian deposits derived from various rock types, including sedimentary, igneous, and metamorphic rock. In some of the mountainous regions, the soils formed dominantly in gravelly colluvium derived from various rock types. The geologic change over short distances makes correlating specific soil properties to individual rock types difficult at the scale used for this survey. The soils are loam or sandy loam and have a moderate level of cations such as calcium, magnesium, and potassium.

Other parent material includes alluvium, glacial drift, and eolian material. The physical and chemical properties influence the type of soil that forms. The soil component D31—Subalpine scrub silty till slopes is an example of an upland soil comprised of a thin layer of loess over coarse-textured glacial outwash deposits. The coarse, porous material maximizes percolation of rainwater and melting snow, which promotes weathering and translocation of minerals in the soils. The coarser soils on uplands have the warmest summer soil temperature of the soils in the region, which enhances biological activity and furthers the weathering processes. Soils that formed in loess over till or colluvium of mixed lithology have significantly finer textures and a lower rate of permeability, which result in only moderate soil horizon development and expression.

The texture of the unconsolidated material influences the thermal properties of the soils and whether or not permafrost is present. Soils that have a thicker loess cap are characterized by silty textures, a low content of rock fragments, and relatively low thermal conductivity properties; thus, permafrost is common in these soils. Thermal conductivity properties are discussed further in the section “Permafrost and Soil Formation.”

Topography

Topography influences the degree of downslope movement of material, the collection or dispersion of water, and the soil temperature and moisture relationships associated with aspect and snow distribution. Slope steepness is an example of a topographic influence on soil formation. Steeper slopes are inherently unstable and are subject to more downslope movement, conditions unfavorable to soil weathering and differentiation of soil horizons. For example, the barren rock outcrops and scree slopes on the steep mountains above about 900 meters in elevation are subject to dominantly colluvial processes and have no apparent soil development.

In other areas, the influence of topography combines with the influence of one or more of the other soil-forming factors. Soils on mountains (topography) with a continuous mat of vegetation (living organisms) illustrate the combined influences of two soil-forming factors. Below an elevation of about 900 meters, even on very steep slopes, colluvial processes are offset somewhat by the effect of the dense root and vegetation mat. This biological mat stabilizes soils, favoring the braunification process. These soils have a thin organic mat and a thin, dark-colored A horizon underlain by a moderately thick, yellowish brown Bw horizon.

Topography also influences the accumulation of water on the landscape. On various landforms in the alpine and subalpine biomes, snow accumulates in swales and depressions and drifts are present until late in spring or early in summer. As drifts in swales melt, a steady discharge of water saturates the soils downslope, promoting anaerobic conditions and the accumulation of organic matter in the mineral surface layer. Closed depressions do not have surface drainage outlets and remain saturated for longer periods during the growing season. Prolonged anaerobic conditions associated with saturation favor the accumulation of thick organic deposits.

Topography also affects flooding. The frequency of flooding and level above active river channels influence the texture of flood deposits and the type of vegetation that grows. Areas adjacent to active channels are regularly scoured by high velocity floodwaters, and the soils are gravelly and have a water table near the surface. Accumulation of calcium carbonate and other salts as a result of fluvial processes affect early successional plant communities along flood plains. These processes along the Tanana River flood plain near Fairbanks were described by Van Cleve and others (Van Cleve and others,1993). Topographic-vegetation relationships in these areas include the presence of young willow scrub and herbaceous communities that established between flooding events or survived previous events. In higher, less frequently flooded positions, the velocity of overbank flooding is slowed by the dense stands of mixed tall alder-willow scrub. The alluvium in these areas consists of finer textured, stratified sandy and silty deposits.

Topographic exposure also influences the type of soils that form. In mountainous alpine areas, the vegetation in depressions on slopes where snow accumulates is in stark contrast. Swales remain snow covered until late in spring, which favors herbaceous vegetation, and remain saturated until late in spring.

Patterned ground is a microrelief feature associated with the mixing of the soil by frost action (cryoturbation). This feature is throughout the detailed soil map unit Alpine Rounded Mountains with Extensive Permafrost. Two general groups of patterned ground are identified and include features with and without permafrost within a depth of 1.5 meters of the soil surface. Common patterned ground features in areas of permafrost include turf hummocks, peat mounds, ice wedge polygons, and circles. Earth hummocks, another common microfeature, generally do not have permafrost.

Earth and turf hummocks are irregular or bumpy features with local horizontal and vertical relief of as much as about 50 centimeters. Earth hummocks are limited to more gently sloping positions in the mountainous alpine biome. Turf hummocks are extensive throughout the alpine biome. Both kinds of hummocks are the result of ice segregation, differential freezing, and differential ground heaving with or without permafrost (Embleton and King, 1968; Sigafoos and Hopkins, 1951). The origin of these features has been attributed to deeper frost penetration in micro-low positions. The commonly saturated conditions conduct cold temperatures downward, causing lateral thrusting or squeezing, often injecting mineral and organic material into or beneath the micro-highs, resulting in the formation of hummocks. Turf hummocks or cottongrass tussocks are common features on slopes of less than about 6 percent, and they are underlain by permafrost.

Solifluction lobes are elongated or lobate earth hummocks on steeper slopes with the long axis of the step orientated in a downslope direction and overall slopes of about 8 to 35 percent. The process of formation is similar to that of hummocks, with the addition of a significant gravity factor because of the steep slopes. During freezing, ice crystals grow and displace soil particles in a direction controlled by the direction of freezing. The soil particles move toward the direction in which the frost enters and penetrates the ground. During periods of thawing, the particles resettle in a direction controlled by gravity. Thus, if the cooling surface is inclined, the displaced particles will resettle slightly downhill from their original position (Embleton and King, 1968).

Development of peat mounds is attributable to a thin cover of snow, which allows for deep frost penetration and frost heaving (Williams and Smith, 1989). These features are underlain by permafrost at a shallow depth. Peat mounds form discrete, irregularly spaced bumps about 1 meter across or more and several centimeters to 1 meter high or more. The drier peat near the surface of these elevated areas increases the overall insulating qualities of the peat, thus maintaining frozen soil conditions throughout 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. The free water in contact with the frozen core then freezes, increasing the size and

extent of the frozen core. Peat mounds commonly are formed as the ice core enlarges and pushes the surface up several centimeters or meters above the surrounding landscape.

Circles (or mud boils) are clusters of more or less circular features several centimeters or meters in diameter that have slightly raised centers and commonly are free of vegetation. Circles are throughout the alpine biome in the survey area, generally on slopes of less than
20 percent. Beneath the center of the circles, permafrost is intermittent and relatively deep in the soil profile. The troughs surrounding the circles are several centimeters or meters wide, support alpine scrub vegetation, and have a thick organic mat, permafrost at a shallow depth, and a shallow water table perched over the permafrost. The formation of circles is attributed to a process described as “diapirism,” which is the upward movement of relatively low density saturated soil material above the permafrost (Swanson and others, 1999). Soil material with low bulk density, as a result of high ice content, is just below the permafrost. This material has significantly lower bulk density than the overlying drier mineral soil material. As a result, upward movement of the low-density soil material is likely to occur when the soil surface is disturbed or the warm summer temperatures cause it to thaw. The flow upward to the surface forms the slightly elevated, commonly vegetation-free microfeature.

Living Organisms

Living organisms include animals and lower and higher plants. Many biochemical processes involving the cycling of different elements occur in soil where the organic compounds exuded by the roots, produced by microbial degradation of organic debris, provide the energy needed in the biological weathering process. Also, the mixing and breakdown of organic material by animals are important in soil formation.

Animals contribute to the mixing and decomposition of organic material in all of the soils in the survey area. Large mammals such as moose, caribou, black bear, and grizzly bear contribute locally to mixing of soils, but they rarely are responsible for determining the type of soil that forms.

Earthworms, though significant contributors in more temperate climates, are minor contributors because of their small size and very low density. Voles are significant contributors to the accumulation of surface organic matter and mixing in some soils. Thick accumulations of organic material commonly are on the soil surface as a result of extensive burrowing by voles, which possibly contributes to the thick, dark-colored mineral A horizon of soils.

The lower plants include moss, fungi, bacteria, and algae. Observing lower plants, especially microorganisms in a field setting, and correlating them to specific soil processes is very difficult and beyond the scope of this survey. In addition, it is difficult to isolate the exclusive role of micro-organisms in the soil system, considering their diversity and the proportion of the soil biota. The effectiveness of micro-organisms in decomposing rocks and minerals was demonstrated by Glazovskaya (Glazovskaya, 1950). He described fungi as the most destructive of the micro flora, producing chelating organic acids similar to fulvic and humic acids. Moss and lichen are the only lower plants consistently documented during this survey. The presence of a continuous layer of moss or lichen on the soil surface is indicative of soil stability and suggests that soil processes such as braunification and podzolization are active. Lack of a layer of moss suggests disturbance of the surface by colluvial processes, flooding, or fire or the presence of productive herbaceous plant communities that prevent the establishment of moss.

The higher plants are vascular, and they include trees, shrubs, grasses, and forbs. These living organisms have the most profound effect on the soils in the survey area. They contribute significantly to the organic matter content and stability of the soils.

Certain tree species such as spruce are susceptible to wildfire, which directly influences thermal properties and permafrost in some soils. In addition to the stabilizing effect of vegetation, various plant communities contribute to the braunification process as a result of the acidity of the litter. Precipitation percolating downward through surface litter and moss acidifies mineral soils. In subalpine areas, especially throughout the Three Fingers area, the resinous litter from shrub birch contributes to soil acidification and braunification. In the subalpine and boreal biomes, alder, which is a strong soil acidifier (Crocker and Major, 1955), and white spruce contribute to surface acidification, which promotes braunification.

In the high alpine mountains, at the upper limit of the treeline (about 800 to 1,000 meters in elevation), the vegetation is dominantly dwarf scrub and is considered metastable. Braunification and colluviation are the principle processes identified. A mosaic of shrub birch and lichen is extensive throughout the area on ridge crests of mountains and on glaciated hills, where microrelief changes dramatically over short distances. Ridges are exposed to wind and commonly have a sparse cover of alpine bearberry and lichen and a high percentage of exposed rock fragments. More protected concave to plane surfaces and leeward slopes of hills support shrub birch scrub. Soils that support shrub birch scrub have a relatively stable surface that is favorable for braunification and podzolization processes. Soils under shrub birch-ericaceous scrub communities are significantly more acid than those under other alpine communities. Reaction typically is extremely acid (pH 3.5 to 4.4) in the surface mineral layer under shrub birch and strongly acid or moderately acid (pH 5.1 to 6.0) under various dwarf scrub communities, including alpine bearberry, white mountain avens, and other low-growing, nonvascular plants. The presence of a gray, leached eluvial E horizon is indicative of acid leaching and podzolization and is more common in soils that support shrub birch scrub communities than in those that support other alpine scrub communities.

At treeline, low productivity white spruce forests and woodland commonly are on soils that have a seasonal water table that is near the surface and is perched over material that has low permeability, such as loamy alluvium or gravelly till. These soils have a thick A horizon enriched by nutrients from downslope movement of the water table.

The most productive forests in the survey area are on flood plains at lower elevations. The soils have a thick loamy alluvial mantle that is enriched by occasional, brief flooding and sediment deposition that provide favorable physical and chemical soil properties for productive forest establishment and maintenance.

Relationships exist between various scrub communities and soils in riparian areas throughout the survey area. These are best expressed in terms of relative elevation above active flood channels, with several discrete flood plain levels evident on the landscape. Low flood plain positions include primarily gravel bar areas. These areas have a high recurrence of flooding and commonly are adjacent to active flood channels that have sparse, if any, vegetation. With a slight increase in elevation above the active channel, the vegetation increases to a sparse cover of feltleaf willow scrub and herbaceous meadow communities in areas of primarily sandy alluvium. The upper boundary of the water table is at a depth of about 66 to 91 centimeters in summer (See ecological site description R231XY198AK—Boreal scrub sandy floodplain, low.). Middle flood plain positions have closed scrub poplar-willow scrub and alder scrub communities on well drained soils. The soils consist of a thin, commonly discontinuous organic mat over a thin mantle of stratified sandy and silty alluvium underlain by sand and gravel (See ecological site description F231XY189AK—*Populus balsamifera.*). The combination of the relatively dense scrub cover and the relative height above the active flood channel favors low velocity flood inundations and the accumulation of a thin mantle of stratified sand and silt. A thin, discontinuous surface organic mat and slight acidification of the A horizon suggests that the interval between individual flood

episodes is several years to decades. High flood plains make up the next discrete flood plain level. Flooding is infrequent and the ground surface is relatively stable, allowing the formation of a relatively thick, continuous organic mat and acidification of the A horizon. The interval between flooding events is likely decades, allowing for periods of stability that favor the replacement of scrub communities with more slow-growing forest species such as black spruce.

Dwarf spruce woodland, commonly referred to as taiga, is the most extensive historical climax plant community in the Interior Alaska Lowlands.

Time

The time that a soil is exposed to soil-forming processes also determines the degree of mineral weathering and horizon development. The soils in the survey area are grouped into four relative age categories—young, intermediate, old, and paleosols. Young soils are those subject to episodic or continuous disturbance that restricts the development of soil horizons other than a thin surface accumulation of organic material or organic enrichment of the mineral surface horizon. These soils do not have significant surface stability, and they range in age from months to decades. Included in this group are actively flooded soils and soils on steep scree and talus slopes.

Soils that are 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 that favors the destabilization or halting of the soil-forming processes. Generally, landform surfaces associated with soils of intermediate age typically are of the Holocene (less than 10,000 years old). Members of this group include well drained soils on moderately steep slopes with a continuous root mat, well drained soils on high flood plains and terraces, and soils on all landforms that have permafrost. With the exception of the soils that have permafrost, braunification is the most active process in these soils. Soil features indicative of the braunification process include a surface A horizon and subsurface Bw horizon. The destabilizing influence of the colluvial processes has minimized the degree of expression of the braunification process, and the total depth of the profile rarely extends to more than 51 centimeters. Also included within this age group are soils that have a thick surface organic horizon and associated permafrost and poor drainage. The presence of a thick organic mat and permafrost indicates a certain degree of surface stability. Destabilizing factors that may offset soil development include surface failure as a result of natural surface disturbance and frost churning (cryoturbation). The dominant process associated with these soils of intermediate age is hydromorphism. Specific soil indicators associated with hydromorphism include establishment of a thick, saturated organic mat and saturated conditions over permafrost.

Old soils are those that formed on landforms that are not subject to the significant destabilizing effects of slope, cryoturbation, or other processes that alter or halt weathering of soil minerals. The surface age is estimated to be early Pleistocene (9,000 to 250,000 years). This group of soils has the best expression and overall depth of soil horizon development under the current climate conditions. A typical sequence of mineral horizons includes an A, E, Bs, and BC horizon, and the sequence extends to a depth of 76 centimeters or more. Included in this group is the soil component D32—Boreal taiga loamy escarpment slopes. This component formed in sandy and gravelly colluvial deposits on escarpments.

Soil Processes and Indicators

Soil processes are defined as a combination of physiochemical and biological reactions that have transformed material into soil horizons. The factors of soil formation discussed in the previous sections 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 particular process, or by a rate of a particular process, the resulting combination commonly has been given a name (Wilding and others, 1984). The primary processes of braunification, colluviation, fluvial processes, hydromorphism, and podzolization are described in the following paragraphs. Each process is related to an observable set of soil properties, or field indicators, used to establish dominant processes.

Colluviation is a depositional process by mass wasting or overland flow. Sediment deposited by mass wasting generally is nonsorted and nonstratified. Individual particles are not rounded. These characteristics distinguish colluvium from sediment deposited by fluvial processes (Longwell and others, 1969). Products of colluvial processes include talus and solifluction deposits. In the survey 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 river escarpments. Field indicators of this process include long plane slopes or conical features extending downslope from steep exposures of bedrock to the base of the slope. Soils within colluvial cones consist of nonsorted soil material with 30 percent angular rock fragments or more, by volume. The unstable surface on steep colluvial slopes results in the absence of soil horizons and the general lack of vegetation. On more stable, or metastable, colluvial slopes, a continuous organic mat underlain by an A, Bw, C, and R horizon sequence is more common.

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. Along low gradient streams, soils such as the component D31—Boreal woodland rocky low flood plains are subject to depositions of stratified sandy and silty sediment from low velocity floodwater. Along higher gradient streams, such as along the Charley River, high velocity floodwater deposits gravelly and cobbly alluvium as channel deposits. The higher flood plains along these higher gradient streams consist of loamy over sandy and gravelly alluvium. Landscape indicators of fluvial processes include the presence of barren or sparsely vegetated gravel bars, channels, and alluvial flats adjacent to active river channels as well as the presence of debris, ice-gouged trees, and watermarks on vegetation. Vegetation indicators of fluvial disturbance include the presence of young stands of feltleaf willow and alder shrub, herbaceous vegetation, or balsam poplar forests adjacent to stream channels. Soil indicators include stratification of sandy and silty sediment and buried organic layers and high soil reaction (pH) relative to soils on adjacent upland positions.

Fluvial processes in conjunction with other landscape factors result in variations in nutrient productivity among riparian systems. Two broad categories of alluvial soils have been identified in the survey area—soils with excess bases and soils without bases. The soils along the Yukon River contain excess bases. A specific fluvial process called enrichment defines these soils with excess bases. Enrichment includes the saturation or accumulation of basic soil metals such as calcium, magnesium, potassium, and sodium in surface soil layers. Enrichment includes the deposition of base-rich sediment by flooding and the concentration of bases in the upper part of the 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. Enrichment results in the accumulation of calcium and magnesium carbonate compounds that may form a white or brown crust on the soil surface. Soils with excessive carbonates effervesce when dilute hydrochloric acid is added. Effervescence commonly is observed in the surface mineral layers of the soil component D31—Boreal scrub sandy low flood plains of the

Boreal Low Flood Plains detailed soil map unit. On low flood plains, a pH of 7.6 or more in the surface mineral layers is also a general indication of enrichment.

Hydromorphism is associated with near-surface saturated conditions, and it occurs extensively throughout the survey area. It is a good example of the topographic factor of soil formation. Water collects locally in small, concave micro-positions above restrictive layers that have low permeability, such as till or permafrost, and act as regional features that may underlie river valleys and basins. This process includes the chemical reduction, mobilization, and movement of soluble minerals and the formation of a thick surface organic mat under saturated anaerobic conditions. Plant roots and soil microbes deplete the soil oxygen in these saturated soils, resulting in 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 have neutral gray to bluish colored features that are referred to as redoximorphic depletions. These soil morphological features are indicated as a Cg horizon. The mobilized minerals are transported through the soil by groundwater to an oxidized zone. Mineral oxidation and precipitation occur, imparting a yellowish to reddish color to the soil. These features are referred to as redoximorphic concentrations. In areas where the water table fluctuates near the surface, the soil environment commonly alternates between reduced and oxidized states and the soils frequently display a complex mottled pattern of both reddish, oxidized concentrations and grayish, reduced color depletions. Permanently saturated soils commonly have a thick organic layer. The accumulation and stability of organic deposits in these soils is attributed to prolonged saturation and the associated anaerobic environment.

Three general groups of hydromorphic soils are in the survey area. These include aquifer-wet, topographically-wet, and climatically-wet soils. Aquifer-wet soils include those on flood plains and in broad depressions that have a local or regional water table in the profile. Evidence of aquifer-wet soils or extensive aquifer systems include the presence of multiple oxbows and cutoff meanders on flood plains. Soil indicators of hydromorphism on these landforms include a water table near the surface during much of the year, abundant redoximorphic depletions and concentrations, and a thick, saturated organic layer. Vegetation indicators include a prevalence of wet sedge meadow or willow/sedge meadow communities.

Topographically-wet soils include those in open swales and closed depressions where the source of water is run-in from adjoining uplands or from precipitation. Water is held near the surface for prolonged periods because of the relatively low permeability of the underlying material. Topographically-wet mineral soils in swales or nivation hollows occupied by snowbeds are common in the alpine and subalpine biomes. Saturated conditions result from melting snowdrifts that remain well into summer. Soils in these depressions normally are slightly more nutrient-rich than adjoining well drained soils and have a water table at or very near the surface during part of the growing season. Indicators of hydromorphism in these soils include a thick organic surface layer or a thick organic-rich mineral layer 20 centimeters thick or more. Indicators of seasonally saturated topographically-wet soils include a thick, dark-colored mineral surface horizon and faint reddish redoximorphic concentrations in the subsoil.

Climatically-wet soils are saturated over permafrost. These soils are very poorly drained or poorly drained and have permafrost within about 2 meters of the soil surface in summer. Melting snow, precipitation in summer, and progressive melting of the active layer in summer maintain the saturated conditions. The surface organic layers are extremely acid or very acid, and the mineral horizons vary in acidity. Indicators of hydromorphism in these soils include a surface organic mat 20 centimeters thick or more, weakly expressed to moderately expressed redoximorphic features, and saturated conditions in the thawed zone above the

permafrost. Low productivity scrub and sedge communities on uplands and patterned ground features, specifically circles, are indicators of climatically-wet soils and the presence of permafrost.

Braunification is the release of iron from primary minerals by oxidation or hydration, which gives the soil matrix a brownish, reddish brown, or red color (Wilding and others, 1984). This process is a good example of the joint influences of time and topography. Braunification is common on vegetated mountain slopes, terraces, plains, and hills throughout the uplands of the survey area. The process is common in soils on relatively stable surfaces not influenced by flooding or excessive downslope movement of soil material. 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) of the surface layer. 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-colored surface mineral horizon, which are indicative of surface stability. Another soil indicator is the presence of a light brown to yellowish brown subsurface layer, which is evidence of weathering and translocation of primary soil minerals. Soil reaction also gradually increases with depth.

Podzolization includes the chelation and chemical migration of aluminum, iron, and organic matter downward in the soil profile, leaving silica in the leached layer (Wilding and others, 1984). This process is a good example of the combined influences of climate and parent material. This process of alteration and translocation is normally active under extremely acid soil conditions that generally are associated with high precipitation. Indicators of this process include a thin, gray, leached surface E horizon over a brown Bs subsoil horizon. Podzolization is more dependent on specific site and soil properties, including coarse-textured soil material and the presence of shrub birch, a known soil acidifier.

Cryoturbation includes the churning of surface and subsoil layers by frost action. The microrelief features associated with this process commonly are referred to as periglacial features. This process is well expressed within the thin, annually thawed zone in soils underlain by permafrost, but permafrost is not requisite. Indicators of cryoturbation include disrupted and broken soil horizons, mixing of material from different horizons, and mechanical sorting of material (Agriculture Canada Expert Committee on Soil Survey, 1987). Cryoturbation is most evident in soils with abundant soil moisture, a high rate of cooling (affected by vegetation and snow cover), and frequent freeze-thaw cycles (Embleton and King, 1968). The presence of earth hummocks, turf hummocks, circles, solifluction lobes, and peat mounds are surface evidence of cryoturbation in the underlying soil. Microrelief features associated with cryoturbation were described in the section “Topography.”

Permafrost and Soil Formation

Permafrost consists of soil or geologic material that is continuously at or below 0 degrees C (National Research Council of Canada, 1988). Permafrost, though not considered a soil or landscape process, has a unique set of associated properties and processes. Permafrost as a landscape feature is a good example of the climate factor of soil formation. Permafrost is extensive on plains and more gently sloping mountainsides throughout the survey area. Permafrost in soils commonly occurs as fine ice crystals between individual soil grains with occasional seams and lenses. The overall ice content ranges from about 60 to 70 percent, by volume. The ice content of the ice wedge polygons is estimated to be 80 percent or more, by volume, in the soil component D31—Alpine tussock-scrub silty polygons, frozen soils, of the Alpine

Rounded Mountains with Extensive Permafrost detailed soil map unit. Disturbance of the surface organic mat of permafrost soils on slopes of 10 percent or more commonly results in melting of the permafrost and slope failure as the soils liquefy and flow downslope. Slope failure associated with melting permafrost as a result of natural disturbance has been observed in areas of the Boreal Hills with Extensive Permafrost detailed soil map unit.

Permafrost is absent on flood plains because of hydrologic factors. Formation of permafrost in soils on uplands requires the presence of a loamy or finer textured material with relatively low rock fragment content and low thermal conductivity properties. Thermal conductivity values indicate how rapidly heat is conducted through soil. These values are relatively low in moist organic material and moist mineral soils that are made up of loamy or finer textured material (Jury and others, 1991). Low conductivity results in slow warming of the soils and overall low summer soil temperatures, conditions favorable for the formation of permafrost. Soils that formed in gravelly alluvium on flood plains and colluvium on mountains have higher thermal conductivity. Heat is transferred from the atmosphere in summer, resulting in rapid warming of the soils and relatively high summer soil temperatures, conditions unfavorable for the formation of permafrost.

Wildfires are common in the boreal and lowland areas of interior Alaska, impacting areas with and without permafrost. The most widespread impact of wildfires, however, is in areas underlain by permafrost. The short-term impact following most wildfires is increased soil temperature, resulting in an increase in the thickness of the active layer, or the surface layer that thaws in summer. As near-surface permafrost thaws, a large volume of water is released and either accumulates in depressions or runs off through surface or subsurface drainage outlets. Differential subsidence of the soil surface and slumping on steeper slopes can occur, depending on the ice content of the permafrost and the rate of thawing. Gradually, in the absence of additional fires or other disturbances, the moss organic layer reestablishes and the permafrost returns to the pre-fire condition (Foote, 1976; Viereck, 1973). Return to the pre-burn state depends in part on the depth of the organic layer consumed by the fire, the rate of revegetation (Viereck and Dyrness, 1979), and the soil texture. The pre-burn state returns as post-fire vegetation succession progresses and the organic mat reestablishes. Dyrness (Dyrness, 1982) reported that 4 years after a burn in an area of black spruce community, the thickness of the active layer increased three-fold in areas where one-half of the organic mat was consumed by the fire and five-fold in areas where the entire surface was consumed and mineral soil was exposed. Foote (Foote, 1976) and Viereck (Viereck, 1973) agree that in black spruce communities, the forest canopy, forest floor, and thickness of the active layer return to their original state within 50 to 70 years following fire. Based on observation of the tree core in the survey area, similar return intervals of the thickness of the organic mat are expected on soils that formed in thick deposits of loess. In this survey area, however, a return interval of 100 to 150 years is estimated for the soils on terraces that have a loamy alluvium surface mantle 50 centimeters thick or more and overly sand and gravel. The higher thermal conductivity properties of this coarser textured material are attributed to the warmer soil temperatures and a longer return interval of the thickness of the organic mat. Charcoal in the soil profile and establishment of aspen and/or birch plant communities indicate a history of wildfire, a significant disturbance in the survey area.

Specific soil processes are associated with each part of a fire cycle. The accumulation of basic soil metals and nutrients, such as calcium, magnesium, potassium, sodium, and nitrates in surface layers originates from the ash residue left behind after fire. The ash layer typically effervesces when dilute hydrochloric acid is added. This reaction commonly can be observed in the remaining surface organic material for a year or more following a fire. Associated with this effervescence is soil reaction (pH) of 8 to 8.2. Other changes in nutrient status following fire, such as

increased content of phosphorus and nitrates, commonly are related to the increase in pH (Heilman, 1966). Heilman reports that the removal by fire of moss layers that have low density and are low in content of nitrogen maximizes the content of nitrogen at the surface in soils. This restoration of the bulk of the soil nitrogen to the warmest portion of the soil profile explains the substantial improvement in productivity and availability of nitrogen following burning. Acidification is associated with the aerobic, well drained, permafrost-free portion of this cycle. As conditions become more acid and the organic mat becomes thicker, the rate of biological decomposition slows and litter and moss accumulate on the soil surface. Nutrients for plant growth become less available. Thickening of the organic mat affects nutrient cycling. Without a corresponding increase in the quantity of available nutrients in the lower part of the soil, the quantity of available nutrients in the organic mat and upper part of the soil is diluted as the organic mat becomes progressively thicker. As succession proceeds, elements that are at low levels and potentially limited, such as nitrogen, phosphorus, and potassium, are cycled by the vegetation and dispersed throughout the increasingly thick organic layer (Heilman, 1966 and 1968). This gradual thickening of the surface organic mat is accompanied by a lowering of the temperature in the underlying soil. In areas that have a mantle of loamy alluvial material 51 centimeters thick or more, permafrost may begin to form as a result of the low thermal conductivity properties associated with the loamy mantle.

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Glossary

Acidification (process). A subprocess of braunification in which excess basic metal cations are removed from the soil profile by leaching or plant use. Acidification is normally accompanied by a lowering in soil reaction (pH).

Active layer. The top layer of ground subject to annual thawing and freezing in areas underlain by permafrost.

Aerobic. A condition in which molecular oxygen is in the soil.

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

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

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

Alpine. Land and related resources above the upper elevation limit of trees (treeline).

Anaerobic. A condition in which molecular oxygen is absent in the soil.

Aspect. The direction in which a slope faces. Also, the general physical appearance of a vegetation cover type.

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 centimeters of water per centimeter of soil. The capacity, in centimeters, in a 150-centimeter profile or to a limiting layer is expressed as:

Very low	0 to 7.6
Low	7.6 to 15.2
Moderate	15.2 to 22.9
High	22.9 to 30.5
Very high	more than 30.5

Basal area. For trees, the area of the cross section of a single tree or of all trees in a stand, usually measured at breast height (see breast height), expressed as square feet per acre or square meters per hectare. For herbs and shrubs, the area or proportion of the ground surface covered by the stems of plants at about ground level, expressed as square feet per acre or square meters per hectare or as a percentage.

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.

Biome. A continental-scale ecosystem characterized by similarities in plant lifeforms and environment. Examples are boreal, subalpine, and alpine.

Bog. A peat-forming ecosystem influenced solely by water, which falls directly onto it as rain or snow. Bog vegetation is dominantly herbs, shrubs, and stunted trees. *Sphagnum spp*. commonly is dominant in the moss layer.

Boreal. The biome of North America that stretches from Alaska and the Rocky Mountains eastward to the Atlantic Ocean. It is bounded by the treeline to the north and by aspen parkland to the south, which is a transition zone to the prairie grassland. The boreal biome supports dominantly forest vegetation.

Braunification (process). Release of iron from primary minerals in soil by hydration or oxidation, giving the soil a yellowish, brownish, or reddish brown color.

Breast height. A standard height for measurement of tree diameter and age, or 1.5 meters above the average ground level.

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

Canopy. The cover of leaves and branches formed by the tops or crowns of plants as viewed from above.

Canopy cover. The proportion of the ground area covered by the vertical projections of the canopy, express as a percentage.

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 as 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.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

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

Coarse textured soil. Sand or loamy sand.

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

Codominant trees. Trees whose crown forms the general level of the forest canopy and that receives full light from above but comparatively little from the sides.

Colluviation (processes). Processes associated with transportation and/or deposition by mass movement (direct gravitational action) and local, unconcentrated runoff on side slopes and/or at the base of slopes.

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 with two or more soils 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.

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

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

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

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

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

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

Hard—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft—When dry, breaks into powder or individual grains under very slight pressure.
Cemented—Hard; affected little by moistening.

Cover type. A unit of vegetation essentially similar in composition and development throughout its extent. Synonyms: community type, vegetation type.

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

Cryic. Soil temperature regime in which the mean annual soil temperature is 0 to 8 degrees C.

Cryoturbation (frost churning). The churning of soil material by frost action, resulting in disrupted or broken horizons, incorporation of material from other horizons, organic matter accumulation on the permafrost table, and oriented rock fragments.

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

Diffusion. Movement from a zone of high concentration to one of lower concentration.

Dominant trees. Trees whose crown forms the general level of the forest canopy and receives full light from above and from the sides.

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

Excessively drained—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. These soils commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, have a high water table, receive additional water from seepage, receive nearly continuous rainfall, or a combination of these.

Poorly drained—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor

drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. In areas where rainfall is high and nearly continuous, they can have a moderate or high slope gradient.

Effervescence. A bubbling reaction upon addition of dilute hydrochloric acid.

Enrichment (process). A fluvial subprocess that includes the accumulation of bases such as calcium carbonate in the soil. The process includes fluvial deposits of base-rich material and concentration in the surface layer due to evaporation.

Ericaceous. Refers primarily to the Heath family, *Ericaceae* (for example, Labrador-tea), but usually includes the Crowberry family, *Empetraceae*.

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

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature (for example, fire that exposes the surface).

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

Esker. A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Evapotranspiration. The combined loss of water from a given area and during a specific period of time by evaporation from the soil surface and by transpiration from plants.

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

Fine textured soil. Sandy clay, silty clay, or clay.

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

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

Fluvial (process). Processes including erosion, transportation, deposition, and enrichment of alluvium by water.

Footslope. The geomorphic component that forms the inner, gently inclined surface at the base of a hillslope. The surface profile is dominantly concave. In terms of gradational processes, a footslope is a transition zone between an upslope site of erosion (backslope) and a downslope site of deposition (toeslope).

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

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

Forest type. A unit of forest vegetation essentially similar in composition and development throughout its extent.

Frost boil. A small mound of fresh soil material formed by frost action. A type of nonsorted circle commonly in fine grained sediment underlain by permafrost.

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.

Geomorphic processes. Natural processes that form the landscape and surficial sediment. For example, colluvial processes, deposition, and erosion.

Glacial drift (geology). 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 (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

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

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). 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.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

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

Gravel. Rounded or angular fragments of rock as much as 7.6 centimeters in diameter. An individual piece is a pebble.

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

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

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

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

Herb. Grasses, sedges, forbs, and any other non-woody herbaceous plants.

Hill. A natural elevation of the land surface, rising as much as 305 meters 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. The major horizons of mineral soil are as follows:

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

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

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

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

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

Cr horizon—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

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

Hummock. A rounded or conical mound or other small elevation. Also, a slight rise of ground above a level surface.

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

Hydromorphism (process). Soil processes associated with saturated conditions, including accumulation of organic material and formation of redoximorphic features (gray and red soil mottles caused by saturation or alternating saturated and unsaturated conditions in soils).

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

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

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate and then 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 centimeters per hour, is expressed as follows:

Less than 0.5	very low
0.5 to 1.0	low
1.0 to 1.9	moderately low
1.9 to 3.2	moderate
3.2 to 4.4	moderately high
4.4 to 6.4	high
More than 6.4	very high

Interior (Alaska). Physiographic area north of the summit of the Alaska Range and south of the summit of the Brooks Range that has a dominantly continental climate.

Interstitial (ice crystals). Ice formation in voids between soil particles.

K_{sat}. Saturated hydraulic conductivity. 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 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." The conversion of K_{sat} rates to "permeability" rates is shown below:

SATURATED HYDRAULIC CONDUCTIVITY - PERMEABILITY

K_{sat} Class			Permeability Class		
705.00	VERY HIGH	100.00	705.00	VERY RAPID	100.00
100.00	HIGH	14.17	141.14	RAPID	20.00
10.00	MODERATELY HIGH	1.417	42.34	MODERATELY RAPID	6.00
1.00	MODERATELY LOW	0.1417	14.11	MODERATE	2.00
0.10	LOW	0.01417	4.23	MODERATELY SLOW	0.60
0.01	VERY LOW	0.001417	1.41	SLOW	0.20
0.00		0.00	0.42	VERY SLOW	0.06
µm/sec		in/hr	0.01	IMPERMEABLE	0.0015
			0.00		0.00
			µm/sec		in/hr

µm/sec x 0.1417 = in/hr in/hr x 7.0572 = µm/sec

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

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

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

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

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

Maritime-continental (climate). A blend of two climate types in which either the maritime or continental climate may be the dominant local weather for extended periods of time.

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

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

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

Minor component. A component of limited extent that may or may not be present in any given area.

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

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

Mountain. A natural elevation of the land surface, rising more 305 meters above the surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes of more than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

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

Munsell notation. A designation of color by 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.)

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

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

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

Outwash plain. An extensive area of glaciofluvial material that was deposited by meltwater streams.

Overstory. The trees in a forest that form the upper canopy layer or layers.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Oxidation. Combination with oxygen, addition of oxygen or other atom or group, or removal of hydrogen or other atom or group.

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 conditions. (See Fibric soil material.)

Pedon. The smallest volume that can be called "soil." A pedon is three-dimensional and large enough to permit study of all the horizons. Its area ranges from about 0.9 to 9.3 square meters, depending on the variability of the soil.

Pergelic. Soil temperature regime in which the mean annual soil temperature is below freezing or lower.

Permafrost. Layers of soil, or bedrock, in arctic or subarctic regions in which a temperature below freezing has existed continuously for 2 years or more.

Permafrost extent or distribution. The percentage of a map unit consisting of soils with permafrost.

Continuous—more than 80 percent of the composition of the map unit consists of soils with permafrost.

Discontinuous—20 to 80 percent of the map unit consists of soils with permafrost.

Sporadic—more than 5 percent but less than 20 percent of the map unit consists of soils with permafrost.

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. For example, slope, stoniness, and thickness.

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

Physiochemical. Related to physical and chemical soil properties.

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.

Podzolization (process). The removal and translocation of iron and aluminum from surface layers into underlying soil material. The soils typically have a gray, leached surface mineral layer a few centimeters thick underlain by a dark red layer of accumulated iron, aluminum, and organic compounds.

Ponding. Standing water on soils in closed depressions. Only percolation or evapotranspiration can remove the water.

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

Potential natural community. The assemblage of plants that most nearly achieves a long-term steady state of productivity, structure, and composition on a site. Synonyms: potential plant community, climax plant community, and plant association.

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

Ultra acid	Below 3.5
Extremely acid	3.5 to 4.5
Very strongly acid	4.6 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. Bodies of apparent accumulation of iron-manganese oxides.

Redoximorphic depletions. Bodies of low chroma (≤1) having value of 4 or more where iron-manganese oxides alone have been stripped out or where both iron-manganese oxides and clay have been stripped out.

Redoximorphic features. Patches of contrasting colors and low chroma colors formed by the processes of reduction, translocation, and oxidation of iron and manganese oxides.

Regeneration. The new growth of a natural plant community, developing from seed.

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

Riparian (or riparian zone). Land in close proximity to a watercourse, lake, or spring and influenced by surface water and groundwater during all or part of the year.

Riverine. Associated with a river system; active river channel and land adjacent to the river that is inundated when stream discharge exceeds channel capacity.

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

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

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

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.

Representative value (RV). Used in the map unit descriptions to designate a representative value of the composition of each major component within a map unit. This value is expressed as a percentage.

Sand. As a soil separate, individual rock or mineral fragments 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.

Sandy soil. Sand or loamy sand.

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.

Scrub type. A unit of scrub vegetation essentially similar in composition and development throughout its extent.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the backslope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

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

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

Similar soils. Soils that have similar 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 the horizontal distance and then multiplied by 100. Thus, a slope of 20 percent is a drop of about 6 meters in 30.5 meters 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 that is capable of supporting plants. It has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over time.

Soil group. A collection of soils that formed under the influence of similar soil and geomorphic processes and have similar chemical and physical properties.

Soil process. A physical or chemical change in soil brought about by exterior influences.

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 underlying material. Living roots and plant and animal activity are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be 1 fragment thick or

more. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 25 to 60 centimeters (10 to 24 inches) in diameter if rounded or 38 to 60 centimeters (15 to 24 inches) in length if flat.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnant of an abandoned flood plain, streambed, or valley floor that was produced during a former stage of erosion or deposition.

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

Subalpine. The biome between the boreal and alpine biomes that consists of alder scrub.

Subarctic continental. The climate of interior Alaska that consists of long, cold winters and short, warm summers.

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

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The part of the soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 10 to 25 centimeters (4 to 10 inches). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taiga. A Russian term meaning “land of little sticks” that is applied to the dwarf or stunted open conifer woodland and forests that are typically underlain by permafrost.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed mainly by falling, rolling, or sliding.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, 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 the terms "coarse," "fine," or "very fine."

Thermal conductivity. A measure of heat transfer through soil.

Thermokarst. Subsidence of the ground surface due to melting of ice masses.

Till plain. An extensive, nearly level to gently rolling or moderately sloping area that is underlain by or consists of till and that has slope of 0 to 8 percent.

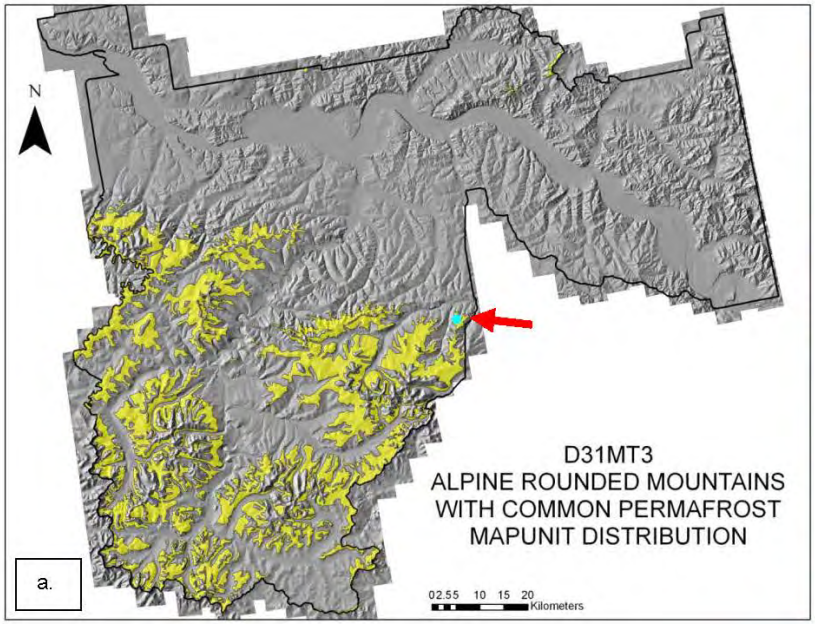
Toeslope. The outermost inclined surface at the base of a hill. Toeslopes are commonly are gently sloping and linear in profile.

Tussock. A pedestal or rounded mound or other small elevation consisting of sedges and sedge detritus.

Understory. Any plants in a forest or scrub community that grow below the tree or shrub overstory and are partially shaded by the overstory.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowland along streams.
Valley. An elongated depressional area primarily developed by stream action.
Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than a result of poor drainage.

Plates



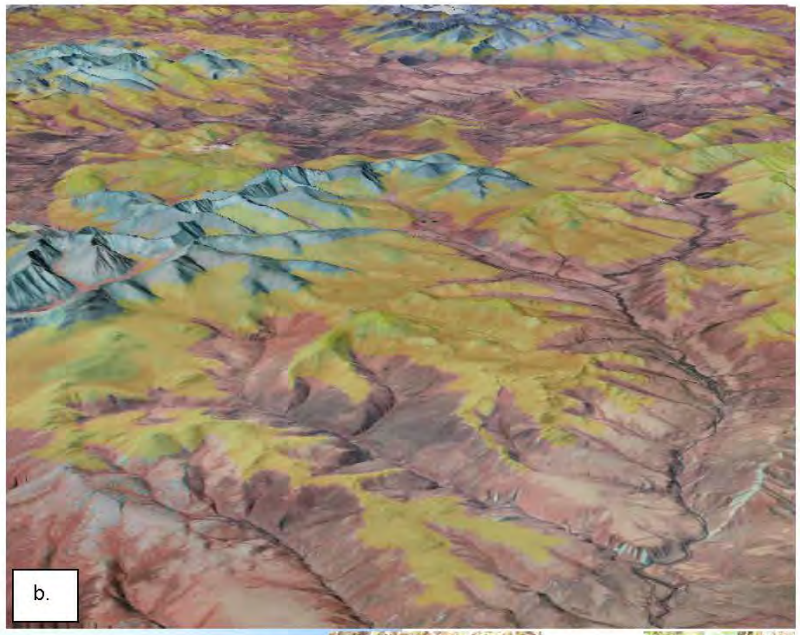
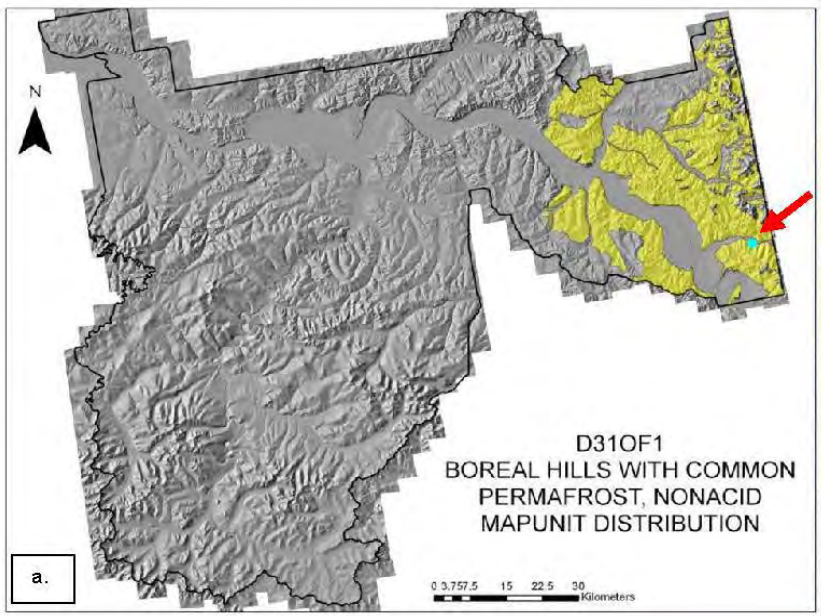


Plate 1.—Distribution map (a) and 3-D representation (b) of D31MT3, Alpine Rounded Mountains with Common Permafrost. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image (b). Geomorphic setting is base slopes of mountains. The pictured component, Alpine low scrub organic hummocks, frozen, comprises 25 percent of the map unit and is classified as loamy, mixed, euic, subgelic Terric Fibristels. The ecological site is Alpine Dwarf Scrub-Graminoid Mosaic Organic Frozen Mound (R231XY116AK).



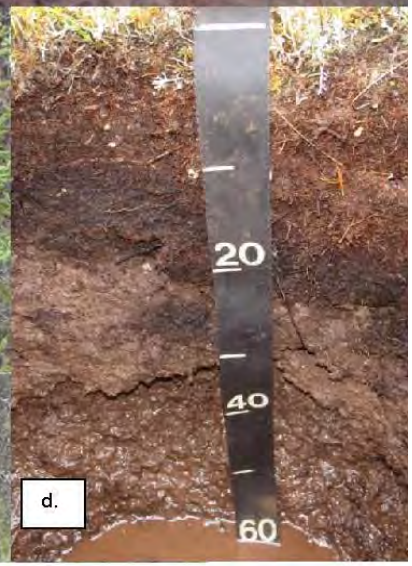


Plate 2.—Distribution map (a) and 3-D representation (b) of D31OF1, Boreal Hills with Common Permafrost, Nonacid. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting of the component is backslopes. The pictured component, Boreal forest gravelly colluvial slopes, frozen, comprises 27 percent of the map unit and is classified as loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels. The ecological site is *Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum* (F231XY111AK).

Plate 3.—Distribution map (a) and 3-D representation (b) of D31UC2, Subalpine and Boreal Hills. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting of the component is backslopes. The pictured component, Subalpine woodland silty colluvial slopes, frozen, comprises 40 percent of the map unit and is classified as loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels. The ecological site is *Picea glauca/Salix-Vaccinium uliginosum* (F231XY184AK).

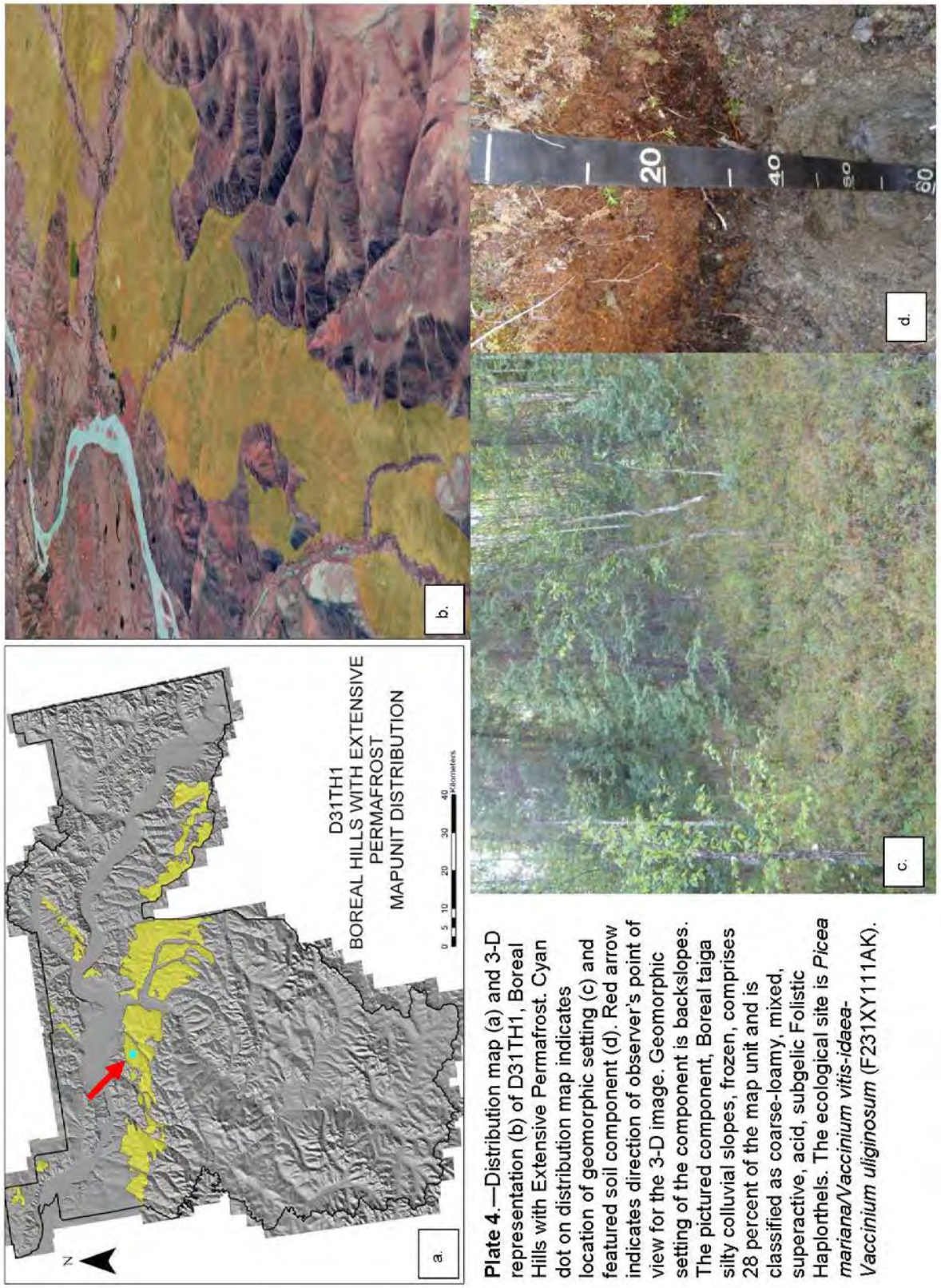


Plate 4.—Distribution map (a) and 3-D representation (b) of D31TH1, Boreal Hills with Extensive Permafrost. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting of the component is backslopes. The pictured component, Boreal taiga silty colluvial slopes, frozen, comprises 28 percent of the map unit and is classified as coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels. The ecological site is *Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum* (F231XY111AK).

Plate 5.—Distribution map (a) and 3-D representation (b) of D31CF1, Boreal and Subalpine Hills with Extensive Permafrost. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting of the component is backslopes. The pictured component, Boreal woodland silty eolian slopes, frozen, comprises 29 percent of the map unit and is classified as loamy-skeletal, mixed, superactive, acid, subgelic Typic Histoturbels. The ecological site is *Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii* (F231XY118AK).

Plate 6.—Distribution map (a) and 3-D representation (b) of D31BH1, Boreal Sedimentary Hills. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting is backslopes. The pictured component, Boreal forest rocky colluvial slopes, comprises 34 percent of the map unit and is classified as loamy-skeletal, mixed, superactive Typic Haplocryepts. The ecological site is *Picea glauca-Betula neoalaskana/Alnus viridis ssp. Fruticosa-Rosa acicularis* (F231XY182AK).

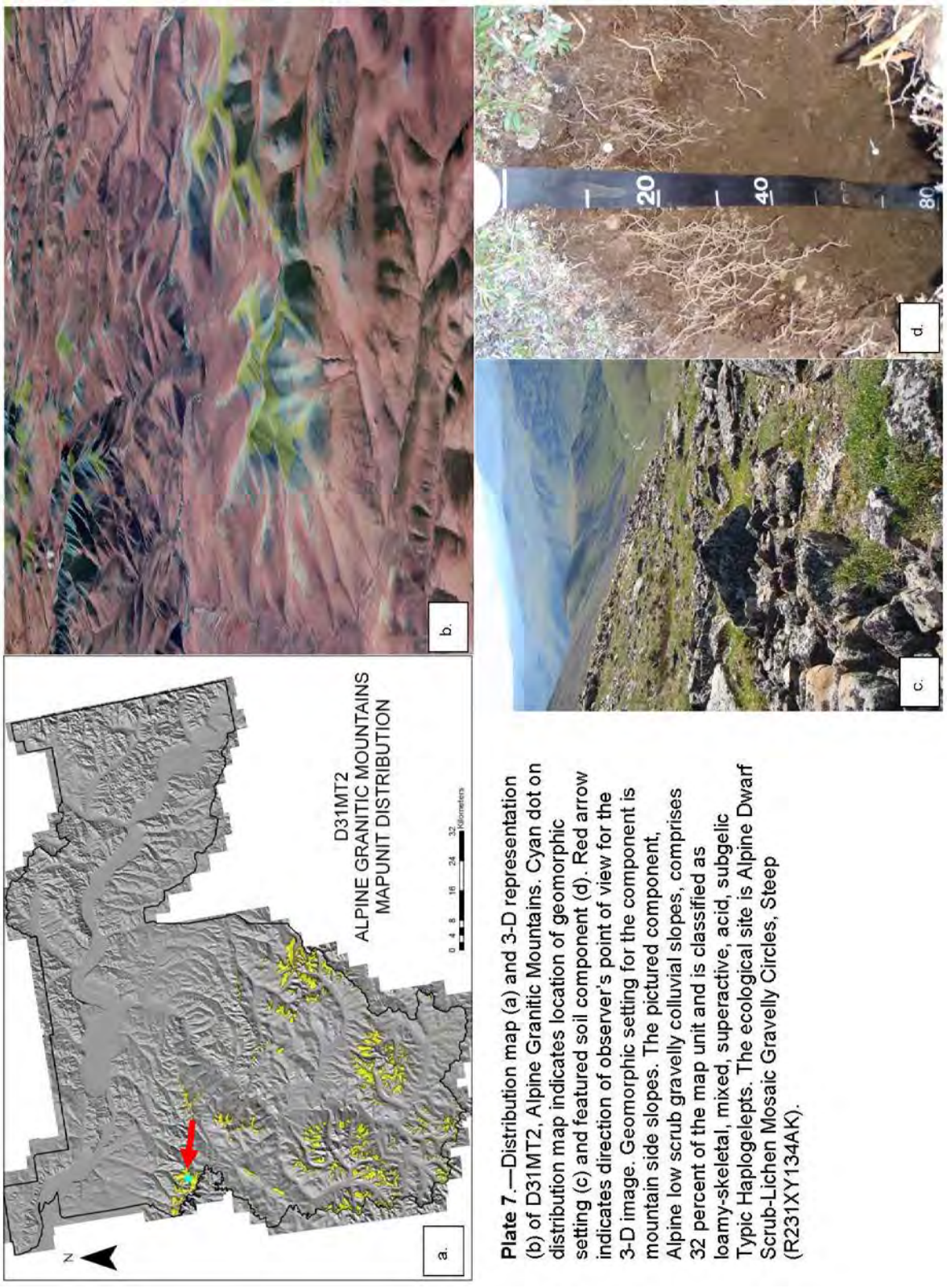
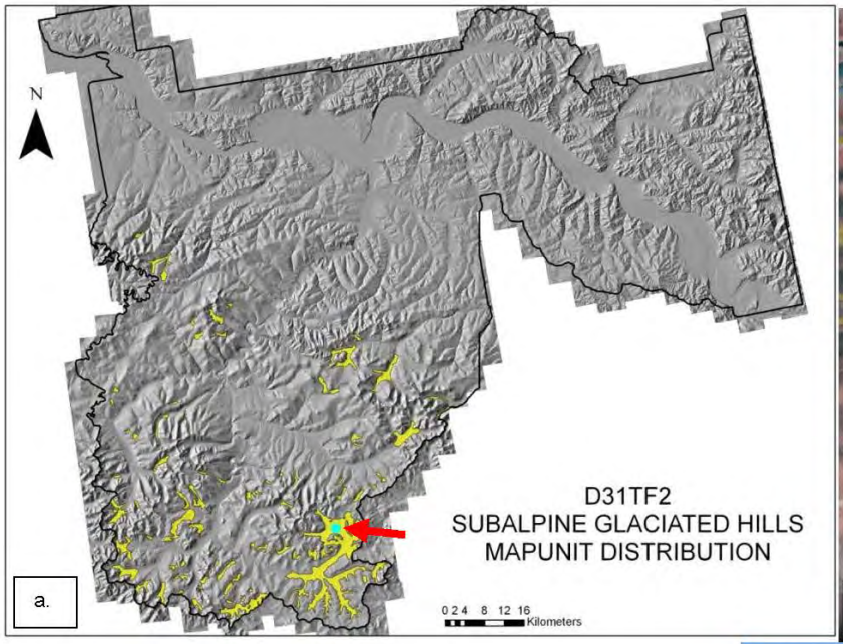
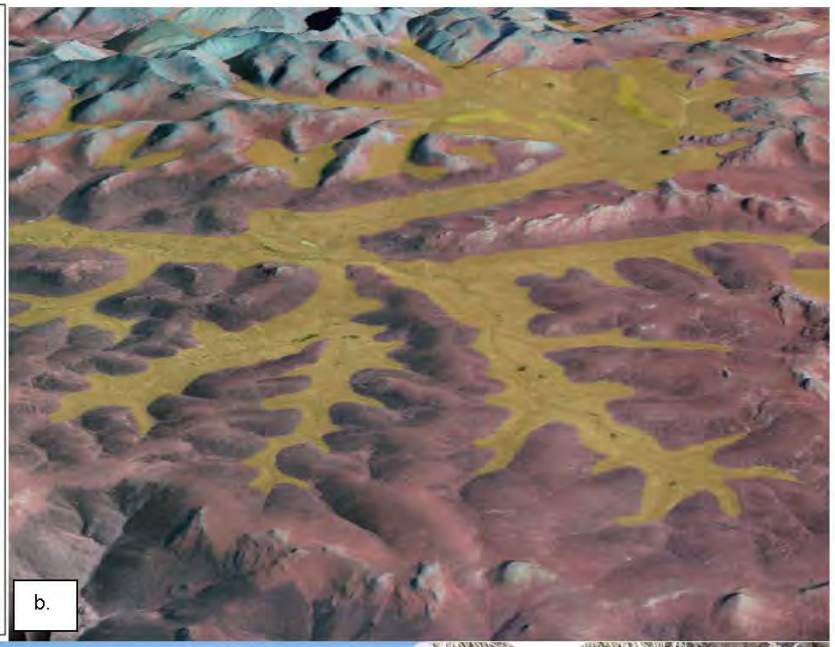


Plate 7.—Distribution map (a) and 3-D representation (b) of D31MT2, Alpine Granitic Mountains. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting for the component is mountain side slopes. The pictured component, Alpine low scrub gravelly colluvial slopes, comprises 32 percent of the map unit and is classified as loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts. The ecological site is Alpine Dwarf Scrub-Lichen Mosaic Gravelly Circles, Steep (R231XY134AK).





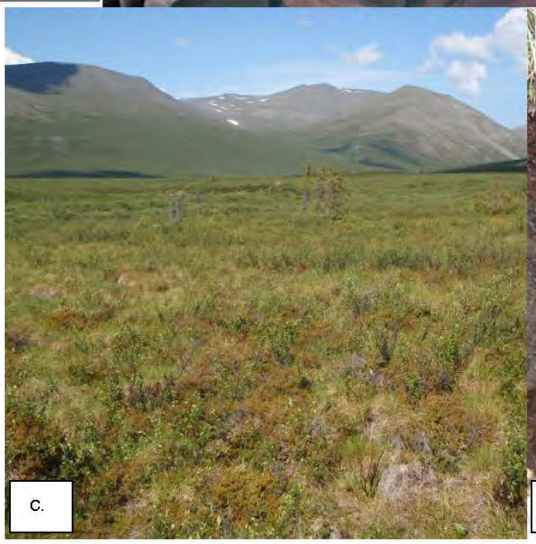
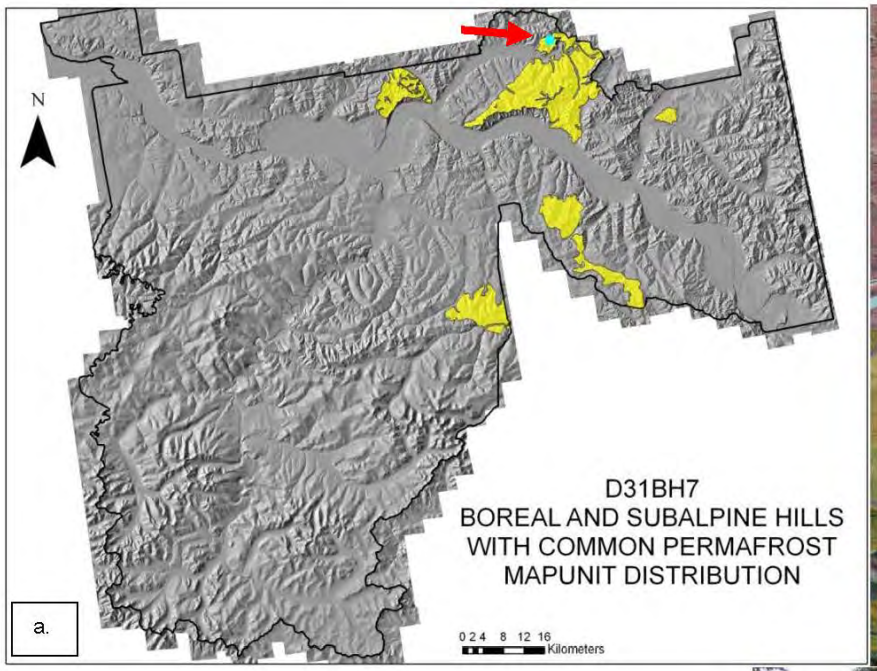
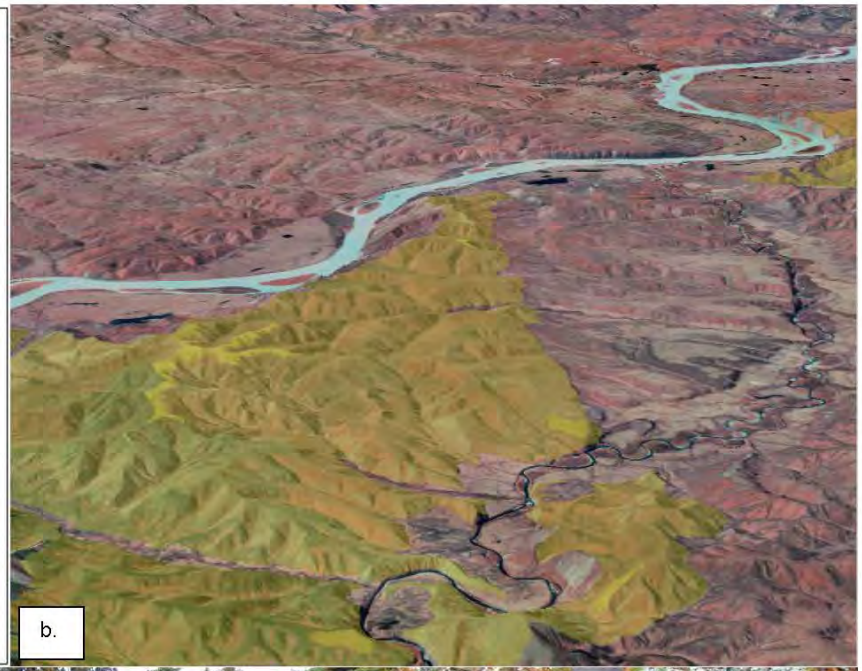


Plate 8.—Distribution map (a) and 3-D representation (b) of D31TF2, Subalpine Glaciated Hills. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting for the component is footslopes and toeslopes. The pictured component, Subalpine tussock–scrub loamy colluvial slopes, frozen, comprises 45 percent of the map unit and is classified as coarse-loamy, mixed, superactive, acid, subgelic Typic Histoturbels. The ecological site is Subalpine Scrub-Tussock Loamy Frozen Hummock (R231XY185AK).





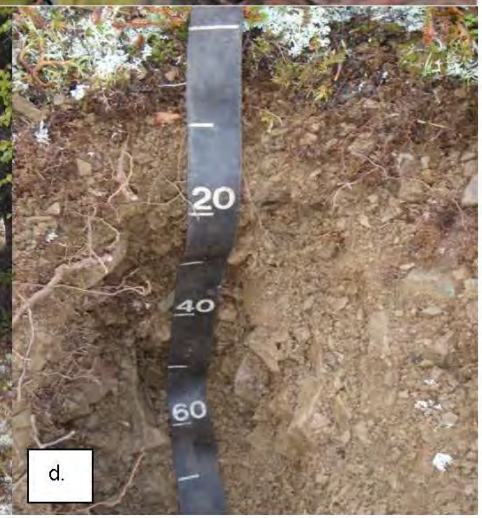


Plate 9.—Distribution map (a) and 3-D representation (b) of D31BH7, Boreal and Subalpine Hills with Common Permafrost. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting for the component is backslopes. The pictured component, Subalpine woodland rocky colluvial slopes, comprises 26 percent of the map unit and is classified as fragmental, mixed, Typic Haplocryepts. The ecological site is *Picea glauca/Betula glandulosa-Empetrum nigrum* (F231XY164AK).

Plate 10.—Distribution map (a) and 3-D representation (b) of D31YV3, Boreal Terraces with Extensive Permafrost. Cyan dot on distribution map indicates location of geomorphic setting (c) and featured soil component (d). Red arrow indicates direction of observer's point of view for the 3-D image. Geomorphic setting is terraces. The pictured component, Boreal taiga/tussock organic terraces, frozen, comprises 90 percent of the map unit and is classified as loamy, mixed, euic, subgelic Terric Fibristels. The ecological site is *Picea mariana/Ledum palustre ssp. Decumbens/Empetrum nigrum* (F231XY169AK).

Tables

Table 1.--Temperature and Precipitation

**(Recorded in the period 1949 to 2011 at Eagle, Alaska;
Source: WRCC)**

Month	Temperature			Precipitation	Snow
	Mean daily maximum	Mean daily minimum	Mean monthly	Mean monthly total	Mean monthly total
	°F	°F	°F	In	In
January----	-3.7	-21.3	-12.5	0.52	0.00
February---	5.3	-16.9	-5.7	0.43	0.02
March------	21.9	-8.1	6.9	0.34	0.86
April------	42.2	14.2	28.2	0.31	9.52
May--------	59.2	31.9	45.6	0.97	10.95
June-------	70.9	43.8	57.4	1.69	11.20
July-------	72.9	47.1	60.0	2.28	7.64
August-----	66.8	41.1	54.0	1.97	6.87
September--	53.8	30.7	42.2	1.24	5.16
October----	32.3	15.1	23.7	0.94	3.12
November---	11.4	-5.0	3.2	0.69	0.78
December---	1.4	-15.6	-7.1	0.69	0.00
Mean yearly----	36.2	13.1	24.6	12.00	59.00
Extreme----	97.0 June 1950	-71.0 January 1952	--- ---	6.04 July 2008	32.00 December 1974

Table 2.--Probability of Frost

(Recorded in the period 1961 to 1990 at Eagle, Alaska)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 28	June 16	July 4
2 years in 10 later than--	May 23	June 8	June 24
5 years in 10 later than--	May 13	May 24	June 7
First freezing temperature in fall:			
1 year in 10 earlier than--	August 24	August 16	August 8
2 years in 10 earlier than--	August 30	August 20	August 12
5 years in 10 earlier than--	September 11	August 28	August 19

Frost station: Eagle, Alaska (2607)
Start year—1961; end year—1990
Requested years of data: 30
Available years of data: 28
Spring--
  Years of missing data: 24 degrees—9; 28 degrees—9; 32 degrees—8
  Years with no occurrence: 24 degrees—0; 28 degrees—0; 32 degrees—0
  Data years used: 24 degrees—21; 28 degrees—21; 32 degrees—22
Fall--
  Years of missing data: 24 degrees—7; 28 degrees—7; 32 degrees—7
  Years with no occurrence: 24 degrees—0; 28 degrees—0; 32 degrees—0
  Data years used: 24 degrees—23; 28 degrees—23; 32 degrees—23

Table 3.--Ecoregions Heirarchy

National Hierarchical Framework of Ecological Units[1]	
Domain: Polar	
Division: Subarctic	
Province: Upper Yukon Tayga	
Section: Yukon-Old Crow Basin	
Subsection: *TL-Thanksgiving Loess Plain*	
Landtype Associations:	**D32TL1—Boreal Eolian Plains with Common Permafrost**
	D32TL2—Boreal Escarpments with Common Permafrost
	D32TL4—Boreal Eolian Plains with Extensive Permafrost
Province: Upper Yukon Tayga-Meadow	
Section: North Ogilvie Mountains	
Subsection: *BH—Biederman Hills*	
Landtype Associations:	**D31BH1—Boreal Sedimentary Hills**
	D31BH2-Boreal Dark Sedimentary Escarpments
	D31BH3—Boreal Hills with Common Permafrost
	D31BH5—Boreal Valley Bottoms
	D31BH6—Boreal Escarpments
	D31BH7—Boreal and Subalpine Hills with Common Permafrost
Subsection: *HL—Hard Luck Lowland*	
Landtype Associations:	**D31HL1—Boreal Eolian Hills with Common Permafrost**
	D31HL2—Boreal Eolian Hills with Extensive Permafrost
Subsection: *KT—Kandik Tableland*	
Landtype Associations:	**D31KT1—Boreal Eolian Plains with Extensive Permafrost, Wet**
Subsection: *LB—Little Black River Hills*	
Landtype Associations:	**D31LB1—Boreal Hills with Common Permafrost, Thin Surface**
	D31LB2—Boreal Hills with Common Permafrost, Steep
Subsection: *OF—Ogilvie Foothills*	
Landtype Associations:	**D31OF1—Boreal Hills with Common Permafrost, Nonacid**
Subsection: *OM—Ogilvie Lime/Dolostone Mountains*	
Landtype Associations:	**D31OM1—Alpine Angular Mountains**
	D31OM2—Alpine Lower Mountain Slopes
Subsection: *S—Snowy Domes*	
Landtype Associations:	**D31SD1—Alpine Rounded Mountains with Extensive Permafrost**

Subsection: ***TH—Tintina Hills***		
	Landtype Associations:	**D31TH1—Boreal Hills with Extensive Permafrost**
Subsection: ***YV—Yukon River Valley***		
	Landtype Associations:	**D31YV1—Boreal Flood Plains, Wet**
		D31YV2—Boreal Terraces and Flood Plains with Common Permafrost
		D31YV3—Boreal Terraces with Extensive Permafrost
		D31YV3—Boreal Terraces with Extensive Permafrost
		D31YV8—Boreal Low Flood Plains
		D31YV9—Boreal High Flood Plains
		D31TE1—Boreal Eolian Terraces with Extensive Permafrost
		D31TE2—Boreal Terraces with Extensive Permafrost, Wet
		D31TL1—Boreal Eolian Plains with Extensive Permafrost, Moist
Section: **Yukon-Tanana Uplands**		
Subsection: ***CF—Charley Foothills***		
	Landtype Associations:	**D31CF1—Boreal and Subalpine Hills with Extensive Permafrost**
Subsection: ***MT—Upper Charley Mountain Tundra***		
	Landtype Associations:	**D31MT1—Alpine Granitic Mountains, Dry**
		D31MT2—Alpine Granitic Mountains
		D31MT3—Alpine Rounded Mountains with Common Permafrost
		D31WA1—Alpine and Subalpine Water
Subsection: ***TF—Three Fingers Subalpine Basin***		
	Landtype Associations:	**D31TF1—Subalpine Hills**
		D31TF2—Subalpine Glaciated Hills
Subsection: ***UC—Upper Charley Valleys***		
	Landtype Associations:	**D31UC1—Boreal Eolian Hills with Common Permafrost, Wet**
		D31UC2—Subalpine and Boreal Hills
		D31UC3—Boreal Plains with Extensive Permafrost
		D31UC4—Boreal Flood Plains with Common Permafrost
		D31UC5—Alpine Glaciated Mountains

[1]Domain through Province level units based on *National Hierachical Framework of Ecological Units* (Cleland and others, 1997). Sections based on *Ecoregions of Alaska* (Nowacki and others, 2001). Subsections based on *Ecological Subsections of Yukon-Charley Rivers National Preserve* (Swanson, 2001). Landtype associations are synonymous with detailed reconnaissance map units developed as part of this survey.

Table 4.--Acreage/Hectarage and Proportionate Extent of the Soils

(An asterisk in the "Percent" column indicates less than 0.1 percent.)

Map symbol	Map unit name	Acres	Hectares	Percent
D31BH1	Boreal Sedimentary Hills	181,206	73,388	7.2
D31BH2	Boreal Dark Sedimentary Escarpments	13,965	5,656	0.6
D31BH3	Boreal Hills with Common Permafrost	17,324	7,016	0.7
D31BH5	Boreal Valley Bottoms	32,359	13,105	1.3
D31BH6	Boreal Escarpments	4,351	1,762	0.2
D31BH7	Boreal and Subalpine Hills with Common Permafrost	104,524	42,332	4.1
D31CF1	Boreal and Subalpine Hills with Extensive Permafrost	211,859	85,803	8.4
D31HL1	Boreal Eolian Hills with Common Permafrost	13,089	5,301	0.5
D31HL2	Boreal Eolian Hills with Extensive Permafrost	35,609	14,422	1.4
D31KT1	Boreal Eolian Plains with Extensive Permafrost, Wet	9,630	3,900	0.4
D31LB1	Boreal Hills with Common Permafrost, Thin Surface	36,636	14,838	1.5
D31LB2	Boreal Hills with Common Permafrost, Steep	24,324	9,851	1.0
D31MT1	Alpine Granitic Mountains, Dry	34,310	13,896	1.4
D31MT2	Alpine Granitic Mountains	113,888	46,125	4.5
D31MT3	Alpine Rounded Mountains with Common Permafrost	366,407	148,395	14.5
D31OF1	Boreal Hills with Common Permafrost, Nonacid	287,839	116,575	11.4
D31OM1	Alpine Angular Mountains	4,171	1,689	0.2
D31OM2	Alpine Lower Mountain Slopes	17,183	6,959	0.7
D31SD1	Alpine Rounded Mountains with Extensive Permafrost	2,662	1,078	0.1
D31TE1	Boreal Eolian Terraces with Extensive Permafrost	26,474	10,722	1.0
D31TE2	Boreal Terraces with Extensive Permafrost, Wet	22,944	9,292	0.9
D31TF1	Subalpine Hills	48,179	19,512	1.9
D31TF2	Subalpine Glaciated Hills	69,624	28,198	2.8
D31TH1	Boreal Hills with Extensive Permafrost	204,599	82,863	8.1
D31TL1	Boreal Eolian Plains with Extensive Permafrost, Moist	47,429	19,209	1.9
D31UC1	Boreal Eolian Hills with Common Permafrost, Wet	52,603	21,304	2.1
D31UC2	Subalpine and Boreal Hills	265,140	107,382	10.5
D31UC3	Boreal Plains with Extensive Permafrost	20,004	8,102	0.8
D31UC4	Boreal Flood Plains with Common Permafrost	28,566	11,569	1.1
D31UC5	Alpine Glaciated Mountains	14,268	5,779	0.6
D31WA1	Alpine and Subalpine Water	149	60	*
D31YV1	Boreal Flood Plains, Wet	19,378	7,848	0.8
D31YV2	Boreal Terraces and Flood Plains with Common Permafrost	19,381	7,849	0.8
D31YV3	Boreal Terraces with Extensive Permafrost	59,772	24,208	2.4
D31YV8	Boreal Low Flood Plains	43,891	17,776	1.7
D31YV9	Boreal High Flood Plains	11,146	4,514	0.4
D32TL1	Boreal Eolian Plains with Common Permafrost	34,456	13,955	1.4
D32TL2	Boreal Escarpments with Common Permafrost	21,346	8,645	0.8
D32TL4	Boreal Eolian Plains with Extensive Permafrost	2,824	1,144	0.1
	Total	2,523,509	1,022,021	100.0

* Less than 0.1 percent.

Table 5.--Soil-Ecological Site Correlation

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31BH1:			
34 percent; D31—Boreal forest rocky colluvial slopes	*Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis*	Forestland	F231XY182AK
24 percent; D31—Boreal forest rocky sedimentary colluvial slopes	*Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*	Forestland	F231XY110AK
17 percent; D31—Boreal taiga silty eolian slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
11 percent; D31—Boreal taiga silty colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
9 percent; D31—Boreal woodland silty eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
5 percent; D31—Boreal taiga silty drainages, frozen	*Picea mariana/Salix-Ledum groenlandicum*	Forestland	F231XY193AK
D31BH2:			
39 percent; D31—Boreal forest rocky sedimentary colluvial slopes	*Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*	Forestland	F231XY110AK
31 percent; D31—Boreal forest rocky colluvial escarpments	*Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*	Forestland	F231XY110AK
12 percent; D31—Boreal forest rocky colluvial slopes	*Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa*-Rosa *acicularis*	Forestland	F231XY182AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31BH2:			
11 percent; D31—Boreal scrub rocky colluvial escarpments	Boreal Scrub Gravelly Slopes, Dry	Rangeland	R231XY109AK
7 percent; D31—Boreal bedrock	Boreal Lichen Rock Outcrops Slopes	Rangeland	R231XY120AK
D31BH3:			
59 percent; D31—Boreal taiga silty eolian slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
33 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
8 percent; D31—Boreal woodland gravelly residual slopes	*Picea mariana-Betula neoalaskana/Vaccinium uliginosum/Cladonia*	Forestland	F231XY162AK
D31BH5:			
36 percent; D31—Boreal taiga/tussock organic terraces, frozen	*Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum*	Forestland	F231XY169AK
28 percent; D31—Boreal forest loamy high flood plains	*Picea glauca/Rosa acicularis/Lupinus arcticus*	Forestland	F231XY131AK
19 percent; D31—Boreal scrub rocky drainages	Boreal Scrub Gravelly Drainages	Rangeland	R231XY195AK
11 percent; D31—Boreal woodland rocky low flood plains	*Populus balsamifera/Salix alaxensis/Calamagrostis canadensis*	Forestland	F231XY130AK
6 percent; D31—Boreal water, flowing	Boreal Water, Non-Vegetated	Rangeland	R231XY194AK
D31BH6:			
56 percent; D31—Boreal forest gravelly colluvial escarpments	*Picea glauca/Rosa acicularis*	Forestland	F231XY181AK
25 percent; D31—Boreal rubble land	Boreal Lichen Rock Outcrops Slopes	Rangeland	R231XY120AK
10 percent; D31—Boreal forest loamy depressions, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31BH6:			
9 percent; D31—Boreal taiga gravelly drainages	*Picea mariana/Alnus viridis ssp. fruticosa/Calamagrostis canadensis*	Forestland	F231XY192AK
D31BH7:			
26 percent; D31—Subalpine woodland rocky colluvial slopes	*Picea glauca/Betula glandulosa-Empetrum nigrum*	Forestland	F231XY164AK
24 percent; D31—Boreal forest rocky colluvial slopes	*Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis*	Forestland	F231XY182AK
20 percent; D31—Boreal forest gravelly colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
13 percent; D31—Boreal forest rocky sedimentary colluvial slopes	*Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*	Forestland	F231XY110AK
10 percent; D31—Boreal woodland silty eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
7 percent; D31—Boreal scrub rocky drainages	Boreal Scrub Gravelly Drainages	Rangeland	R231XY195AK
D31CF1:			
32 percent; D31—Boreal forest gravelly colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
29 percent; D31—Boreal woodland silty eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
20 percent; D31—Subalpine woodland silty colluvial slopes, frozen	*Picea glauca/Salix-Vaccinium uliginosum*	Forestland	F231XY184AK
11 percent; D31—Subalpine woodland rocky residual slopes	*Picea glauca/Betula glandulosa-Empetrum nigrum*	Forestland	F231XY164AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31CF1:			
8 percent; D31—Boreal taiga gravelly drainages	*Picea mariana/Alnus viridis ssp. fruticosa/Calamagrostis canadensis*	Forestland	F231XY192AK
D31HL1:			
37 percent; D31—Boreal taiga silty colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
27 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
14 percent; D31—Boreal scrub rocky drainages	Boreal Scrub Gravelly Drainages	Rangeland	R231XY195AK
13 percent; D31—Boreal woodland rocky low flood plains	*Populus balsamifera/Salix alaxensis/Calamagrostis canadensis*	Forestland	F231XY130AK
9 percent; D31—Boreal forest loamy high flood plains, frozen	*Picea glauca/Alnus viridis ssp. fruticosa*	Forestland	F231XY151AK
D31HL2:			
47 percent; D31—Boreal taiga silty colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
43 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
10 percent; D31—Boreal taiga silty drainages, frozen	*Picea mariana/Salix-Ledum groenlandicum*	Forestland	F231XY193AK
D31KT1:			
79 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
10 percent; D31—Boreal taiga silty eolian slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
7 percent; D31—Boreal moss organic depressions	Boreal Moss Peat Plain	Rangeland	R231XY150AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31KT1:			
4 percent; D31—Boreal scrub-sedge organic depressions	Boreal Scrub Peat Plains	Rangeland	R231XY158AK
D31LB1:			
31 percent; D31—Boreal taiga silty eolian slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
26 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
23 percent; D31—Boreal forest rocky colluvial slopes	*Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa*-Rosa *acicularis*	Forestland	F231XY182AK
14 percent; D31—Boreal forest rocky sedimentary colluvial slopes	*Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*	Forestland	F231XY110AK
6 percent; D31—Boreal taiga silty drainages, frozen	*Picea mariana/Salix-Ledum groenlandicum*	Forestland	F231XY193AK
D31LB2:			
36 percent; D31—Boreal taiga silty colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
34 percent; D31—Boreal forest rocky sedimentary colluvial slopes	*Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*	Forestland	F231XY110AK
27 percent; D31—Boreal forest rocky colluvial slopes	*Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa*-Rosa *acicularis*	Forestland	F231XY182AK
3 percent; D31—Boreal scrub rocky colluvial escarpments	Boreal Scrub Gravelly Slopes, Dry	Rangeland	R231XY109AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31MT1:			
66 percent; D31—Alpine rubble land	Alpine and Subalpine Lichen Rock Outcrops Slopes	Rangeland	R231XY127AK
22 percent; D31—Alpine low scrub gravelly colluvial slopes	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Circles, Steep	Rangeland	R231XY134AK
7 percent; D31—Alpine scrub gravelly circles	Alpine Dwarf Scrub-Lichen Mosaic Gravelly, Circles	Rangeland	R231XY134AK
5 percent; D31—Alpine scrub gravelly circles, acid	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock	Rangeland	R231XY101AK
D31MT2:			
32 percent; D31—Alpine low scrub gravelly colluvial slopes	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Circles, Steep	Rangeland	R231XY34AK
30 percent; D31—Alpine scrub gravelly circles	Alpine Dwarf Scrub-Lichen Mosaic Gravelly, Circles	Rangeland	R231XY134AK
24 percent; D31—Alpine rubble land	Alpine and Subalpine Lichen Rock Outcrops Slopes	Rangeland	R231XY127AK
7 percent; D31—Alpine scrub gravelly circles, acid	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock	Rangeland	R231XY101AK
7 percent; D31—Alpine scrub loamy hummocks, frozen	Alpine Dwarf Scrub-Lichen Mosaic Peat Hummock	Rangeland	R231XY114AK
D31MT3:			
25 percent; D31—Alpine low scrub organic hummocks, frozen	Alpine Dwarf Scrub-Graminoid Mosaic Organic Frozen Mound	Rangeland	R231XY116AK
25 percent; D31—Alpine scrub loamy hummocks, frozen	Alpine Dwarf Scrub-Lichen Mosaic Peat Hummock	Rangeland	R231XY114AK
22 percent; D31—Alpine low scrub loamy solifluction lobes	Alpine Dwarf Scrub-Graminoid Mosaic Loamy Mound	Rangeland	R231XY113AK
10 percent; D31—Subalpine scrub silty till slopes	Subalpine Scrub Loamy Hummock	Rangeland	R231XY148AK
9 percent; D31—Alpine scrub gravelly circles, acid	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock	Rangeland	R231XY101AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31MT3:			
9 percent; D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Subalpine Scrub-Tussock Loamy Frozen Hummock	Rangeland	R231XY185AK
D31OF1:			
27 percent; D31—Boreal forest gravelly colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
24 percent; D31—Boreal woodland silty eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
21 percent; D31—Boreal forest rocky sedimentary colluvial slopes	*Picea glauca-Populus tremuloides/Shepherdia canadensis-Rosa acicularis/Mertensia paniculata-Geocaulon lividum*	Forestland	F231XY110AK
10 percent; D31—Boreal forest rocky colluvial slopes	*Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa-Rosa acicularis*	Forestland	F231XY182AK
10 percent; D31—Boreal woodland rocky colluvial slopes	*Picea mariana-Betula neoalaskana/Vaccinium uliginosum/Cladonia*	Forestland	F231XY162AK
8 percent; D31—Boreal scrub rocky drainages	Boreal Scrub Gravelly Drainages	Rangeland	R231XY195AK
D31OM1:			
57 percent; D31—Alpine scrub silty circles	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Slopes, Basic	Rangeland	R231XY105AK
30 percent; D31—Alpine rubble land	Alpine and Subalpine Lichen Rock Outcrops Slopes	Rangeland	R231XY127AK
13 percent; D31—Alpine bedrock	Alpine and Subalpine Lichen Rock Outcrops Slopes	Rangeland	R231XY127AK
D31OM2:			
60 percent; D31—Alpine scrub silty circles	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Slopes, Basic	Rangeland	R231XY105AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31OM2:			
18 percent; D31—Subalpine woodland silty colluvial slopes, frozen	*Picea glauca/Salix-Vaccinium uliginosum*	Forestland	F231XY184AK
14 percent; D31—Alpine bedrock	Alpine and Subalpine Lichen Rock Outcrops Slopes	Rangeland	R231XY127AK
8 percent; D31—Subalpine woodland silty colluvial slopes	*Picea glauca/Salix pulchra/Carex*	Forestland	F231XY140AK
D31SD1:			
48 percent; D31—Alpine low scrub organic hummocks, frozen	Alpine Dwarf Scrub-Graminoid Mosaic Organic Frozen Mound	Rangeland	R231XY116AK
29 percent; D31—Alpine tussock-scrub silty polygons, frozen	Alpine Lichen Loamy Polygon	Rangeland	R231XY115AK
11 percent; D31—Subalpine woodland silty colluvial slopes	*Picea glauca/Salix pulchra/Carex*	Forestland	F231XY140AK
7 percent; D31—Subalpine scrub loamy colluvial slopes, frozen	Subalpine Scrub Loamy Frozen Circles	Rangeland	R231XY129AK
5 percent; D31—Alpine rubble land	Alpine and Subalpine Lichen Rock Outcrops Slopes	Rangeland	R231XY127AK
D31TE1:			
62 percent; D31—Boreal taiga/tussock organic terraces, frozen	*Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum*	Forestland	F231XY169AK
20 percent; D31—Boreal taiga silty terraces, frozen	*Picea mariana/Vaccinium vitis-idaea-Rosa acicularis*	Forestland	F231XY178AK
10 percent; D31—Boreal forest silty drainages, frozen	*Betula neoalaskana/Alnus incana ssp. tenuifolia*	Forestland	F231XY197AK
8 percent; D31—Boreal grass organic depressions	Boreal Graminoid Peat Terrace, Depression	Rangeland	R231XY199AK
D31TE2:			
78 percent; D31—Boreal taiga/tussock organic terraces, frozen	*Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum*	Forestland	F231XY169AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31TE2:			
12 percent; D31—Boreal forest silty drainages, frozen	*Betula neoalaskana/Alnus incana ssp. tenuifolia*	Forestland	F231XY197AK
10 percent; D31—Boreal grass organic depressions	Boreal Graminoid Peat Terrace, Depression	Rangeland	R231XY199AK
D31TF1:			
55 percent; D31—Subalpine woodland silty colluvial slopes	*Picea glauca/Salix pulchra/Carex*	Forestland	F231XY140AK
34 percent; D31—Subalpine scrub loamy residual slopes	Subalpine Scrub Loamy Slopes	Rangeland	R231XY139AK
6 percent; D31—Subalpine scrub rocky drainages	Subalpine Scrub Loamy Drainages	Rangeland	R231XY152AK
5 percent; D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Subalpine Scrub-Tussock Loamy Frozen Hummock	Rangeland	R231XY185AK
D31TF2:			
45 percent; D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Subalpine Scrub-Tussock Loamy Frozen Hummock	Rangeland	R231XY185AK
41 percent; D31—Subalpine scrub silty till slopes	Subalpine Scrub Loamy Hummock	Rangeland	R231XY148AK
8 percent; D31—Subalpine scrub rocky drainages	Subalpine Scrub Loamy Drainages	Rangeland	R231XY152AK
6 percent; D31—Subalpine grass organic swales	Subalpine Graminoid Peat Swale	Rangeland	R231XY149AK
D31TH1:			
28 percent; D31—Boreal taiga silty colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
22 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
19 percent; D31—Boreal taiga gravelly colluvial slopes	*Picea mariana-Betula neoalaskana/Vaccinium uliginosum/Cladonia*	Forestland	F231XY162AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31TH1:			
17 percent; D31—Boreal woodland silty eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
8 percent; D31—Boreal forest loamy depressions	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
6 percent; D31—Boreal taiga silty drainages, frozen	*Picea mariana/Salix-Ledum groenlandicum*	Forestland	F231XY193AK
D31TL1:			
44 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
39 percent; D31—Boreal taiga silty eolian slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
10 percent; D31—Boreal forest loamy colluvial slopes	*Picea glauca*/Alnus-Rosa *acicularis*	Forestland	F231XY117AK
4 percent; D31—Boreal taiga gravelly drainages	*Picea mariana/Alnus viridis ssp. fruticosa/Calamagrostis canadensis*	Forestland	F231XY192AK
3 percent; D31—Boreal moss organic depressions	Boreal Moss Peat Plain	Rangeland	R231XY150AK
D31UC1:			
42 percent; D31—Boreal tussock organic plains, frozen	Boreal Tussock Peat Plains	Rangeland	R231XY128AK
24 percent; D31—Boreal taiga organic eolian slopes, frozen	*Picea mariana/Vaccinium uliginosum-Betula glandulosa/Carex bigelowii*	Forestland	F231XY118AK
21 percent; D31—Boreal forest loamy high flood plains	*Picea glauca/Rosa acicularis/Lupinus arcticus*	Forestland	F231XY131AK
9 percent; D31—Boreal woodland rocky low flood plains	*Populus balsamifera/Salix alaxensis/Calamagrostis canadensis*	Forestland	F231XY130AK
4 percent; D31—Boreal water, flowing	Boreal Water, Non-Vegetated	Rangeland	R231XY194AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31UC2:			
40 percent; D31—Subalpine woodland silty colluvial slopes, frozen	*Picea glauca/Salix-Vaccinium uliginosum*	Forestland	F231XY184AK
31 percent; D31—Boreal forest gravelly colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
13 percent; D31—Subalpine woodland rocky colluvial slopes, cold	*Picea mariana/Betula glandulosa*	Forestland	F231XY124AK
10 percent; D31—Subalpine scrub loamy colluvial slopes, frozen	Subalpine Scrub Loamy Frozen Circles	Rangeland	R231XY129AK
6 percent; D31—Boreal scrub rocky drainages	Boreal Scrub Gravelly Drainages	Rangeland	R231XY195AK
D31UC3:			
65 percent; D31—Boreal tussock organic plains, frozen	Boreal Tussock Peat Plains	Rangeland	R231XY128AK
18 percent; D31—Boreal taiga silty colluvial slopes, frozen	*Picea mariana/Vaccinium vitis-idaea-Vaccinium uliginosum*	Forestland	F231XY111AK
10 percent; D31—Boreal taiga silty drainages, frozen	*Picea mariana/Salix-Ledum groenlandicum*	Forestland	F231XY193AK
7 percent; D31—Boreal forest rocky colluvial slopes	*Picea glauca-Betula neoalaskana/Alnus viridis ssp. fruticosa*-Rosa *acicularis*	Forestland	F231XY182AK
D31UC4:			
32 percent; D31—Boreal woodland rocky low flood plains	*Populus balsamifera/Salix alaxensis/Calamagrostis canadensis*	Forestland	F231XY130AK
25 percent; D31—Boreal forest loamy high flood plains	*Picea glauca/Rosa acicularis/Lupinus arcticus*	Forestland	F231XY131AK
13 percent; D31—Boreal taiga/tussock organic terraces, frozen	*Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum*	Forestland	F231XY169AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31UC4:			
11 percent; D31—Boreal scrub organic depressions	Boreal Scrub Peat Floodplain	Rangeland	R231XY137AK
10 percent; D31—Boreal riverwash	Boreal Gravelly Floodplain, Non-Vegetated	Rangeland	R231XY126AK
9 percent; D31—Boreal forest loamy high flood plains, frozen	*Picea glauca/Alnus viridis ssp. fruticosa*	Forestland	F231XY151AK
D31UC5:			
35 percent; D31—Subalpine scrub silty till slopes	Subalpine Scrub Loamy Hummock	Rangeland	R231XY148AK
30 percent; D31—Alpine scrub gravelly circles, acid	Alpine Dwarf Scrub-Lichen Mosaic Gravelly Hummock	Rangeland	R231XY101AK
13 percent; D31—Alpine scrub loamy hummocks, frozen	Alpine Dwarf Scrub-Lichen Mosaic Peat Hummock	Rangeland	R231XY114AK
12 percent; D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Subalpine Scrub-Tussock Loamy Frozen Hummock	Rangeland	R231XY185AK
10 percent; D31—Subalpine scrub rocky drainages	Subalpine Scrub Loamy Drainages	Rangeland	R231XY152AK
D31WA1:			
95 percent; D31—Alpine water, ponded	Boreal Water, Non-Vegetated	Rangeland	R231XY194AK
5 percent; D31—Subalpine scrub rocky drainages	Subalpine Scrub Loamy Drainages	Rangeland	R231XY152AK
D31YV1:			
36 percent; D31—Boreal forest loamy mid flood plains	*Populus balsamifera*	Forestland	F231XY189AK
32 percent; D31—Boreal taiga loamy high flood plains, frozen	*Picea glauca*	Forestland	F231XY196AK
26 percent; D31—Boreal scrub sandy low flood plains	Boreal Scrub Sandy Floodplain, Low	Rangeland	R231XY198AK
6 percent; D31—Boreal riverwash--	Boreal Gravelly Floodplain, Non-Vegetated	Rangeland	R231XY126AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D31YV2:			
55 percent; D31—Boreal taiga/tussock organic terraces, frozen	*Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum*	Forestland	F231XY169AK
32 percent; D31—Boreal taiga loamy high flood plains, frozen	*Picea glauca*	Forestland	F231XY196AK
7 percent; D31—Boreal water, ponded	Boreal Water, Non-Vegetated	Rangeland	R231XY194AK
6 percent; D31—Boreal scrub organic depressions	Boreal Scrub Peat Floodplain	Rangeland	R231XY137AK
D31YV3:			
90 percent; D31—Boreal taiga/tussock organic terraces, frozen	*Picea mariana/Ledum palustre ssp. decumbens/Empetrum nigrum*	Forestland	F231XY169AK
10 percent; D31—Boreal grass organic depressions	Boreal Graminoid Peat Terrace, Depression	Rangeland	R231XY199AK
D31YV8:			
70 percent; D31—Boreal water, flowing	Boreal Water, Non-Vegetated	Rangeland	R231XY194AK
14 percent; D31—Boreal scrub sandy low flood plains	Boreal Scrub Sandy Floodplain, Low	Rangeland	R231XY198AK
10 percent; D31—Boreal riverwash	Boreal Gravelly Floodplain, Non-Vegetated	Rangeland	R231XY126AK
6 percent; D31—Boreal forest loamy mid flood plains	*Populus balsamifera*	Forestland	F231XY189AK
D31YV9:			
78 percent; D31—Boreal taiga loamy high flood plains, frozen	*Picea glauca*	Forestland	F231XY196AK
11 percent; D31—Boreal scrub sandy low flood plains	Boreal Scrub Sandy Floodplain, Low	Rangeland	R231XY198AK
7 percent; D31—Boreal scrub organic depressions	Boreal Scrub Peat Floodplain	Rangeland	R231XY137AK
4 percent; D31—Boreal scrub loamy depressions	Boreal Scrub Loamy Depression	Rangeland	R231XY138AK
D32TL1:			
79 percent; D32—Boreal taiga organic plains, frozen	*Picea mariana/Vaccinium uliginosum*-Ledum *groenlandicum*	Forestland	F232XY201AK

Table 5.--Soil-Ecological Site Correlation--Continued

Map unit symbol, percentage of map unit, and soil name	Ecological site name	Ecological site type	Ecological site ID
D32TL1:			
9 percent; D32—Boreal woodland loamy drainages, frozen	*Picea mariana/Salix pulchra-Alnus viridis ssp. fruticosa*	Forestland	F232XY203AK
8 percent; D32—Boreal forest gravelly escarpments, frozen	*Picea glauca-Betula* papyrifera*/Alnus viridis ssp. fruticosa*	Forestland	F232XY210AK
4 percent; Boreal moss organic depressions	Boreal Moss Peat Depression	Rangeland	R232XY220AK
D32TL2:			
40 percent; D32—Boreal forest gravelly escarpments, frozen	*Picea glauca-Betula* papyrifera*/Alnus viridis ssp. fruticosa*	Forestland	F232XY210AK
30 percent; D32—Boreal taiga loamy escarpment slopes	*Picea glauca/Shepherdia canadensis-Rosa acicularis*	Forestland	F232XY211AK
20 percent; D32—Boreal taiga silty eolian slopes, frozen	*Picea mariana/Alnus viridis ssp. fruticosa*-Ledum *groenlandicum*	Forestland	F232XY227AK
7 percent; D32—Boreal taiga organic plains, frozen	*Picea mariana/Vaccinium uliginosum*-Ledum *groenlandicum*	Forestland	F232XY201AK
3 percent; D32—Boreal woodland loamy drainages, frozen	*Picea mariana/Salix pulchra-Alnus viridis ssp. fruticosa*	Forestland	F232XY203AK
D32TL4:			
83 percent; D32—Boreal taiga organic plains, frozen	*Picea mariana/Vaccinium uliginosum*-Ledum groenlandicum	Forestland	F232XY201AK
10 percent; D32—Boreal woodland loamy drainages, frozen	*Picea mariana/Salix pulchra-Alnus viridis ssp. fruticosa*	Forestland	F232XY203AK
7 percent; D32—Boreal moss organic depressions	Boreal Moss Peat Depression	Rangeland	R232XY220AK

Table 6.--Plants in the Survey Area

Plant symbol	Scientific name	Common name
2FUNGI		Fungus
2LC		Lichen, crustose
2LF		Lichen, foliose
2LICHN		Lichen
2LU		Lichen, fruticose
2LW		Liverwort
2MOSS		Moss
ABAB70	*Abietinella abietina*	Abietinella moss
ACDE2	*Aconitum delphiniifolium*	Larkspurleaf monkshood
ACDED3	*Aconitum delphiniifolium ssp. delphiniifolium*	Larkspurleaf monkshood
ACDEP	*Aconitum delphiniifolium ssp. paradoxum*	Larkspurleaf monkshood
ACMI2	*Achillea millefolium*	Common yarrow
ACMIB	*Achillea millefolium var. borealis*	Boreal yarrow
ACMIO	*Achillea millefolium var. occidentalis*	Western yarrow
ACRU2	*Actaea rubra*	Red baneberry
ACSI	*Achillea sibirica*	Siberian yarrow
ADMO	*Adoxa moschatellina*	Muskroot
AGROP2	*Agropyron*	Wheatgrass
AGROS2	*Agrostis*	Bentgrass
AGSC5	*Agrostis scabra*	Rough bentgrass
ALAE	*Alopecurus aequalis*	Shortawn foxtail
ALINT	*Alnus incana ssp. tenuifolia*	Thinleaf alder
ALNUS	*Alnus*	Alder
ALOC60	*Alectoria ochroleuca*	Witch's hair lichen
ALSC	*Allium schoenoprasum*	Wild chives
ALSCS	*Allium schoenoprasum var. sibiricum*	Wild chives
ALVIF	*Alnus viridis ssp. fruticosa*	Siberian alder
AMAL2	*Amelanchier alnifolia*	Saskatoon serviceberry
ANAL4	*Antennaria alpina*	Alpine pussytoes
ANCH	*Androsace chamaejasme*	Sweetflower rockjasmine
ANDR	*Anemone drummondii*	Drummond's anemone
ANEMO	*Anemone*	Anemone
ANFR	*Antennaria friesiana*	Fries' pussytoes
ANMO9	*Antennaria monocephala*	Pygmy pussytoes
ANMU	*Anemone multifida*	Pacific anemone
ANNA	*Anemone narcissiflora*	Narcissus anemone
ANPA	*Anemone parviflora*	Smallflowered anemone
ANPO	*Andromeda polifolia*	Bog rosemary
ANRI	*Anemone richardsonii*	Yellow thimbleweed
ANRO2	*Antennaria rosea*	Rosy pussytoes
ANRU7	*Andreaea rupestris*	Andreaea moss
ANSE4	*Androsace septentrionalis*	Pygmyflower rockjasmine
ANTEN	*Antennaria*	Pussytoes
APAN2	*Apocynum androsaemifolium*	Spreading dogbane
AQBR	*Aquilegia brevistyla*	Smallflower columbine
AQUIL	*Aquilegia*	Columbine
ARABI2	*Arabis*	Rockcress
ARAL2	*Arctostaphylos alpina*	Alpine bearberry
ARAL5	*Artemisia alaskana*	Alaska wormwood
ARAN5	*Arnica angustifolia*	Narrowleaf arnica
ARAN7	*Argentina anserina*	Silverweed cinquefoil
ARANA	*Arnica angustifolia ssp. angustifolia*	Narrowleaf arnica
ARAR9	*Artemisia arctica*	Boreal sagebrush
ARARA2	*Artemisia arctica ssp. arctica*	Boreal sagebrush
ARCA12	*Artemisia campestris*	Field sagewort
ARCA7	*Arenaria capillaris*	Slender mountain sandwort
ARCE60	*Arctoparmelia centrifuga*	Acrtoparmelia lichen
AREG	*Argentina egedii*	Pacific silverweed
AREGE	*Argentina egedii ssp. egedii*	Pacific silverweed
ARFR2	*Arnica frigida*	Snow arnica
ARFR4	*Artemisia frigida*	Prairie sagewort

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
ARHO2	*Arabis holboellii*	Holboell's rockcress
ARLA2	*Arctagrostis latifolia*	Wideleaf polargrass
ARLA9	*Artemisia laciniata*	Siberian wormwood
ARLE2	*Arnica lessingii*	Nodding arnica
ARLO5	*Arnica lonchophylla*	Longleaf arnica
ARMO4	*Arnica mollis*	Hairy arnica
ARNIC	*Arnica*	Arnica
ARRU	*Arctostaphylos rubra*	Red fruit bearberry
ARTEM	*Artemisia*	Sagebrush
ARTI	*Artemisia tilesii*	Tilesius' wormwood
ARUV	*Arctostaphylos uva-ursi*	Kinnikinnick
ASAHI2	*Asahinea*	Asahinea lichen
ASAL3	*Aster alpinus*	Alpine aster
ASAL7	*Astragalus alpinus*	Alpine milkvetch
ASAU4	*Astragalus australis*	Indian milkvetch
ASBO	*Astragalus bodinii*	Bodin's milkvetch
ASCI9	*Aspicilia cinerea*	Rimmed lichen
ASTER	*Aster*	Aster
ASTRA	*Astragalus*	Milkvetch
ASUM2	*Astragalus umbellatus*	Tundra milkvetch
AULAC2	*Aulacomnium*	Aulacomnium moss
AUPA70	*Aulacomnium palustre*	Aulacomnium moss
AUTU70	*Aulacomnium turgidum*	Turgid aulacomnium moss
BEGL	*Betula glandulosa*	Shrub birch
BENA	*Betula nana*	Dwarf birch
BENE4	*Betula neoalaskana*	Resin birch
BEOC2	*Betula occidentalis*	Water birch
BESA3	*Betula × sargentii*	Sargent birch
BESY	*Beckmannia syzigachne*	American sloughgrass
BETUL	*Betula*	Birch
BORI2	*Boykinia richardsonii*	Richardson's brookfoam
BORO	*Boschniakia rossica*	Northern groundcone
BRACH10	*Brachythecium*	Brachythecium moss
BRCI2	*Bromus ciliatus*	Fringed brome
BRDI60	*Bryocaulon divergens*	Bryocaulon lichen
BRINP5	*Bromus inermis ssp. pumpellianus var. pumpellianus*	Pumpelly's brome
BRODO2	*Brodoa*	Brodoa lichen
BROMU	*Bromus*	Brome
BRSA7	*Brachythecium salebrosum*	Brachythecium moss
BRYOR2	*Bryoria*	Horsehair lichen
BRYUM2	*Bryum*	Bryum moss
BUAM2	*Bupleurum americanum*	American thorow wax
CAAQ	*Carex aquatilis*	Water sedge
CAAT2	*Carex atherodes*	Wheat sedge
CAAU3	*Carex aurea*	Golden sedge
CABE	*Cardamine bellidifolia*	Alpine bittercress
CABI5	*Carex bigelowii*	Bigelow's sedge
CACA11	*Carex canescens*	Silvery sedge
CACA12	*Carex capillaris*	Hairlike sedge
CACA13	*Carex capitata*	Capitate sedge
CACA20	*Castilleja caudata*	Port Clarence Indian paintbrush
CACA4	*Calamagrostis canadensis*	Bluejoint
CACO10	*Carex concinna*	Low northern sedge
CADE9	*Carex deweyana*	Dewey sedge
CADI4	*Carex diandra*	Lesser panicled sedge
CAEL6	*Castilleja elegans*	Elegant Indian paintbrush
CAHY6	*Castilleja hyperborea*	Northern Indian paintbrush
CALA10	*Carex lachenalii*	Twotipped sedge
CALA11	*Carex lasiocarpa*	Woollyfruit sedge

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
CALA7	*Campanula lasiocarpa*	Mountain harebell
CALAM	*Calamagrostis*	Reedgrass
CALI7	*Carex limosa*	Mud sedge
CALLI10	*Calliergon*	Calliergon moss
CALO4	*Carex loliacea*	Ryegrass sedge
CAME4	*Carex membranacea*	Fragile sedge
CAMI4	*Carex microchaeta*	Smallawned sedge
CAMIM	*Carex microchaeta ssp. microchaeta*	Smallawned sedge
CAMPA	*Campanula*	Bellflower
CAOL	*Cardamine oligosperma*	Little western bittercress
CAOLK	*Cardamine oligosperma var. kamtschatica*	Umbel bittercress
CAPA26	*Castilleja parviflora*	Mountain Indian paintbrush
CAPA5	*Caltha palustris*	Yellow marsh marigold
CAPO	*Carex podocarpa*	Shortstalk sedge
CAPR3	*Cardamine pratensis*	Cuckoo flower
CAPU	*Calamagrostis purpurascens*	Purple reedgrass
CAPU5	*Cardamine purpurea*	Purple bittercress
CARA5	*Carex rariflora*	Looseflower alpine sedge
CARDA	*Cardamine*	Bittercress
CAREX	*Carex*	Sedge
CARO2	*Campanula rotundifolia*	Bluebell bellflower
CARO7	*Carex rotundata*	Round sedge
CASA10	*Carex saxatilis*	Rock sedge
CASC10	*Carex scirpoidea*	Northern singlespike sedge
CASI12	*Carex siccata*	Dryspike sedge
CAST10	*Carex stylosa*	Variegated sedge
CAST36	*Calamagrostis stricta*	Slimstem reedgrass
CASTI2	*Castilleja*	Indian paintbrush
CASTI3	*Calamagrostis stricta ssp. inexpansa*	Northern reedgrass
CATE11	*Cassiope tetragona*	White arctic mountain heather
CATE5	*Carex tenuiflora*	Sparseflower sedge
CAUT	*Carex utriculata*	Northwest Territory sedge
CAVA2	*Carex vaginata*	Sheathed sedge
CAYU	*Castilleja yukonis*	Yukon Indian paintbrush
CEBE2	*Cerastium beeringianum*	Bering chickweed
CEER6	*Cetraria ericetorum*	Cetraria lichen
CEIS60	*Cetraria islandica*	Island cetraria lichen
CEMA5	*Cerastium maximum*	Great chickweed
CENI60	*Cetraria nigricans*	Cetraria lichen
CEPU12	*Ceratodon purpureus*	Ceratodon moss
CERAS	*Cerastium*	Mouse-ear chickweed
CETRA2	*Cetraria*	Cetraria lichen
CHAME2	*Chamerion*	Fireweed
CHAN9	*Chamerion angustifolium*	Fireweed
CHANA2	*Chamerion angustifolium ssp. angustifolium*	Fireweed
CHCA2	*Chamaedaphne calyculata*	Leatherleaf
CHCA4	*Chenopodium capitatum*	Blite goosefoot
CHLA13	*Chamerion latifolium*	Dwarf fireweed
CHTE3	*Chrysosplenium tetrandrum*	Northern golden saxifrage
CIAL	*Circaea alpina*	Small enchanter's nightshade
CIVI5	*Cicuta virosa*	Mackenzie's water hemlock
CIVI5	*Cicuta virosa*	Mackenzie's water hemlock
CLADI3	*Cladina*	Reindeer lichen
CLADO3	*Cladonia*	Cup lichen
CLBE4	*Cladonia bellidiflora*	Cup lichen
CLBO7	*Cladonia borealis*	Boreal cup lichen
CLBO9	*Cladonia botrytes*	Cup lichen
CLCA9	*Cladonia cariosa*	Cup lichen
CLCH3	*Cladonia chlorophaea*	Cup lichen
CLCO12	*Cladonia coccifera*	Cup lichen

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
CLCO19	*Cladonia cornuta*	Cup lichen
CLDE60	*Cladonia deformis*	Deformed cup lichen
CLDE70	*Climacium dendroides*	Tree climacium moss
CLFI2	*Cladonia fimbriata*	Cup lichen
CLGR13	*Cladonia gracilis*	Cup lichen
CLMI60	*Cladina mitis*	Reindeer lichen
CLMU60	*Cladonia multiformis*	Cup lichen
CLPH60	*Cladonia phyllophora*	Cup lichen
CLPL60	*Cladonia pleurota*	Cup lichen
CLPO60	*Cladonia pocillum*	Cup lichen
CLPY60	*Cladonia pyxidata*	Cup lichen
CLRA60	*Cladina rangiferina*	Greygreen reindeer lichen
CLSA2	*Claytonia sarmentosa*	Alaska springbeauty
CLSC60	*Cladonia scabriuscula*	Cup lichen
CLST5	*Cladina stygia*	Reindeer lichen
CLST60	*Cladina stellaris*	Star reindeer lichen
CLUN60	*Cladonia uncialis*	Cup lichen
CNCN	*Cnidium cnidiifolium*	Jakutsk snowparsley
COCA13	*Cornus canadensis*	Bunchberry dogwood
COCO38	*Conocephalum conicum*	Scented liverwort
COPA28	*Comarum palustre*	Purple marshlocks
COSE5	*Corydalis sempervirens*	Rock harlequin
COSES	*Cornus sericea ssp. sericea*	Redosier dogwood
COTE70	*Conostomum tetragonum*	Conostomum moss
COTR2	*Coptis trifolia*	Threeleaf goldthread
COTR3	*Corallorrhiza trifida*	Yellow coralroot
CREL	*Crepis elegans*	Elegant hawksbeard
CYFR2	*Cystopteris fragilis*	Brittle bladderfern
CYGU	*Cypripedium guttatum*	Spotted lady's slipper
CYPA5	*Cypripedium passerinum*	Sparrowegg lady's slipper
CYPRI	*Cypripedium*	Lady's slipper
DAAR60	*Dactylina arctica*	Arctic dactylina lichen
DACTY4	*Dactylina*	Dactylina lichen
DEBR	*Delphinium brachycentrum*	Northern larkspur
DECA18	*Deschampsia caespitosa*	Tufted hairgrass
DEGL3	*Delphinium glaucum*	Sierra larkspur
DELPH	*Delphinium*	Larkspur
DESO3	*Descurainia sophioides*	Northern tansymustard
DICR71	*Dicranoweisia crispula*	Dicranoweisia moss
DICRA8	*Dicranum*	Dicranum moss
DILA	*Diapensia lapponica*	Pincushion plant
DITRI2	*Ditrichum*	Ditrichum moss
DOFR	*Dodecatheon frigidum*	Western arctic shootingstar
DRDE	*Draba densifolia*	Denseleaf draba
DRFR	*Dryopteris fragrans*	Fragrant woodfern
DRIN4	*Dryas integrifolia*	Entireleaf mountain-avens
DRINS	*Dryas integrifolia ssp. sylvatica*	Entireleaf mountain-avens
DROC	*Dryas octopetala*	Eightpetal mountain-avens
DROSE	*Drosera*	Sundew
DRRO	*Drosera rotundifolia*	Roundleaf sundew
DRYAS	*Dryas*	Mountain-avens
DRYOP	*Dryopteris*	Woodfern
ELCO	*Elaeagnus commutata*	Silverberry
ELMA7	*Elymus macrourus*	Thickspike wheatgrass
ELTR7	*Elymus trachycaulus*	Slender wheatgrass
ELTRS	*Elymus trachycaulus ssp. subsecundus*	Slender wheatgrass
ELYMU	*Elymus*	Wildrye
EMNI	*Empetrum nigrum*	Black crowberry
EPAN2	*Epilobium angustifolium*	Fireweed
EPDA	*Epilobium davuricum*	Dahurian willowherb

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
EPILO	*Epilobium*	Willowherb
EQAR	*Equisetum arvense*	Field horsetail
EQFL	*Equisetum fluviatile*	Water horsetail
EQHY	*Equisetum hyemale*	Scouringrush horsetail
EQPA	*Equisetum palustre*	Marsh horsetail
EQPR	*Equisetum pratense*	Meadow horsetail
EQSC	*Equisetum scirpoides*	Dwarf scouringrush
EQSY	*Equisetum sylvaticum*	woodland horsetail
EQUIS	*Equisetum*	Horsetail
EQVA	*Equisetum variegatum*	Variegated scouringrush
ERACP2	*Erigeron acris ssp. politus*	Bitter fleabane
ERAN6	*Eriophorum angustifolium*	Tall cottongrass
ERBR6	*Eriophorum brachyantherum*	Northland cottonsedge
ERCA2	*Erigeron caespitosus*	Tufted fleabane
ERGL2	*Erigeron glabellus*	Streamside fleabane
ERGR8	*Eriophorum gracile*	Slender cottongrass
ERHU	*Erigeron humilis*	Arctic alpine fleabane
ERIGE2	*Erigeron*	Fleabane
ERIOP	*Eriophorum*	Cottongrass
ERRU2	*Eriophorum russeolum*	Red cottongrass
ERSC2	*Eriophorum scheuchzeri*	White cottongrass
ERVA4	*Eriophorum vaginatum*	Tussock cottongrass
EUSI13	*Eurybia sibirica*	Arctic aster
EVME60	*Evernia mesomorpha*	Ring lichen
FEAL	*Festuca altaica*	Altai fescue
FEBR	*Festuca brachyphylla*	Alpine fescue
FERU2	*Festuca rubra*	Red fescue
FESTU	*Festuca*	Fescue
FLCU	*Flavocetraria cucullata*	Flavo lichen
FLNI	*Flavocetraria nivalis*	Fleavo lichen
GABO2	*Galium boreale*	Northern bedstraw
GATR2	*Galium trifidum*	Threepetal bedstraw
GEAL2	*Gentiana algida*	Whitish gentian
GEAL3	*Geum aleppicum*	Yellow avens
GEGL	*Gentiana glauca*	Pale gentian
GELI2	*Geocaulon lividum*	False toadflax
GENTI	*Gentiana*	Gentian
GEPR3	*Gentiana prostrata*	Pygmy gentian
GEPR5	*Gentianella propinqua*	Fourpart dwarf gentian
GEPRP	*Gentianella propinqua ssp. propinqua*	Fourpart dwarf gentian
GERO2	*Geum rossii*	Ross' avens
GLGR	*Glyceria grandis*	American mannagrass
GORE2	*Goodyera repens*	Lesser rattlesnake plantain
GYDR	*Gymnocarpium dryopteris*	Western oakfern
GYJE	*Gymnocarpium jessoense*	Asian oakfern
HEAL	*Hedysarum alpinum*	Alpine sweetvetch
HEBO	*Hedysarum boreale*	Boreal sweetvetch
HEDYS	*Hedysarum*	Sweetvetch
HIAL2	*Hieracium albiflorum*	White hawkweed
HIAL3	*Hierochloe alpina*	Alpine sweetgrass
HIERO	*Hierochloe*	Sweetgrass
HIOD	*Hierochloe odorata*	Vanilla grass
HIVU2	*Hippuris vulgaris*	Common mare's-tail
HUSES	*Huperzia selago var. selago*	Fir clubmoss
HYPH60	*Hypogymnia physodes*	Tube lichen
HYPOG2	*Hypogymnia*	Tube lichen
HYRE70	*Hypnum revolutum*	Revolute hypnum moss
HYSP70	*Hylocomium splendens*	Splendid feather moss
ICER	*Icmadophila ericetorum*	Peppermint drop lichen

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
JUAL4	*Juncus alpinoarticulatus*	Northern green rush
JUAR2	*Juncus arcticus*	Arctic rush
JUARA	*Juncus arcticus ssp. alaskanus*	Alaska rush
JUCA6	*Juncus castaneus*	Chestnut rush
JUCAC2	*Juncus castaneus ssp. castaneus*	Chestnut rush
JUCO6	*Juniperus communis*	Common juniper
JUTE	*Juncus tenuis*	Poverty rush
KOMA	*Koeleria macrantha*	Prairie Junegrass
LECID2	*Lecidea*	Lecidea lichen
LEDUM	*Ledum*	Labrador tea
LEGR	*Ledum groenlandicum*	Bog Labrador tea
LEPAD	*Ledum palustre ssp. decumbens*	Marsh Labrador tea
LETE60	*Lecidea tessellata*	Lecidea lichen
LIBO3	*Linnaea borealis*	Twinflower
LIBO4	*Listera borealis*	Northern twayblade
LLSE	*Lloydia serotina*	Common alplily
LOPR	*Loiseleuria procumbens*	Alpine azalea
LUAR2	*Lupinus arcticus*	Arctic lupine
LUAR9	*Luzula arctica*	Arctic woodrush
LUARU	*Luzula arcuata ssp. unalaschcensis*	Alaska curved woodrush
LUCO5	*Luzula confusa*	Northern woodrush
LUGR8	*Luzula groenlandica*	Greenland woodrush
LUMU2	*Luzula multiflora*	Common woodrush
LUPA4	*Luzula parviflora*	Smallflowered woodrush
LURU2	*Luzula rufescens*	Rufous woodrush
LUSP4	*Luzula spicata*	Spiked woodrush
LUZUL	*Luzula*	Woodrush
LYAL3	*Lycopodium alpinum*	Alpine clubmoss
LYAN2	*Lycopodium annotinum*	Stiff clubmoss
LYCL	*Lycopodium clavatum*	Running clubmoss
LYCO3	*Lycopodium complanatum*	Groundcedar
LYCOP2	*Lycopodium*	Clubmoss
LYDE	*Lycopodium dendroideum*	Tree groundpine
MAPA4	*Malaxis paludosa*	Bog adder's-mouth orchid
MAPO16	*Marchantia polymorpha*	Marchantia polymorpha
MARI60	*Masonhalea richardsonii*	Richardson's manohalea lichen
MELAN5	*Melanelia*	Melanelia lichen
MEPA	*Mertensia paniculata*	Tall bluebells
METR3	*Menyanthes trifoliata*	Buckbean
MEUL70	*Meesia uliginosa*	Meesia moss
MIAR3	*Minuartia arctica*	Arctic stitchwort
MIBI9	*Minuartia biflora*	Mountain stitchwort
MINUA	*Minuartia*	Stitchwort
MIRO4	*Minuartia rossii*	Ross' sandwort
MIYU	*Minuartia yukonensis*	Yukon stitchwort
MOLA6	*Moehringia lateriflora*	Bluntleaf sandwort
MOUN2	*Moneses uniflora*	Single delight
MYAS2	*Myosotis asiatica*	Asian forget-me-not
MYGA	*Myrica gale*	Sweetgale
NEAR60	*Nephroma arcticum*	Arctic kidney lichen
NEEX2	*Nephroma expallidum*	Kidney lichen
NEPHR3	*Nephroma*	Kidney lichen
OCUP60	*Ochrolechia upsaliensis*	Upsala crabseye lichen
OPLA4	*Ophioparma lapponica*	Ophioparma lichen
ORSE	*Orthilia secunda*	Sidebells wintergreen
OXAR2	*Oxytropis arctica*	Arctic locoweed
OXDE2	*Oxytropis deflexa*	Nodding locoweed
OXDEF	*Oxytropis deflexa var. foliolosa*	Nodding locoweed
OXDI3	*Oxyria digyna*	Alpine mountainsorrel
OXNI	*Oxytropis nigrescens*	Blackish oxytrope

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
OXSC	*Oxytropis scammaniana*	Scamman's oxytrope
OXYTR	*Oxytropis*	Locoweed
PAFI3	*Parnassia fimbriata*	Fringed grass of Parnassus
PAHY5	*Packera hyperborealis*	Northern groundsel
PAKO3	*Parnassia kotzebuei*	Kotzebue's grass of Parnassus
PALA9	*Papaver lapponicum*	Lapland poppy
PAMA5	*Papaver macounii*	Macoun's poppy
PAMC	*Papaver mcconnellii*	McConnell's poppy
PANU5	*Parrya nudicaulis*	Nakedstem wallflower
PAPA8	*Parnassia palustris*	Marsh grass of Parnassus
PAPAV	*Papaver*	Poppy
PARA11	*Papaver radicatum*	Rooted poppy
PARAA	*Papaver radicatum ssp. alaskanum*	Rooted poppy
PASU63	*Parmelia sulcata*	Shield lichen
PEAP60	*Peltigera aphthosa*	Felt lichen
PECA2	*Pedicularis capitata*	Capitate lousewort
PECA60	*Peltigera canina*	Felt lichen
PEDI60	*Peltigera didactyla*	Felt lichen
PEDIC	*Pedicularis*	Lousewort
PEFL15	*Pentaphylloides floribunda*	Shrubby cinquefoil
PEFL15	*Pentaphylloides floribunda*	Shrubby cinquefoil
PEFR5	*Petasites frigidus*	Arctic sweet coltsfoot
PEFRF	*Petasites frigidus var. frigidus*	Arctic sweet coltsfoot
PEGO	*Penstemon gormanii*	Gorman's beardtongue
PEGR2	*Pedicularis groenlandica*	Elephanthead lousewort
PELA	*Pedicularis labradorica*	Labrador lousewort
PELA14	*Pedicularis lanata*	Wooly lousewort
PELA3	*Pedicularis langsdorfii*	Langsdorf's lousewort
PELA4	*Pedicularis lapponica*	Lapland lousewort
PELTI2	*Peltigera*	Felt lichen
PEOE	*Pedicularis oederi*	Oeder's lousewort
PESU	*Pedicularis sudetica*	Sudetic lousewort
PEVE	*Pedicularis verticillata*	Whorled lousewort
PHFO6	*Philonotis fontana*	Philonotis moss
PIGL	*Picea glauca*	White spruce
PIMA	*Picea mariana*	Black spruce
PIVI	*Pinguicula villosa*	Hairy butterwort
PLEUR10	*Pleurozium*	Big red stem moss
PLHY2	*Platanthera hyperborea*	Northern green orchid
PLMA2	*Plantago major*	Common plantain
PLOB	*Platanthera obtusata*	Bluntleaved orchid
PLOBO2	*Platanthera obtusata ssp. oligantha*	Bluntleaved orchid
PLSC70	*Pleurozium schreberi*	Schreber's big red stem moss
POA	*Poa*	Bluegrass
POAC	*Polemonium acutiflorum*	Tall Jacob's-ladder
POAL11	*Polygonum alpinum*	Alaska wild rhubarb
POAL2	*Poa alpina*	Alpine bluegrass
POAR2	*Poa arctica*	Arctic bluegrass
POARA2	*Poa arctica ssp. arctica*	Arctic bluegrass
POBA2	*Populus balsamifera*	Balsam poplar
POBI5	*Polygonum bistorta*	Meadow bistort
POBI8	*Potentilla biflora*	Twoflower cinquefoil
POBO2	*Polemonium boreale*	Northern Jacob's-ladder
POCO38	*Polytrichum commune*	Polytrichum moss
POGL	*Poa glauca*	Glaucous bluegrass
POGR9	*Potentilla gracilis*	Slender cinquefoil
POHLI2	*Pohlia*	Pohlia moss
POJU70	*Polytrichum juniperinum*	Juniper polytrichum moss
POLEM	*Polemonium*	Jacob's-ladder
POLYG4	*Polygonum*	Knotweed

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
POLYT5	*Polytrichum*	Polytrichum moss
POMA18	*Podistera macounii*	Macoun's woodroot
PONI2	*Potentilla nivea*	Snow cinquefoil
PONO3	*Potentilla norvegica*	Norwegian cinquefoil
PONU70	*Pohlia nutans*	Pohlia moss
POPA2	*Poa palustris*	Fowl bluegrass
POPE8	*Potentilla pensylvanica*	Pennsylvania cinquefoil
POPI10	*Polytrichum piliferum*	Polytrichum moss
POPO9	*Poa porsildii*	Porsild's bluegrass
POPR	*Poa pratensis*	Kentucky bluegrass
POPRA6	*Poa pratensis ssp. alpigena*	Kentucky bluegrass
PORPI2	*Porpidia*	Porpidai lichen
PORU3	*Potentilla rubricaulis*	rocky Mountain cinquefoil
POST70	*Polytrichum strictum*	Polytrichum moss
POTEN	*Potentilla*	Cinquefoil
POTR5	*Populus tremuloides*	Quaking aspen
POVI3	*Polygonum viviparum*	Alpine bistort
PREG	*Primula egaliksensis*	Greenland primrose
PRQU2	*Preissia quadrata*	Preissia quadrata
PRTS	*Primula tschuktschorum*	Chukchi primrose
PSDE60	*Psora decipiens*	Fishscale lichen
PSEUD33	*Pseudephebe*	Blackcurly lichen
PSPU60	*Pseudephebe pubescens*	Blackcurly lichen
PSSP6	*Pseudoroegneria spicata*	Bluebunch wheatgrass
PSSPS	*Pseudoroegneria spicata ssp. spicata*	Bluebunch wheatgrass
PTCR70	*Ptilium crista-castrensis*	Knights plume moss
PUPA5	*Pulsatilla patens*	American pasqueflower
PYAS	*Pyrola asarifolia*	Liverleaf wintergreen
PYCH	*Pyrola chlorantha*	Greenflowered wintergreen
PYGR	*Pyrola grandiflora*	Largeflowered wintergreen
PYMI	*Pyrola minor*	Snowline wintergreen
PYROL	*Pyrola*	Wintergreen
RAES	*Ranunculus eschscholtzii*	Eschscholtz's buttercup
RAGM	*Ranunculus gmelinii*	Gmelin's buttercup
RALA	*Ranunculus lapponicus*	Lapland buttercup
RAMA2	*Ranunculus macounii*	Macoun's buttercup
RANUN	*Ranunculus*	Buttercup
RHGE2	*Rhizocarpon geminatum*	Map lichen
RHGR5	*Rhizomnium gracile*	Rhizomnium moss
RHINI	*Rhodiola integrifolia ssp. integrifolia*	Ledge stonecrop
RHIZO2	*Rhizomnium*	Rhizomnium moss
RHIZO3	*Rhizocarpon*	Map lichen
RHLA2	*Rhododendron lapponicum*	Lapland rosebay
RHRU70	*Rhytidium rugosum*	Rhytidium moss
RHTR70	*Rhytidiadelphus triquetrus*	Rough goose neck moss
RHYTI4	*Rhytidium*	Rhytidium moss
RIBES	*Ribes*	Currant
RIGL	*Ribes glandulosum*	Skunk currant
RIHU	*Ribes hudsonianum*	Northern black currant
RILA	*Ribes lacustre*	Prickly currant
RITR	*Ribes triste*	Red currant
ROAC	*Rosa acicularis*	Prickly rose
ROBA	*Rorippa barbareifolia*	Hoary yellowcress
ROPA2	*Rorippa palustris*	Bog yellowcress
RORIP	*Rorippa*	Yellowcress
RUAQ	*Rumex aquaticus*	Western dock
RUAQF	*Rumex aquaticus var. fenestratus*	Western dock
RUAR	*Rubus arcticus*	Arctic blackberry
RUAR6	*Rumex arcticus*	Arctic dock
RUARA2	*Rubus arcticus ssp. acaulis*	Dwarf raspberry

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
RUCH	*Rubus chamaemorus*	Cloudberry
RUID	*Rubus idaeus*	American red raspberry
RUMEX	*Rumex*	Dock
SAAL	*Salix alaxensis*	Feltleaf willow
SAALA	*Salix alaxensis var. alaxensis*	Feltleaf willow
SAALL	*Salix alaxensis var. longistylis*	Feltleaf willow
SAAN3	*Saussurea angustifolia*	Narrowleaf saw-wort
SAANA3	*Saussurea angustifolia var. angustifolia*	Narrowleaf saw-wort
SAANY	*Saussurea angustifolia var. yukonensis*	Narrowleaf saw-wort
SAAR27	*Salix arctica*	Arctic willow
SAAR3	*Salix arbusculoides*	Littletree willow
SABA4	*Salix barrattiana*	Barratt's willow
SABE2	*Salix bebbiana*	Bebb willow
SABR6	*Saxifraga bronchialis*	Yellowdot saxifrage
SACA4	*Salix candida*	Sageleaf willow
SACA50	*Saxifraga caespitosa*	Tufted alpine saxifrage
SACH	*Salix chamissonis*	Chamisso's willow
SAFL6	*Saxifraga flagellaris*	Whiplash saxifrage
SAFU	*Salix fuscescens*	Alaska bog willow
SAGL	*Salix glauca*	Grayleaf willow
SAHA	*Salix hastata*	Halberd willow
SAHI3	*Saxifraga hirculus*	Yellow marsh saxifrage
SAHI5	*Saxifraga hieraciifolia*	Stiffstem saxifrage
SAIN3	*Salix interior*	Sandbar willow
SALIX	*Salix*	Willow
SALU	*Salix lucida*	Shining willow
SALUL	*Salix lucida ssp. lasiandra*	Pacific willow
SAMY	*Salix myrtillifolia*	Blueberry willow
SANE3	*Saxifraga nelsoniana*	Heartleaf saxifrage
SANEP2	*Saxifraga nelsoniana ssp. porsildiana*	Porsild's saxifrage
SANGU2	*Sanguisorba*	Burnet
SANI10	*Salix niphoclada*	Barrenground willow
SAOF3	*Sanguisorba officinalis*	Official burnet
SAOP	*Saxifraga oppositifolia*	Purple mountain saxifrage
SAPH	*Salix phlebophylla*	Skeletonleaf willow
SAPO	*Salix polaris*	Polar willow
SAPS	*Salix pseudomonticola*	False mountain willow
SAPS8	*Salix pseudomyrsinites*	Firmleaf willow
SAPU15	*Salix pulchra*	Tealeaf willow
SARA7	*Saxifraga razshivinii*	Alaska saxifrage
SARE2	*Salix reticulata*	Netleaf willow
SARE8	*Saxifraga reflexa*	Reflexed saxifrage
SARI4	*Salix richardsonii*	Richardson's willow
SARI8	*Saxifraga rivularis*	Weak saxifrage
SARO2	*Salix rotundifolia*	Least willow
SASC	*Salix scouleriana*	Scouler's willow
SASE7	*Saxifraga serpyllifolia*	Thymeleaf saxifrage
SASP4	*Saxifraga spicata*	Spiked saxifrage
SATR5	*Saxifraga tricuspidata*	Three toothed saxifrage
SAUN8	*Sanionia uncinata*	Sanionia moss
SAXIF	*Saxifraga*	Saxifrage
SCGA	*Scutellaria galericulata*	Marsh skullcap
SCMI2	*Scirpus microcarpus*	Panicled bulrush
SELU	*Senecio lugens*	Small blacktip ragwort
SENEC	*Senecio*	Ragwort
SESI	*Selaginella sibirica*	Siberian spikemoss
SHCA	Shepherdia *canadensis*	Russet buffaloberry
SIAC	*Silene acaulis*	Moss campion
SIIN4	*Silene involucrata*	Arctic catchfly
SILEN	*Silene*	Catchfly

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
SIME	*Silene menziesii*	Menzies' campion
SIMEW	*Silene menziesii ssp. williamsii*	Menzies' campion
SIPR	*Sibbaldia procumbens*	Creeping sibbaldia
SIRE3	*Silene repens*	Pink campion
SOCA6	*Solidago canadensis*	Canada goldenrod
SOCR60	*Solorina crocea*	Chocolate chip lichen
SOLID	*Solidago*	Goldenrod
SOMU	*Solidago multiradiata*	rocky Mountain goldenrod
SOMUM	*Solidago multiradiata var. multiradiata*	rocky Mountain goldenrod
SOMUS	*Solidago multiradiata var. scopulorum*	Manyray goldenrod
SOSI3	*Solidago simplex*	Mt. Albert goldenrod
SPAN11	*Sphagnum angustifolium*	Sphagnum
SPFU70	*Sphagnum fuscum*	Sphagnum
SPGI70	*Sphagnum girgensohnii*	Girgensohn's sphagnum
SPHAG2	*Sphagnum*	Shagnum moss
SPLU7	*Splachnum luteum*	Yellow moosedung moss
SPMA70	*Sphagnum magellanicum*	Magellan's sphagnum
SPRO	*Spiranthes romanzoffiana*	Hooded ladies'-tresses
SPST3	*Spiraea stevenii*	Beauverd spirea
SPWA70	*Sphagnum warnstorfii*	Warnstorf's sphagnum
STAL3	*Stellaria alaskana*	Alaska starwort
STCA	*Stellaria calycantha*	Northern starwort
STCR	*Stellaria crassifolia*	Fleshy starwort
STELL	*Stellaria*	Starwort
STERE2	*Stereocaulon*	Snow lichen
STLO	*Stellaria longifolia*	Longleaf starwort
STLO2	*Stellaria longipes*	Longstalk starwort
STME2	*Stellaria media*	Common chickweed
STTO60	*Stereocaulon tomentosum*	Tomentose snow lichen
SYBO	*Synthyris borealis*	Northern kittentails
SYFA	*Symphyotrichum falcatum*	White prairie aster
SYFAF	*Symphyotrichum falcatum var. falcatum*	White prairie aster
TABI	*Tanacetum bipinnatum*	Lake Huron tansy
TABIH	*Tanacetum bipinnatum ssp. huronense*	Lake Huron tansy
TALY	*Taraxacum lyratum*	Harp dandelion
TEAT2	*Tephroseris atropurpurea*	Arctic groundsel
THAL	*Thalictrum alpinum*	Alpine meadow-rue
THALI2	*Thalictrum*	Meadow-rue
THAMN3	*Thamnolia*	Whiteworm lichen
THOC	*Thalictrum occidentale*	Western meadow-rue
THSP	*Thalictrum sparsiflorum*	Fewflower meadow-rue
THSU60	*Thamnolia subuliformis*	Whiteworm lichen
TOCO	*Tofieldia coccinea*	Northern asphodel
TOFIE	*Tofieldia*	Tofieldia
TONI70	*Tomentypnum nitens*	Tomentypnum moss
TONI70	*Tomentypnum nitens*	Tomentypnum moss
TONIN	*Toninia*	Bruised lichen
TOPU	*Tofieldia pusilla*	Scotch false asphodel
TORTU	*Tortula*	Tortula moss
TRAT3	*Tremolecia atrata*	Disc lichen
TRCA30	*Trichophorum caespitosum*	Tufted bulrush
TREMO	*Tremolecia*	Disc lichen
TRIGL	*Triglochin*	Arrowgrass
TRMA4	*Triglochin maritimum*	Seaside arrowgrass
TRSP2	*Trisetum spicatum*	Spike trisetum
UMBIL2	*Umbilicaria*	Navel lichen
USNEA2	*Usnea*	Beard lichen
VACA3	*Valeriana capitata*	Captiate valerian
VAOX	*Vaccinium oxycoccos*	Small cranberry
VAUL	*Vaccinium uliginosum*	Bog blueberry

Table 6.--Plants in the Survey Area--Continued

Plant symbol	Scientific name	Common name
VAVI	*Vaccinium vitis-idaea*	Lingonberry
VEWO2	*Veronica wormskjoldii*	American alpine speedwell
VIED	*Viburnum edule*	Squashberry
VIEP	*Viola epipsila*	Dwarf marsh violet
VIOLA	*Viola*	Violet
VUPI	*Vulpicida pinastri*	Pin lichen
VUTI	*Vulpicida tilesii*	Tile lichen
WIPH	*Wilhelmsia physodes*	Merckia
WOAL	*Woodsia alpina*	Alpine woodsia
WOGL	*Woodsia glabella*	Smooth woodsia
XANTH7	*Xanthoparmelia*	Xanthoparmelia lichen
XASO2	*Xanthoparmelia somloensis*	Vestergrenopsis lichen
ZIEL2	*Zigadenus elegans*	Mountain deathcamas

Table 7.--Engineering Index Properties

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

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31BH1:												
D31—Boreal forest rocky colluvial slopes	0-8	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	8-14	Gravelly loam, silt loam	ML	A-4	0-4	0-11	70-95	68-95	61-95	42-86	0-48	NP-7
	14-42	Extremely cobbly sandy loam, very cobbly silt loam, very cobbly loam	GC-GM	A-2-4	0-10	5-32	38-60	35-59	29-59	18-43	0-39	NP-9
	42-152	Very gravelly silt loam, extremely gravelly coarse sandy loam	GP-GM	A-1-a	0-15	12-32	12-61	8-59	5-52	3-32	0-44	NP-9
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-10	Very stony loam, silt, stony silt loam	ML	A-4	0-14	0-13	43-89	41-89	36-89	25-78	0-50	NP-9
	10-41	Extremely gravelly sandy loam, very gravelly silt loam, very gravelly loam	GC-GM	A-2-4	0-12	10-26	28-59	24-58	20-56	11-38	0-39	NP-8
	41-152	Very gravelly sandy loam, extremely gravelly sandy loam	GP-GM	A-1-a	0-10	15-33	11-43	7-41	5-35	2-22	0-43	NP-9
D31—Boreal taiga silty eolian slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	—-
	21-28	Loam, silt, silt loam	ML	A-4	0	0	89-100	88-100	79-100	61-96	0-47	NP-6
	28-53	Cobbly sandy loam, silt loam	CL-ML	A-4	0	0-9	80-94	79-93	68-93	45-82	0-44	NP-9
	53-152	Permanently frozen sandy loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0-2	80-93	79-93	70-93	53-87	0-40	NP-6
D31BH2:												
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	—-
	4-10	Very stony loam, silt, stony silt loam	ML	A-4	0-14	0-13	43-89	41-89	36-89	25-78	0-50	NP-9
	10-41	Extremely gravelly sandy loam, very gravelly silt loam, very gravelly loam	GC-GM	A-2-4	0-12	10-26	28-59	24-58	20-56	11-38	0-39	NP-8
	41-152	Very gravelly sandy loam, extremely gravelly sandy loam	GP-GM	A-1-a	0-10	15-33	11-43	7-41	5-35	2-22	0-43	NP-9

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31BH2:												
D31—Boreal forest rocky colluvial escarpments	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-10	Extremely flaggy sandy loam, flaggy silt loam, very flaggy sandy loam	GM	A-4	5-24	14-43	47-78	46-77	36-75	22-52	0-49	NP-8
	10-43	Extremely flaggy sandy loam, very flaggy silt loam, extremely flaggy loam	GM	A-1-b	8-24	26-43	19-70	17-70	13-65	8-46	0-39	NP-8
	43-152	Channers, very channery silt loam, extremely channery sandy loam	GP-GM	A-1-a	18-22	34-45	9-59	7-58	5-48	3-33	0-43	NP-8
D31BH3:												
D31—Boreal taiga silty eolian slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Loam, silt, silt loam	ML	A-4	0	0	89-100	88-100	79-100	61-96	0-47	NP-6
	28-53	Cobbly sandy loam, silt loam	CL-ML	A-4	0	0-9	80-94	79-93	68-93	45-82	0-44	NP-9
	53-152	Permanently frozen sandy loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0-2	80-93	79-93	70-93	53-87	0-40	NP-6
D31—Boreal taiga organic eolian slopes, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9
D31BH5:												
D31—Boreal taiga/tussock organic terraces, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-54	Loam, silt, silt loam	ML	A-4	0	0	100	100	90-100	65-91	0-44	NP-9
	54-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	100	100	88-100	65-91	0-44	NP-9
D31—Boreal forest loamy high flood plains	0-13	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	13-18	Silt loam, sandy loam	ML	A-4	0	0	80-100	79-100	64-97	35-61	0-45	NP-4
	18-152	Stratified extremely gravelly loamy sand to very gravelly sandy loam, stratified loamy coarse sand to gravelly sandy loam, stratified very gravelly loamy coarse sand to gravelly sandy loam	GM	A-1-b	0-12	3-19	40-80	37-79	23-61	9-29	0-26	NP-4

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*						*Pct*
D31BH5:												
D31—Boreal scrub rocky drainages	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-14	Stratified fine sandy loam to silt loam, stratified sandy loam to silt loam	ML	A-4	0	0-20	73-100	72-100	59-100	34-67	0-50	NP-9
	14-152	Stratified very gravelly loamy fine sand to gravelly sandy loam, stratified very gravelly loamy sand to very gravelly sandy loam	GM	A-1-b	0-10	2-19	39-68	37-67	25-57	12-33	0-32	NP-10
D31BH6:												
D31—Boreal forest gravelly colluvial escarpments	0-14	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	14-22	Very cobbly sandy loam, silt loam, cobbly sandy loam	SM	A-4	2-9	4-18	38-83	35-83	28-83	16-58	0-50	NP-9
	22-152	Cobbles, extremely cobbly silt loam, extremely cobbly coarse sandy loam	GP-GM	A-1-a	0	21-43	11-38	7-36	5-32	3-21	0-44	NP-9
D31—Boreal rubble land	0-55	Extremely cobbly sandy loam, cobbles, extremely cobbly silt loam	GM	A-1-a	1-15	31-41	6-44	2-41	1-39	1-23	0-26	NP-2
	55-152	Bedrock			---	---	---	---	---	---	---	---
D31BH7:												
D31—Subalpine woodland rocky colluvial slopes	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-8	Very cobbly sandy loam, cobbly silt loam	GM	A-4	0-4	18-35	44-79	42-78	38-78	27-67	0-45	NP-4
	8-27	Cobbles, extremely cobbly silt loam, extremely cobbly sandy loam			0-5	20-51	8-38	4-35	3-32	2-21	0-34	NP-4
	27-152	Extremely cobbly silt loam, cobbles			0-9	40-53	4-17	0-13	0-12	0-9	0-29	NP-4
D31—Boreal forest rocky colluvial slopes	0-8	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	8-14	Gravelly loam, silt loam	ML	A-4	0-4	0-11	70-95	68-95	61-95	42-86	0-48	NP-7
	14-42	Extremely cobbly sandy loam, very cobbly silt loam, very cobbly loam	GC-GM	A-2-4	0-10	5-32	38-60	35-59	29-59	18-43	0-39	NP-9
	42-152	Very gravelly silt loam, extremely gravelly coarse sandy loam	GP-GM	A-1-a	0-15	12-32	12-61	8-59	5-52	3-32	0-44	NP-9

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31BH7:												
D31—Boreal forest gravelly colluvial slopes, frozen	**0-21**	**Slightly decomposed plant material**	**PT**	**A-8**	**0**	**0**	**---**	**---**	**---**	**---**	**---**	**---**
	21-26	**Very cobbly sandy loam, silt, silt loam**	**ML**	**A-4**	**0-3**	**0-24**	**48-100**	**46-100**	**41-100**	**31-90**	**0-43**	**NP-3**
	26-58	**Extremely gravelly sandy loam, gravelly silt loam, very gravelly fine sandy loam**	**GM**	**A-1-b**	**0-18**	**0-19**	**27-63**	**24-62**	**19-61**	**11-40**	**0-40**	**NP-6**
	58-152	**Permanently frozen very stony silt loam, permanently frozen extremely stony sandy loam**	**GM**	**A-1-b**	**4-18**	**8-20**	**13-64**	**10-63**	**7-62**	**4-38**	**0-36**	**NP-3**
D31CF1:												
D31—Boreal forest gravelly colluvial slopes, frozen	**0-21**	**Slightly decomposed plant material**	**PT**	**A-8**	**0**	**0**	**---**	**---**	**---**	**---**	**---**	**---**
	21-26	**Very cobbly sandy loam, silt, silt loam**	**ML**	**A-4**	**0-3**	**0-24**	**48-100**	**46-100**	**41-100**	**31-90**	**0-43**	**NP-3**
	26-58	**Extremely gravelly sandy loam, gravelly silt loam, very gravelly fine sandy loam**	**GM**	**A-1-b**	**0-18**	**0-19**	**27-63**	**24-62**	**19-61**	**11-40**	**0-40**	**NP-6**
	58-152	**Permanently frozen very stony silt loam, permanently frozen extremely stony sandy loam**	**GM**	**A-1-b**	**4-18**	**8-20**	**13-64**	**10-63**	**7-62**	**4-38**	**0-36**	**NP-3**
D31—Boreal woodland silty eolian slopes, frozen	**0-25**	**Peat**	**PT**	**A-8**	**0**	**0**	**---**	**---**	**---**	**---**	**---**	**---**
	25-50	**Very gravelly loam, gravelly silt loam**	**GM**	**A-2-4**	**0-7**	**0-22**	**41-75**	**38-74**	**33-74**	**22-62**	**0-40**	**NP-6**
	50-152	**Permanently frozen extremely gravelly sandy loam, permanently frozen very gravelly silt loam, permanently frozen very gravelly sandy loam**	**GM**	**A-1-b**	**0-1**	**0-19**	**30-54**	**27-52**	**20-48**	**12-33**	**0-40**	**NP-6**

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31CF1:												
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-30	Gravelly loam, silt, silt loam	ML	A-4	0-5	0-15	70-91	69-90	59-90	45-73	0-45	NP-4
	30-64	Very gravelly sandy loam, gravelly silt loam, gravelly sandy loam	GM	A-2-4	0-11	0-12	59-78	57-77	43-70	25-47	0-38	NP-4
	64-152	Permanently frozen gravelly sandy loam, permanently frozen very gravelly sandy loam	GM	A-1-b	0-6	0-10	40-62	37-60	25-50	12-30	0-29	NP-4
D31HL1:												
D31—Boreal taiga silty colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Gravelly loam, silt, silt loam	ML	A-4	0-6	0-1	71-100	70-100	62-100	44-94	0-50	NP-9
	28-60	Gravelly loam, silt loam	ML	A-4	0-5	0-9	73-91	72-91	61-91	41-80	0-44	NP-9
	60-152	Permanently frozen gravelly loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0-5	0-6	73-90	72-89	63-89	45-84	0-44	NP-9
D31—Boreal taiga organic eolian slopes, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9
D31HL2:												
D31—Boreal taiga silty colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Gravelly loam, silt, silt loam	ML	A-4	0-6	0-1	71-100	70-100	62-100	44-94	0-50	NP-9
	28-60	Gravelly loam, silt loam	ML	A-4	0-5	0-9	73-91	72-91	61-91	41-80	0-44	NP-9
	60-152	Permanently frozen gravelly loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0-5	0-6	73-90	72-89	63-89	45-84	0-44	NP-9
D31—Boreal taiga organic eolian slopes, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31KT1:												
D31—Boreal taiga organic eolian slopes, frozen-------	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9
D31LB1:												
D31—Boreal taiga silty eolian slopes, frozen-------	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Loam, silt, silt loam	ML	A-4	0	0	89-100	88-100	79-100	61-96	0-47	NP-6
	28-53	Cobbly sandy loam, silt loam	CL-ML	A-4	0	0-9	80-94	79-93	68-93	45-82	0-44	NP-9
	53-152	Permanently frozen sandy loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0-2	80-93	79-93	70-93	53-87	0-40	NP-6
D31—Boreal taiga organic eolian slopes, frozen-------	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9
D31—Boreal forest rocky colluvial slopes---------------	0-8	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	8-14	Gravelly loam, silt loam	ML	A-4	0-4	0-11	70-95	68-95	61-95	42-86	0-48	NP-7
	14-42	Extremely cobbly sandy loam, very cobbly silt loam, very cobbly loam	GC-GM	A-2-4	0-10	5-32	38-60	35-59	29-59	18-43	0-39	NP-9
	42-152	Very gravelly silt loam, extremely gravelly coarse sandy loam	GP-GM	A-1-a	0-15	12-32	12-61	8-59	5-52	3-32	0-44	NP-9
D31LB2:												
D31—Boreal taiga silty colluvial slopes, frozen-------	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Gravelly loam, silt, silt loam	ML	A-4	0-6	0-1	71-100	70-100	62-100	44-94	0-50	NP-9
	28-60	Gravelly loam, silt loam	ML	A-4	0-5	0-9	73-91	72-91	61-91	41-80	0-44	NP-9
	60-152	Permanently frozen gravelly loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0-5	0-6	73-90	72-89	63-89	45-84	0-44	NP-9

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31LB2:												
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-10	Very stony loam, silt, stony silt loam	ML	A-4	0-14	0-13	43-89	41-89	36-89	25-78	0-50	NP-9
	10-41	Extremely gravelly sandy loam, very gravelly silt loam, very gravelly loam	GC-GM	A-2-4	0-12	10-26	28-59	24-58	20-56	11-38	0-39	NP-8
	41-152	Very gravelly sandy loam, extremely gravelly sandy loam	GP-GM	A-1-a	0-10	15-33	11-43	7-41	5-35	2-22	0-43	NP-9
D31—Boreal forest rocky colluvial slopes	0-8	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	8-14	Gravelly loam, silt loam	ML	A-4	0-4	0-11	70-95	68-95	61-95	42-86	0-48	NP-7
	14-42	Extremely cobbly sandy loam, very cobbly silt loam, very cobbly loam	GC-GM	A-2-4	0-10	5-32	38-60	35-59	29-59	18-43	0-39	NP-9
	42-152	Very gravelly silt loam, extremely gravelly coarse sandy loam	GP-GM	A-1-a	0-15	12-32	12-61	8-59	5-52	3-32	0-44	NP-9
D31MT1:												
D31—Alpine rubble land	0-152	Cobbles			1-80	8-80	4-32	0-29	0	0	---	---
D31—Alpine low scrub gravelly colluvial slopes	0-11	Very stony loam, silt loam, stony silt loam	ML	A-4	0-24	0-16	50-92	48-92	41-92	29-72	0-45	NP-4
	11-34	Extremely cobbly sandy loam, very cobbly silt loam, very cobbly coarse sandy loam	GM	A-1-b	4-23	8-36	32-68	30-66	21-58	11-35	0-34	NP-4
	34-152	Very stony sandy loam, extremely stony coarse sandy loam	GP-GM	A-1-a	4-22	8-34	17-52	13-50	8-39	4-21	0-38	NP-4
D31MT2:												
D31—Alpine low scrub gravelly colluvial slopes	0-11	Very stony loam, silt loam, stony silt loam	ML	A-4	0-24	0-16	50-92	48-92	41-92	29-72	0-45	NP-4
	11-34	Extremely cobbly sandy loam, very cobbly silt loam, very cobbly coarse sandy loam	GM	A-1-b	4-23	8-36	32-68	30-66	21-58	11-35	0-34	NP-4
	34-152	Very stony sandy loam, extremely stony coarse sandy loam	GP-GM	A-1-a	4-22	8-34	17-52	13-50	8-39	4-21	0-38	NP-4
D31—Alpine scrub gravelly circles	0-10	Very gravelly sandy loam, silt loam, gravelly silt loam	GM	A-4	0-14	0-25	49-79	47-78	41-78	30-65	0-50	NP-9
	10-31	Gravelly silt loam, very gravelly sandy loam	GC-GM	A-2-4	0-19	0-20	43-73	40-72	31-69	16-43	0-39	NP-9
	31-152	Very stony sandy loam, extremely stony fine sandy loam	GM	A-1-b	0-28	0-18	21-53	18-51	14-48	7-31	0-44	NP-9

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31MT2:												
D31—Alpine rubble land	0-152	Cobbles			1-80	8-80	4-32	0-29	0	0	---	---
D31MT3:												
D31—Alpine low scrub organic hummocks, frozen	0-44	Peat	PT	A-8	0	0	---	---	---	---	---	---
	44-152	Permanently frozen gravelly loam, permanently frozen silt loam	ML	A-4	0-3	0-13	63-94	62-94	54-94	40-75	0-38	NP-4
D31—Alpine scrub loamy hummocks, frozen	0-31	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	31-57	Very gravelly sandy loam, silt loam, gravelly sandy loam	GM	A-2-4	0	0-21	51-86	49-86	35-76	21-52	0-38	NP-4
	57-152	Permanently frozen silt loam, permanently frozen cobbly coarse sandy loam	SM	A-4	0-15	0-23	66-95	64-95	46-86	28-57	0-29	NP-4
D31—Alpine low scrub loamy solifluction lobes	0-5	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	5-21	Very stony sandy loam, silt loam, stony silt loam	ML	A-4	4-32	0-32	65-100	64-100	58-100	42-83	0-45	NP-4
	21-152	Extremely cobbly loamy sand, cobbly silt loam, very cobbly loamy coarse sand	SM	A-1-b	3-23	6-42	43-79	41-78	21-51	9-24	0-26	NP-4
D31OF1:												
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-26	Very cobbly sandy loam, silt, silt loam	ML	A-4	0-3	0-24	48-100	46-100	41-100	31-90	0-43	NP-3
	26-58	Extremely gravelly sandy loam, gravelly silt loam, very gravelly fine sandy loam	GM	A-1-b	0-18	0-19	27-63	24-62	19-61	11-40	0-40	NP-6
	58-152	Permanently frozen very stony silt loam, permanently frozen extremely stony sandy loam	GM	A-1-b	4-18	8-20	13-64	10-63	7-62	4-38	0-36	NP-3

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31OF1:												
D31—Boreal woodland silty eolian slopes, frozen	0-25	Peat	PT	A-8	0	0	---	---	---	---	---	---
	25-50	Very gravelly loam, gravelly silt loam	GM	A-2-4	0-7	0-22	41-75	38-74	33-74	22-62	0-40	NP-6
	50-152	Permanently frozen extremely gravelly sandy loam, permanently frozen very gravelly silt loam, permanently frozen very gravelly sandy loam	GM	A-1-b	0-1	0-19	30-54	27-52	20-48	12-33	0-40	NP-6
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-10	Very stony loam, silt, stony silt loam	ML	A-4	0-14	0-13	43-89	41-89	36-89	25-78	0-50	NP-9
	10-41	Extremely gravelly sandy loam, very gravelly silt loam, very gravelly loam	GC-GM	A-2-4	0-12	10-26	28-59	24-58	20-56	11-38	0-39	NP-8
	41-152	Very gravelly sandy loam, extremely gravelly sandy loam	GP-GM	A-1-a	0-10	15-33	11-43	7-41	5-35	2-22	0-43	NP-9
D31OM1:												
D31—Alpine scrub silty circles	0-11	Gravelly loam, silt, silt loam	ML	A-4	0	0	61-95	59-95	53-95	39-84	0-45	NP-4
	11-29	Gravelly silt loam, very gravelly sandy loam	GM	A-2-4	0-6	0-15	41-70	39-69	32-67	18-44	0-45	NP-4
	29-152	Extremely stony sandy loam, stony silt loam, very stony sandy loam	GM	A-1-b	3-22	5-17	21-64	17-62	14-60	7-36	0-38	NP-4
D31—Alpine rubble land	0-152	Cobbles			1-80	8-80	4-32	0-29	0	0	---	---
D31OM2:												
D31—Alpine scrub silty circles	0-11	Gravelly loam, silt, silt loam	ML	A-4	0	0	61-95	59-95	53-95	39-84	0-45	NP-4
	11-29	Gravelly silt loam, very gravelly sandy loam	GM	A-2-4	0-6	0-15	41-70	39-69	32-67	18-44	0-45	NP-4
	29-152	Extremely stony sandy loam, stony silt loam, very stony sandy loam	GM	A-1-b	3-22	5-17	21-64	17-62	14-60	7-36	0-38	NP-4

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31OM2:												
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-30	Gravelly loam, silt, silt loam	ML	A-4	0-5	0-15	70-91	69-90	59-90	45-73	0-45	NP-4
	30-64	Very gravelly sandy loam, gravelly silt loam, gravelly sandy loam	GM	A-2-4	0-11	0-12	59-78	57-77	43-70	25-47	0-38	NP-4
	64-152	Permanently frozen gravelly sandy loam, permanently frozen very gravelly sandy loam	GM	A-1-b	0-6	0-10	40-62	37-60	25-50	12-30	0-29	NP-4
D31SD1:												
D31—Alpine low scrub organic hummocks, frozen	0-44	Peat	PT	A-8	0	0	---	---	---	---	---	---
	44-152	Permanently frozen gravelly loam, permanently frozen silt loam	ML	A-4	0-3	0-13	63-94	62-94	54-94	40-75	0-38	NP-4
D31—Alpine tussock-scrub silty polygons, frozen	0-27	Peat	PT	A-8	0	0	---	---	---	---	---	---
	27-35	Loam, silt loam	ML	A-4	0	0	100	100	91-100	73-89	0-45	NP-4
	35-42	Gravelly sandy loam, silt loam	ML	A-4	0	0-9	71-96	70-96	63-96	46-80	0-38	NP-4
	42-152	Permanently frozen gravelly sandy loam, permanently frozen silt loam	ML	A-4	0	0-5	71-96	70-96	63-96	49-83	0-38	NP-4
D31TE1:												
D31—Boreal taiga/tussock organic terraces, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-54	Loam, silt, silt loam	ML	A-4	0	0	100	100	90-100	65-91	0-44	NP-9
	54-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	100	100	88-100	65-91	0-44	NP-9
D31—Boreal taiga silty terraces, frozen	0-18	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	18-28	Loam, silt loam	ML	A-4	0	0	82-100	81-100	72-100	52-89	0-47	NP-6
	28-69	Gravelly sandy loam, silt loam, sandy loam	SM	A-4	0	0-2	68-90	67-90	56-90	31-60	0-40	NP-6
	69-152	Permanently frozen silt loam, permanently frozen gravelly sandy loam	SM	A-2-4	0	0-8	57-83	55-82	38-73	22-46	0-40	NP-6

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31TE2:												
D31—Boreal taiga/tussock organic terraces, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-54	Loam, silt, silt loam	ML	A-4	0	0	100	100	90-100	65-91	0-44	NP-9
	54-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	100	100	88-100	65-91	0-44	NP-9
D31TF1:												
D31—Subalpine woodland silty colluvial slopes	0-15	Peat	PT	A-8	0	0	---	---	---	---	---	---
	15-22	Cobbly sandy loam, silt loam	ML	A-4	0	0-16	62-93	60-93	53-93	38-74	0-45	NP-5
	22-47	Very gravelly sandy loam, gravelly silt loam, gravelly sandy loam	GC-GM	A-2-4	0-1	0-13	46-76	43-75	33-70	19-47	17-35	2-10
	47-152	Extremely gravelly sandy loam, gravelly silt loam, very gravelly sandy loam	GM	A-1-b	0-10	5-18	36-69	33-68	22-58	11-35	0-40	NP-6
D31—Subalpine scrub loamy residual slopes	0-12	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	12-19	Gravelly sandy loam, silt loam, loam	ML	A-4	0	0-5	73-100	71-100	59-100	38-73	20-50	1-9
	19-54	Extremely gravelly sandy loam, gravelly silt loam, very gravelly sandy loam	GC-GM	A-1-b	0	0-7	29-57	26-55	17-47	8-28	16-39	1-9
	54-152	Very gravelly silt loam, extremely gravelly coarse sandy loam	GP-GM	A-1-a	0	0-6	11-32	7-29	4-26	2-17	0-39	NP-5
D31TF2:												
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	0-22	Peat	PT	A-8	0	0	---	---	---	---	---	---
	22-27	Stony loam, silt loam	ML	A-4	0-16	0-16	78-100	78-100	68-100	53-84	0-45	NP-4
	27-60	Very stony sandy loam, silt loam, stony loam	SM	A-4	0-22	0-22	59-88	57-87	45-84	29-61	0-38	NP-4
	60-152	Permanently frozen silt loam, permanently frozen stony loam	ML	A-4	0-12	0-13	59-91	58-90	49-90	32-67	0-38	NP-4
D31—Subalpine scrub silty till slopes	0-10	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	10-21	Stony loam, silt loam	ML	A-4	0-29	0-15	66-100	64-100	58-100	45-94	0-45	NP-4
	21-37	Stony silt loam, very stony sandy loam	GM	A-2-4	0-20	0-34	47-74	45-73	36-73	21-53	0-29	NP-4
	37-152	Extremely stony sandy loam, very stony silt loam, very stony sandy loam	GM	A-1-b	8-35	5-30	24-64	20-62	15-55	8-36	0-38	NP-4

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31TH1:												
D31—Boreal taiga silty colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Gravelly loam, silt, silt loam	ML	A-4	0-6	0-1	71-100	70-100	62-100	44-94	0-50	NP-9
	28-60	Gravelly loam, silt loam	ML	A-4	0-5	0-9	73-91	72-91	61-91	41-80	0-44	NP-9
	60-152	Permanently frozen gravelly loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0-5	0-6	73-90	72-89	63-89	45-84	0-44	NP-9
D31—Boreal taiga organic eolian slopes, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9
D31—Boreal taiga gravelly colluvial slopes	0-4	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	4-8	Cobbly loam, silt loam	ML	A-4	0	0-10	78-100	77-100	68-100	48-89	0-50	NP-9
	8-36	Very gravelly sandy loam, gravelly silt loam, gravelly sandy loam	GM	A-2-4	0-7	0-11	42-73	40-72	32-71	20-49	0-39	NP-9
	36-152	Extremely gravelly sandy loam, very gravelly sandy loam, extremely gravelly loamy very fine sand	GP-GM	A-1-a	0-5	0-11	17-53	14-51	8-40	4-22	0-44	NP-9
D31—Boreal woodland silty eolian slopes, frozen	0-25	Peat	PT	A-8	0	0	---	---	---	---	---	---
	25-50	Very gravelly loam, gravelly silt loam	GM	A-2-4	0-7	0-22	41-75	38-74	33-74	22-62	0-40	NP-6
	50-152	Permanently frozen extremely gravelly sandy loam, permanently frozen very gravelly silt loam, permanently frozen very gravelly sandy loam	GM	A-1-b	0-1	0-19	30-54	27-52	20-48	12-33	0-40	NP-6
D31TL1:												
D31—Boreal taiga organic eolian slopes, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31TL1:												
D31—Boreal taiga silty eolian slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Loam, silt, silt loam	ML	A-4	0	0	89-100	88-100	79-100	61-96	0-47	NP-6
	28-53	Cobbly sandy loam, silt loam	CL-ML	A-4	0	0-9	80-94	79-93	68-93	45-82	0-44	NP-9
	53-152	Permanently frozen sandy loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0-2	80-93	79-93	70-93	53-87	0-40	NP-6
D31UC1:												
D31—Boreal tussock organic plains, frozen	0-41	Peat	PT	A-8	0	0	---	---	---	---	---	---
	41-49	Loam, silt, silt loam	ML	A-4	0	0	93-100	93-100	80-100	64-100	0-50	NP-9
	49-56	Sandy loam, silt loam, loam	CL-ML	A-4	0-8	0-1	84-100	83-100	65-100	42-82	0-44	NP-9
	56-152	Permanently frozen loam, permanently frozen silt loam	CL-ML	A-4	0	0	83-100	83-100	61-100	44-85	0-44	NP-9
D31—Boreal taiga organic eolian slopes, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-48	Loam, silt, silt loam	ML	A-4	0	0	88-100	87-100	79-100	59-97	0-44	NP-9
	48-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	96-100	96-100	87-100	67-97	0-44	NP-9
D31—Boreal forest loamy high flood plains	0-13	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	13-18	Silt loam, sandy loam	ML	A-4	0	0	80-100	79-100	64-97	35-61	0-45	NP-4
	18-152	Stratified extremely gravelly loamy sand to very gravelly sandy loam, stratified loamy coarse sand to gravelly sandy loam, stratified very gravelly loamy coarse sand to gravelly sandy loam	GM	A-1-b	0-12	3-19	40-80	37-79	23-61	9-29	0-26	NP-4
D31UC2:												
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-30	Gravelly loam, silt, silt loam	ML	A-4	0-5	0-15	70-91	69-90	59-90	45-73	0-45	NP-4
	30-64	Very gravelly sandy loam, gravelly silt loam, gravelly sandy loam	GM	A-2-4	0-11	0-12	59-78	57-77	43-70	25-47	0-38	NP-4
	64-152	Permanently frozen gravelly sandy loam, permanently frozen very gravelly sandy loam	GM	A-1-b	0-6	0-10	40-62	37-60	25-50	12-30	0-29	NP-4

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31UC2:												
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-26	Very cobbly sandy loam, silt, silt loam	ML	A-4	0-3	0-24	48-100	46-100	41-100	31-90	0-43	NP-3
	26-58	Extremely gravelly sandy loam, gravelly silt loam, very gravelly fine sandy loam	GM	A-1-b	0-18	0-19	27-63	24-62	19-61	11-40	0-40	NP-6
	58-152	Permanently frozen very stony silt loam, permanently frozen extremely stony sandy loam	GM	A-1-b	4-18	8-20	13-64	10-63	7-62	4-38	0-36	NP-3
D31UC3:												
D31—Boreal tussock organic plains, frozen	0-41	Peat	PT	A-8	0	0	---	---	---	---	---	---
	41-49	Loam, silt, silt loam	ML	A-4	0	0	93-100	93-100	80-100	64-100	0-50	NP-9
	49-56	Sandy loam, silt loam, loam	CL-ML	A-4	0-8	0-1	84-100	83-100	65-100	42-82	0-44	NP-9
	56-152	Permanently frozen loam, permanently frozen silt loam	CL-ML	A-4	0	0	83-100	83-100	61-100	44-85	0-44	NP-9
D31—Boreal taiga silty colluvial slopes, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-28	Gravelly loam, silt, silt loam	ML	A-4	0-6	0-1	71-100	70-100	62-100	44-94	0-50	NP-9
	28-60	Gravelly loam, silt loam	ML	A-4	0-5	0-9	73-91	72-91	61-91	41-80	0-44	NP-9
	60-152	Permanently frozen gravelly loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0-5	0-6	73-90	72-89	63-89	45-84	0-44	NP-9
D31UC4:												
D31—Boreal woodland rocky low flood plains	0-30	Extremely cobbly loamy sand, cobbly sandy loam, very cobbly coarse sandy loam	GM	A-1-b	0-6	5-37	40-74	38-73	24-63	9-31	0-26	NP-4
	30-152	Very gravelly sandy loam, extremely gravelly loamy coarse sand	GP-GM	A-1-a	0-10	11-42	14-64	10-62	5-41	2-16	0-26	NP-4
D31—Boreal forest loamy high flood plains	0-13	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	13-18	Silt loam, sandy loam	ML	A-4	0	0	80-100	79-100	64-97	35-61	0-45	NP-4
	18-152	Stratified extremely gravelly loamy sand to very gravelly sandy loam, stratified loamy coarse sand to gravelly sandy loam, stratified very gravelly loamy coarse sand to gravelly sandy loam	GM	A-1-b	0-12	3-19	40-80	37-79	23-61	9-29	0-26	NP-4

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31UC5:												
D31—Subalpine scrub silty till slopes	0-10	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	10-21	Stony loam, silt loam	ML	A-4	0-29	0-15	66-100	64-100	58-100	45-94	0-45	NP-4
	21-37	Stony silt loam, very stony sandy loam	GM	A-2-4	0-20	0-34	47-74	45-73	36-73	21-53	0-29	NP-4
	37-152	Extremely stony sandy loam, very stony silt loam, very stony sandy loam	GM	A-1-b	8-35	5-30	24-64	20-62	15-55	8-36	0-38	NP-4
D31—Alpine scrub gravelly circles, acid	0-3	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	3-12	Very cobbly loam, silt loam	ML	A-4	0	0-25	49-89	47-89	41-89	29-69	0-45	NP-4
	12-35	Gravelly silt loam, very gravelly sandy loam	GM	A-2-4	0-3	0-25	40-75	38-74	30-71	17-47	0-34	NP-4
	35-152	Extremely cobbly sandy loam, very cobbly silt loam, very cobbly sandy loam	GM	A-1-b	0-16	13-39	20-62	16-61	11-54	6-34	0-38	NP-4
D31WA1:												
D31—Alpine water, ponded	0-152	Water			---	---	---	---	---	---	---	---
D31YV1:												
D31—Boreal forest loamy mid flood plains	0-5	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	5-76	Stratified loamy sand to sandy loam	SM	A-4	0	0-6	89-100	89-100	74-100	33-59	0-38	NP-4
	76-152	Stratified loamy sand to sandy loam	SM	A-2-4	0	0-5	91-100	91-100	71-100	26-46	0-29	NP-4
D31—Boreal taiga loamy high flood plains, frozen	0-9	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	9-77	Stratified fine sandy loam to silt loam, stratified sandy loam to silt loam	ML	A-4	0	0	94-100	93-100	76-100	40-66	0-44	NP-9
	77-152	Stratified permanently frozen silt loam to fine sandy loam, stratified permanently frozen sandy loam to silt loam	SM	A-4	0	0	91-100	90-100	71-99	35-62	0-44	NP-9

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31YV1:												
D31—Boreal scrub sandy low flood plains	0-78	Stratified loamy sand to gravelly sandy loam, stratified loamy sand to sandy loam	SM	A-4	0	0-9	74-94	73-94	57-94	25-54	0-43	NP-8
	78-152	Stratified very gravelly sandy loam to gravelly fine sandy loam, stratified sandy loam to gravelly fine sandy loam, stratified gravelly sandy loam to fine sandy loam	SM	A-2-4	0	0-7	52-95	49-94	36-91	16-50	0-43	NP-8
D31YV2:												
D31—Boreal taiga/tussock organic terraces, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-54	Loam, silt, silt loam	ML	A-4	0	0	100	100	90-100	65-91	0-44	NP-9
	54-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	100	100	88-100	65-91	0-44	NP-9
D31—Boreal taiga loamy high flood plains, frozen	0-9	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	9-77	Stratified fine sandy loam to silt loam, stratified sandy loam to silt loam	ML	A-4	0	0	94-100	93-100	76-100	40-66	0-44	NP-9
	77-152	Stratified permanently frozen silt loam to fine sandy loam, stratified permanently frozen sandy loam to silt loam	SM	A-4	0	0	91-100	90-100	71-99	35-62	0-44	NP-9
D31YV3:												
D31—Boreal taiga/tussock organic terraces, frozen	0-42	Peat	PT	A-8	0	0	---	---	---	---	---	---
	42-54	Loam, silt, silt loam	ML	A-4	0	0	100	100	90-100	65-91	0-44	NP-9
	54-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	100	100	88-100	65-91	0-44	NP-9
D31YV8:												
D31—Boreal water, flowing	0-152	Water			---	---	---	---	---	---	---	---

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D31YV9:												
D31—Boreal taiga loamy high flood plains, frozen	0-9	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	9-77	Stratified fine sandy loam to silt loam, stratified sandy loam to silt loam	ML	A-4	0	0	94-100	93-100	76-100	40-66	0-44	NP-9
	77-152	Stratified permanently frozen silt loam to fine sandy loam, stratified permanently frozen sandy loam to silt loam	SM	A-4	0	0	91-100	90-100	71-99	35-62	0-44	NP-9
D32TL1:												
D32—Boreal taiga organic plains, frozen	0-41	Peat	PT	A-8	0	0	---	---	---	---	---	---
	41-60	Loam, silt, silt loam	CL-ML	A-4	0	0	94-100	94-100	79-100	63-95	0-43	NP-9
	60-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	94-100	94-100	79-100	62-94	0-43	NP-9
D32TL2:												
D32—Boreal forest gravelly escarpments, frozen	0-21	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	21-56	Very gravelly sandy loam, gravelly silt loam, gravelly very fine sandy loam	GM	A-2-4	0	0-14	45-74	43-73	33-68	18-44	0-40	NP-6
	56-152	Permanently frozen gravelly silt loam, permanently frozen very gravelly fine sandy loam	GM	A-1-b	0	0-13	38-66	36-64	28-61	13-35	0-40	NP-6
D32—Boreal taiga loamy escarpment slopes	0-8	Sandy loam, silt loam, loam	ML	A-4	0	0	86-100	85-100	64-93	39-64	0-46	NP-6
	8-28	Silt, loam	CL	A-4	0	0	80-98	79-98	61-97	43-78	0-39	NP-9
	28-152	Gravelly sandy loam, very gravelly loamy coarse sand	GP-GM	A-1-a	0	0-6	38-78	35-78	18-54	6-22	0-31	NP-10
D32—Boreal taiga silty eolian slopes, frozen	0-11	Slightly decomposed plant material	PT	A-8	0	0	---	---	---	---	---	---
	11-70	Loam, silt, silt loam	CL-ML	A-4	0	0	77-100	76-100	62-100	45-85	0-39	NP-6
	70-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	90-100	89-100	75-100	57-90	0-39	NP-6

Table 7.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	>250 mm	75-250 mm	4	10	40	200		
	cm				*Pct*	*Pct*					*Pct*	
D32TL4:												
D32—Boreal taiga organic plains, frozen	0-41	Peat	PT	A-8	0	0	---	---	---	---	---	---
	41-60	Loam, silt, silt loam	CL-ML	A-4	0	0	94-100	94-100	79-100	63-95	0-43	NP-9
	60-152	Permanently frozen loam, permanently frozen silt, permanently frozen silt loam	ML	A-4	0	0	94-100	94-100	79-100	62-94	0-43	NP-9

Table 8.--Erosion Properties

(Entries under "Erosion factors" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer.)

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31BH1:						
D31—Boreal forest rocky colluvial slopes	0-8	---	---	3	3	86
	8-14	.24	.32			
	14-42	.20	.49			
	42-152	.02	.28			
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	---	---	3	3	86
	4-10	.20	.32			
	10-41	.15	.43			
	41-152	.05	.37			
D31—Boreal taiga silty eolian slopes, frozen	0-21	---	---	2	3	86
	21-28	.43	.43			
	28-53	.49	.55			
	53-152	.49	.55			
D31BH2:						
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	---	---	3	3	86
	4-10	.20	.32			
	10-41	.15	.43			
	41-152	.05	.37			
D31—Boreal forest rocky colluvial escarpments	0-4	---	---	3	3	86
	4-10	.10	.24			
	10-43	.05	.43			
	43-152	.02	.24			
D31BH3:						
D31—Boreal taiga silty eolian slopes, frozen	0-21	---	---	2	3	86
	21-28	.43	.43			
	28-53	.49	.55			
	53-152	.49	.55			
D31—Boreal taiga organic eolian slopes, frozen	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			
D31BH5:						
D31—Boreal taiga/tussock organic terraces, frozen	0-42	---	---	2	7	38
	42-54	.64	.64			
	54-152	.49	.49			
D31—Boreal forest loamy high flood plains	0-13	---	---	4	1	180
	13-18	.24	.24			
	18-152	.10	.28			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31BH5:						
D31—Boreal scrub rocky drainages	0-4	---	---	3	2	134
	4-14	.24	.28			
	14-152	.15	.37			
D31BH6:						
D31—Boreal forest gravelly colluvial escarpments	0-14	---	---	3	3	86
	14-22	.20	.32			
	22-152	.02	.32			
D31—Boreal rubble land	0-55	.10	.49	1	8	0
	55-152	.02	.02			
D31BH7:						
D31—Subalpine woodland rocky colluvial slopes	0-4	---	---	2	2	134
	4-8	.20	.37			
	8-27	.20	.37			
	27-152	.10	.55			
D31—Boreal forest rocky colluvial slopes	0-8	---	---	3	3	86
	8-14	.24	.32			
	14-42	.20	.49			
	42-152	.02	.28			
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	---	---	2	3	86
	21-26	.37	.43			
	26-58	.15	.43			
	58-152	.05	.32			
D31CF1:						
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	---	---	2	3	86
	21-26	.37	.43			
	26-58	.15	.43			
	58-152	.05	.32			
D31—Boreal woodland silty eolian slopes, frozen	0-25	---	---	2	3	86
	25-50	.24	.55			
	50-152	.15	.37			
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	---	---	2	5	56
	21-30	.24	.32			
	30-64	.20	.43			
	64-152	.15	.37			
D31HL1:						
D31—Boreal taiga silty colluvial slopes, frozen	0-21	---	---	2	2	134
	21-28	.37	.43			
	28-60	.43	.55			
	60-152	.37	.49			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31HL1:						
D31—Boreal taiga organic eolian slopes, frozen-------	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			
D31HL2:						
D31—Boreal taiga silty colluvial slopes, frozen----	0-21	---	---	2	2	134
	21-28	.37	.43			
	28-60	.43	.55			
	60-152	.37	.49			
D31—Boreal taiga organic eolian slopes, frozen-------	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			
D31KT1:						
D31—Boreal taiga organic eolian slopes, frozen-------	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			
D31LB1:						
D31—Boreal taiga silty eolian slopes, frozen----------	0-21	---	---	2	3	86
	21-28	.43	.43			
	28-53	.49	.55			
	53-152	.49	.55			
D31—Boreal taiga organic eolian slopes, frozen-------	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			
D31—Boreal forest rocky colluvial slopes------------	0-8	---	---	3	3	86
	8-14	.24	.32			
	14-42	.20	.49			
	42-152	.02	.28			
D31LB2:						
D31—Boreal taiga silty colluvial slopes, frozen----	0-21	---	---	2	2	134
	21-28	.37	.43			
	28-60	.43	.55			
	60-152	.37	.49			
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	---	---	3	3	86
	4-10	.20	.32			
	10-41	.15	.43			
	41-152	.05	.37			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31LB2:						
D31—Boreal forest rocky colluvial slopes	0-8	---	---	3	3	86
	8-14	.24	.32			
	14-42	.20	.49			
	42-152	.02	.28			
D31MT1:						
D31—Alpine rubble land	0-152	.02	.02	1	8	0
D31—Alpine low scrub gravelly colluvial slopes	0-11	.24	.32	2	2	134
	11-34	.10	.37			
	34-152	.10	.28			
D31MT2:						
D31—Alpine low scrub gravelly colluvial slopes	0-11	.24	.32	2	2	134
	11-34	.10	.37			
	34-152	.10	.28			
D31—Alpine scrub gravelly circles	0-10	.24	.32	2	3	86
	10-31	.15	.32			
	31-152	.10	.49			
D31—Alpine rubble land	0-152	.02	.02	1	8	0
D31MT3:						
D31—Alpine low scrub organic hummocks, frozen	0-44	---	---	2	3	86
	44-152	.43	.64			
D31—Alpine scrub loamy hummocks, frozen	0-31	---	---	2	3	86
	31-57	.28	.49			
	57-152	.43	.64			
D31—Alpine low scrub loamy solifluction lobes	0-5	---	---	2	3	86
	5-21	.24	.37			
	21-152	.10	.24			
D31OF1:						
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	---	---	2	3	86
	21-26	.37	.43			
	26-58	.15	.43			
	58-152	.05	.32			
D31—Boreal woodland silty eolian slopes, frozen	0-25	---	---	2	3	86
	25-50	.24	.55			
	50-152	.15	.37			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31OF1:						
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	---	---	3	3	86
	4-10	.20	.32			
	10-41	.15	.43			
	41-152	.05	.37			
D31OM1:						
D31—Alpine scrub silty circles	0-11	.20	.37	2	2	134
	11-29	.10	.28			
	29-152	.10	.43			
D31—Alpine rubble land	0-152	.02	.02	1	8	0
D31OM2:						
D31—Alpine scrub silty circles	0-11	.20	.37	2	2	134
	11-29	.10	.28			
	29-152	.10	.43			
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	---	---	2	5	56
	21-30	.24	.32			
	30-64	.20	.43			
	64-152	.15	.37			
D31SD1:						
D31—Alpine low scrub organic hummocks, frozen	0-44	---	---	2	3	86
	44-152	.43	.64			
D31—Alpine tussock-scrub silty polygons, frozen	0-27	---	---	2	2	134
	27-35	.37	.24			
	35-42	.49	.64			
	42-152	.49	.64			
D31TE1:						
D31—Boreal taiga/tussock organic terraces, frozen	0-42	---	---	2	7	38
	42-54	.64	.64			
	54-152	.49	.49			
D31—Boreal taiga silty terraces, frozen	0-18	---	---	2	3	86
	18-28	.37	.37			
	28-69	.37	.49			
	69-152	.10	.20			
D31TE2:						
D31—Boreal taiga/tussock organic terraces, frozen	0-42	---	---	2	7	38
	42-54	.64	.64			
	54-152	.49	.49			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31TF1:						
D31—Subalpine woodland silty colluvial slopes	0-15	---	---	2	5	56
	15-22	.32	.32			
	22-47	.24	.43			
	47-152	.10	.32			
D31—Subalpine scrub loamy residual slopes	0-12	---	---	2	5	56
	12-19	.28	.20			
	19-54	.10	.28			
	54-152	.10	.37			
D31TF2:						
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	0-22	---	---	2	3	86
	22-27	.15	.32			
	27-60	.28	.49			
	60-152	.37	.55			
D31—Subalpine scrub silty till slopes	0-10	---	---	2	2	134
	10-21	.20	.37			
	21-37	.24	.49			
	37-152	.10	.43			
D31TH1:						
D31—Boreal taiga silty colluvial slopes, frozen	0-21	---	---	2	2	134
	21-28	.37	.43			
	28-60	.43	.55			
	60-152	.37	.49			
D31—Boreal taiga organic eolian slopes, frozen	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			
D31—Boreal taiga gravelly colluvial slopes	0-4	---	---	3	2	134
	4-8	.28	.32			
	8-36	.24	.49			
	36-152	.05	.24			
D31—Boreal woodland silty eolian slopes, frozen	0-25	---	---	2	3	86
	25-50	.24	.55			
	50-152	.15	.37			
D31TL1:						
D31—Boreal taiga organic eolian slopes, frozen	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31TL1:						
D31—Boreal taiga silty eolian slopes, frozen	0-21	---	---	2	3	86
	21-28	.43	.43			
	28-53	.49	.55			
	53-152	.49	.55			
D31UC1:						
D31—Boreal tussock organic plains, frozen	0-41	---	---	2	7	38
	41-49	.49	.49			
	49-56	.32	.37			
	56-152	.32	.37			
D31—Boreal taiga organic eolian slopes, frozen	0-42	---	---	2	7	38
	42-48	.55	.64			
	48-152	.55	.55			
D31—Boreal forest loamy high flood plains	0-13	---	---	4	1	180
	13-18	.24	.24			
	18-152	.10	.28			
D31UC2:						
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	---	---	2	5	56
	21-30	.24	.32			
	30-64	.20	.43			
	64-152	.15	.37			
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	---	---	2	3	86
	21-26	.37	.43			
	26-58	.15	.43			
	58-152	.05	.32			
D31UC3:						
D31—Boreal tussock organic plains, frozen	0-41	---	---	2	7	38
	41-49	.49	.49			
	49-56	.32	.37			
	56-152	.32	.37			
D31—Boreal taiga silty colluvial slopes, frozen	0-21	---	---	2	2	134
	21-28	.37	.43			
	28-60	.43	.55			
	60-152	.37	.49			
D31UC4:						
D31—Boreal woodland rocky low flood plains	0-30	.10	.28	4	2	134
	30-152	.02	.15			
D31—Boreal forest loamy high flood plains	0-13	---	---	4	1	180
	13-18	.24	.24			
	18-152	.10	.28			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D31UC5:						
D31—Subalpine scrub silty till slopes	0-10	---	---	2	2	134
	10-21	.20	.37			
	21-37	.24	.49			
	37-152	.10	.43			
D31—Alpine scrub gravelly circles, acid	0-3	---	---	2	3	86
	3-12	.24	.32			
	12-35	.10	.43			
	35-152	.10	.37			
D31WA1:						
D31—Alpine water, ponded	0-152	---	---	---	8	0
D31YV1:						
D31—Boreal forest loamy mid flood plains	0-5	---	---	4	2	134
	5-76	.43	.43			
	76-152	.32	.32			
D31—Boreal taiga loamy high flood plains, frozen	0-9	---	---	2	2	134
	9-77	.49	.49			
	77-152	.28	.28			
D31—Boreal scrub sandy low flood plains	0-78	.28	.37	4	3	86
	78-152	.20	.32			
D31YV2:						
D31—Boreal taiga/tussock organic terraces, frozen	0-42	---	---	2	7	38
	42-54	.64	.64			
	54-152	.49	.49			
D31—Boreal taiga loamy high flood plains, frozen	0-9	---	---	2	2	134
	9-77	.49	.49			
	77-152	.28	.28			
D31YV3:						
D31—Boreal taiga/tussock organic terraces, frozen	0-42	---	---	2	7	38
	42-54	.64	.64			
	54-152	.49	.49			
D31YV8:						
D31—Boreal water, flowing	0-152	---	---	---	8	0
D31YV9:						
D31—Boreal taiga loamy high flood plains, frozen	0-9	---	---	2	2	134
	9-77	.49	.49			
	77-152	.28	.28			

Table 8.--Erosion Properties--Continued

Map symbol and soil name	Depth	Erosion factors			Wind erodibility group	Wind erodibility index
		Kw	Kf	T		
	cm					
D32TL1:						
D32—Boreal taiga organic plains, frozen	0-41	---	---	2	7	38
	41-60	.64	.64			
	60-152	.55	.55			
D32TL2:						
D32—Boreal forest gravelly escarpments, frozen	0-21	---	---	2	2	134
	21-56	.24	.43			
	56-152	.10	.20			
D32—Boreal taiga loamy escarpment slopes	0-8	.10	.02	2	6	48
	8-28	.32	.37			
	28-152	.10	.17			
D32—Boreal taiga silty eolian slopes, frozen	0-11	---	---	2	3	86
	11-70	.37	.43			
	70-152	.43	.43			
D32TL4:						
D32—Boreal taiga organic plains, frozen	0-41	---	---	2	7	38
	41-60	.64	.64			
	60-152	.55	.55			

Table 9.--Physical Properties of the Soils

(Sand, silt, and clay values are shown either as a range or a representative value (RV). Absence of an entry indicates that data were not estimated. Soil properties are measured or inferred from direct observations in the field or laboratory.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D31BH1:									
D31—Boreal forest rocky colluvial slopes	0-8	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	8-14	20-52	37-75	2-12	0.89-1.18	1.0-11.0	0.10-0.38	0.1-3.0	2.0-11
	14-42	32-60	30-55	2-15	1.11-1.34	2.0-13.0	0.07-0.18	0.1-3.0	0.5-8.0
	42-152	23-75	15-75	2-15	1.26-1.48	9.0-26.0	0.04-0.07	0.1-3.0	0.4-6.0
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	4-10	9-49	47-82	2-15	0.93-1.22	3.0-13.0	0.10-0.34	0.1-3.0	2.0-11
	10-41	44-74	16-50	2-15	1.13-1.40	3.0-16.0	0.07-0.18	0.1-3.0	0.5-8.0
	41-152	52-77	15-44	2-15	1.15-1.39	5.0-22.0	0.05-0.08	0.1-3.0	0.4-6.0
D31—Boreal taiga silty eolian slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	14-50	47-83	2-11	0.95-1.18	1.0-7.0	0.10-0.43	0.1-3.0	2.0-11
	28-53	20-60	35-72	2-15	1.06-1.27	1.0-6.0	0.10-0.36	0.1-3.0	0.4-8.0
	53-152	12-54	44-83	2-11	0.99-1.18	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31BH2:									
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	4-10	9-49	47-82	2-15	0.93-1.22	3.0-13.0	0.10-0.34	0.1-3.0	2.0-11
	10-41	44-74	16-50	2-15	1.13-1.40	3.0-16.0	0.07-0.18	0.1-3.0	0.5-8.0
	41-152	52-77	15-44	2-15	1.15-1.39	5.0-22.0	0.05-0.08	0.1-3.0	0.4-6.0
D31—Boreal forest rocky colluvial escarpments	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	4-10	44-74	16-50	2-15	0.92-1.24	6.0-20.0	0.07-0.18	0.1-3.0	2.0-11
	10-43	44-74	16-50	2-15	0.97-1.26	6.0-18.0	0.05-0.07	0.1-3.0	0.5-8.0
	43-152	44-74	16-50	2-15	1.12-1.31	7.0-19.0	0.02-0.05	0.1-3.0	0.4-6.0
D31BH3:									
D31—Boreal taiga silty eolian slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	14-50	47-83	2-11	0.95-1.18	1.0-7.0	0.10-0.43	0.1-3.0	2.0-11
	28-53	20-60	35-72	2-15	1.06-1.27	1.0-6.0	0.10-0.36	0.1-3.0	0.4-8.0
	53-152	12-54	44-83	2-11	0.99-1.18	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0
D31BH5:									
D31—Boreal taiga/tussock organic terraces, frozen	0-42	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	42-54	10-48	47-83	2-15	1.02-1.21	0.0-5.0	0.10-0.40	0.1-3.0	0.4-8.0
	54-152	10-48	47-83	2-15	0.98-1.19	0.0-2.0	0.10-0.40	0.1-3.0	0.4-8.0
D31—Boreal forest loamy high flood plains	0-13	0-0	0-0	0-0	0.80-1.12	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	13-18	44-74	16-50	2-10	1.00-1.27	6.0-17.0	0.10-0.41	0.1-3.0	2.0-11
	18-152	55-86	9-37	2-8	1.26-1.46	16.0-55.0	0.03-0.08	0.1-3.0	0.1-2.5
D31—Boreal scrub rocky drainages	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	4-14	44-74	16-50	2-15	0.92-1.23	5.0-18.0	0.10-0.39	0.1-3.0	2.0-11
	14-152	52-77	15-44	2-15	1.19-1.46	9.0-24.0	0.02-0.09	0.1-3.0	0.1-2.5

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D31BH6:									
D31—Boreal forest gravelly colluvial escarpments	0-14	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	14-22	28-60	25-58	2-15	0.94-1.24	5.0-17.0	0.09-0.19	0.1-3.0	2.0-11
	22-152	45-72	20-50	2-15	1.20-1.45	4.0-20.0	0.04-0.05	0.1-3.0	0.4-8.0
D31—Boreal rubble land.									
D31BH7:									
D31—Subalpine woodland rocky colluvial slopes	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.0-3.0	50-100
	4-8	30-58	40-68	2-8	0.91-1.15	1.0-8.0	0.09-0.18	0.1-3.0	2.0-11
	8-27	40-70	20-52	2-10	1.24-1.46	3.0-15.0	0.01-0.01	0.1-3.0	0.5-6.0
	27-152	33-60	27-65	2-13	0.57-0.67	7.0-22.0	0.00-0.03	0.1-3.0	0.2-4.0
D31—Boreal forest rocky colluvial slopes	0-8	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	8-14	20-52	37-75	2-12	0.89-1.18	1.0-11.0	0.10-0.38	0.1-3.0	2.0-11
	14-42	32-60	30-55	2-15	1.11-1.34	2.0-13.0	0.07-0.18	0.1-3.0	0.5-8.0
	42-152	23-75	15-75	2-15	1.26-1.48	9.0-26.0	0.04-0.07	0.1-3.0	0.4-6.0
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-26	14-49	47-83	2-8	0.87-1.14	1.0-9.0	0.10-0.36	0.1-3.0	2.0-11
	26-58	19-70	20-79	2-10	1.12-1.36	4.0-18.0	0.08-0.16	0.1-3.0	0.4-8.0
	58-152	23-72	20-75	2-8	1.28-1.47	0.0-2.0	0.07-0.09	0.1-3.0	0.4-8.0
D31CF1:									
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-26	14-49	47-83	2-8	0.87-1.14	1.0-9.0	0.10-0.36	0.1-3.0	2.0-11
	26-58	19-70	20-79	2-10	1.12-1.36	4.0-18.0	0.08-0.16	0.1-3.0	0.4-8.0
	58-152	23-72	20-75	2-8	1.28-1.47	0.0-2.0	0.07-0.09	0.1-3.0	0.4-8.0
D31—Boreal woodland silty eolian slopes, frozen	0-25	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	25-50	26-50	48-71	2-10	1.06-1.31	2.0-12.0	0.09-0.22	0.1-3.0	0.4-8.0
	50-152	44-74	16-50	2-10	1.18-1.37	0.0-2.0	0.07-0.16	0.1-3.0	0.4-8.0
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.37-0.42	1.0-10.0	0.10-0.49	0.0-3.0	50-100
	21-30	14-49	49-83	2-8	0.97-1.22	1.0-10.0	0.10-0.36	0.1-3.0	2.0-11
	30-64	44-74	18-50	2-8	1.20-1.45	3.0-15.0	0.09-0.26	0.1-3.0	0.4-8.0
	64-152	50-77	16-48	2-8	1.45-1.69	0.0-2.0	0.02-0.09	0.1-3.0	0.2-4.0
D31HL1:									
D31—Boreal taiga silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.79-0.91	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	15-48	40-80	2-15	0.98-1.23	1.0-9.0	0.10-0.38	0.1-3.0	2.0-11
	28-60	25-50	40-72	2-15	1.10-1.31	1.0-9.0	0.10-0.34	0.1-3.0	0.4-8.0
	60-152	15-50	40-80	2-15	1.06-1.29	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0
D31HL2:									
D31—Boreal taiga silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.79-0.91	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	15-48	40-80	2-15	0.98-1.23	1.0-9.0	0.10-0.38	0.1-3.0	2.0-11
	28-60	25-50	40-72	2-15	1.10-1.31	1.0-9.0	0.10-0.34	0.1-3.0	0.4-8.0
	60-152	15-50	40-80	2-15	1.06-1.29	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D31KT1:									
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0
D31LB1:									
D31—Boreal taiga silty eolian slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	14-50	47-83	2-11	0.95-1.18	1.0-7.0	0.10-0.43	0.1-3.0	2.0-11
	28-53	20-60	35-72	2-15	1.06-1.27	1.0-6.0	0.10-0.36	0.1-3.0	0.4-8.0
	53-152	12-54	44-83	2-11	0.99-1.18	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0
D31—Boreal forest rocky colluvial slopes	0-8	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	8-14	20-52	37-75	2-12	0.89-1.18	1.0-11.0	0.10-0.38	0.1-3.0	2.0-11
	14-42	32-60	30-55	2-15	1.11-1.34	2.0-13.0	0.07-0.18	0.1-3.0	0.5-8.0
	42-152	23-75	15-75	2-15	1.26-1.48	9.0-26.0	0.04-0.07	0.1-3.0	0.4-6.0
D31LB2:									
D31—Boreal taiga silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.79-0.91	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	15-48	40-80	2-15	0.98-1.23	1.0-9.0	0.10-0.38	0.1-3.0	2.0-11
	28-60	25-50	40-72	2-15	1.10-1.31	1.0-9.0	0.10-0.34	0.1-3.0	0.4-8.0
	60-152	15-50	40-80	2-15	1.06-1.29	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	4-10	9-49	47-82	2-15	0.93-1.22	3.0-13.0	0.10-0.34	0.1-3.0	2.0-11
	10-41	44-74	16-50	2-15	1.13-1.40	3.0-16.0	0.07-0.18	0.1-3.0	0.5-8.0
	41-152	52-77	15-44	2-15	1.15-1.39	5.0-22.0	0.05-0.08	0.1-3.0	0.4-6.0
D31—Boreal forest rocky colluvial slopes	0-8	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	8-14	20-52	37-75	2-12	0.89-1.18	1.0-11.0	0.10-0.38	0.1-3.0	2.0-11
	14-42	32-60	30-55	2-15	1.11-1.34	2.0-13.0	0.07-0.18	0.1-3.0	0.5-8.0
	42-152	23-75	15-75	2-15	1.26-1.48	9.0-26.0	0.04-0.07	0.1-3.0	0.4-6.0
D31MT1:									
D31—Alpine rubble land.									
D31—Alpine low scrub gravelly colluvial slopes	0-11	28-52	45-70	2-8	0.97-1.24	2.0-13.0	0.10-0.29	0.1-3.0	2.0-11
	11-34	44-74	20-50	2-10	1.28-1.52	3.0-19.0	0.02-0.07	0.1-3.0	0.5-8.0
	34-152	52-77	15-44	2-8	1.19-1.47	10.0-32.0	0.06-0.08	0.1-3.0	0.4-6.0
D31MT2:									
D31—Alpine low scrub gravelly colluvial slopes	0-11	28-52	45-70	2-8	0.97-1.24	2.0-13.0	0.10-0.29	0.1-3.0	2.0-11
	11-34	44-74	20-50	2-10	1.28-1.52	3.0-19.0	0.02-0.07	0.1-3.0	0.5-8.0
	34-152	52-77	15-44	2-8	1.19-1.47	10.0-32.0	0.06-0.08	0.1-3.0	0.4-6.0
D31—Alpine scrub gravelly circles	0-10	26-55	43-72	2-15	0.91-1.20	3.0-13.0	0.09-0.29	0.1-3.0	2.0-11
	10-31	45-70	16-50	2-15	1.30-1.56	2.0-14.0	0.02-0.08	0.1-3.0	0.5-8.0
	31-152	48-77	16-50	2-15	1.16-1.41	7.0-34.0	0.06-0.10	0.1-3.0	0.4-6.0
D31—Alpine rubble land.									
D31MT3:									
D31—Alpine low scrub organic hummocks, frozen	0-44	0-0	0-0	0-0	0.33-0.38	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	44-152	20-50	44-78	1-8	1.09-1.32	0.0-2.0	0.10-0.28	0.1-3.0	0.4-8.0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D31MT3:									
D31—Alpine scrub loamy hummocks, frozen	0-31	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	31-57	30-70	25-60	2-10	1.36-1.55	1.0-13.0	0.09-0.24	0.1-3.0	0.4-8.0
	57-152	27-70	23-65	2-8	1.27-1.43	0.0-2.0	0.03-0.14	0.1-3.0	0.2-4.0
D31—Alpine low scrub loamy solifluction lobes	0-5	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	5-21	17-54	44-78	2-8	0.97-1.18	1.0-7.0	0.10-0.29	0.1-3.0	2.0-11
	21-152	36-83	9-54	2-10	1.50-1.68	12.0-27.0	0.08-0.16	0.1-3.0	0.1-2.5
D31OF1:									
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-26	14-49	47-83	2-8	0.87-1.14	1.0-9.0	0.10-0.36	0.1-3.0	2.0-11
	26-58	19-70	20-79	2-10	1.12-1.36	4.0-18.0	0.08-0.16	0.1-3.0	0.4-8.0
	58-152	23-72	20-75	2-8	1.28-1.47	0.0-2.0	0.07-0.09	0.1-3.0	0.4-8.0
D31—Boreal woodland silty eolian slopes frozen	0-25	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	25-50	26-50	48-71	2-10	1.06-1.31	2.0-12.0	0.09-0.22	0.1-3.0	0.4-8.0
	50-152	44-74	16-50	2-10	1.18-1.37	0.0-2.0	0.07-0.16	0.1-3.0	0.4-8.0
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	4-10	9-49	47-82	2-15	0.93-1.22	3.0-13.0	0.10-0.34	0.1-3.0	2.0-11
	10-41	44-74	16-50	2-15	1.13-1.40	3.0-16.0	0.07-0.18	0.1-3.0	0.5-8.0
	41-152	52-77	15-44	2-15	1.15-1.39	5.0-22.0	0.05-0.08	0.1-3.0	0.4-6.0
D31OM1:									
D31—Alpine scrub silty circles	0-11	15-49	46-82	2-8	0.84-1.13	1.0-10.0	0.10-0.36	0.1-3.0	2.0-11
	11-29	35-60	30-57	2-10	1.17-1.48	2.0-16.0	0.02-0.10	0.1-3.0	2.0-11
	29-152	42-77	16-50	2-8	0.98-1.29	8.0-22.0	0.07-0.08	0.1-3.0	0.4-8.0
D31—Alpine rubble land.									
D31OM2:									
D31—Alpine scrub silty circles	0-11	15-49	46-82	2-8	0.84-1.13	1.0-10.0	0.10-0.36	0.1-3.0	2.0-11
	11-29	35-60	30-57	2-10	1.17-1.48	2.0-16.0	0.02-0.10	0.1-3.0	2.0-11
	29-152	42-77	16-50	2-8	0.98-1.29	8.0-22.0	0.07-0.08	0.1-3.0	0.4-8.0
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.37-0.42	1.0-10.0	0.10-0.49	0.0-3.0	50-100
	21-30	14-49	49-83	2-8	0.97-1.22	1.0-10.0	0.10-0.36	0.1-3.0	2.0-11
	30-64	44-74	18-50	2-8	1.20-1.45	3.0-15.0	0.09-0.26	0.1-3.0	0.4-8.0
	64-152	50-77	16-48	2-8	1.45-1.69	0.0-2.0	0.02-0.09	0.1-3.0	0.2-4.0
D31SD1:									
D31—Alpine low scrub organic hummocks, frozen	0-44	0-0	0-0	0-0	0.33-0.38	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	44-152	20-50	44-78	1-8	1.09-1.32	0.0-2.0	0.10-0.28	0.1-3.0	0.4-8.0
D31—Alpine tussock-scrub silty polygons, frozen	0-27	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	27-35	18-46	46-78	2-8	1.05-1.20	0.0-3.0	0.10-0.45	0.1-3.0	2.0-11
	35-42	25-55	43-70	2-8	1.05-1.20	0.0-3.0	0.10-0.34	0.1-3.0	0.4-8.0
	42-152	20-55	43-78	2-8	1.05-1.20	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31TE1:									
D31—Boreal taiga/tussock organic terraces, frozen	0-42	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	42-54	10-48	47-83	2-15	1.02-1.21	0.0-5.0	0.10-0.40	0.1-3.0	0.4-8.0
	54-152	10-48	47-83	2-15	0.98-1.19	0.0-2.0	0.10-0.40	0.1-3.0	0.4-8.0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D31TE1:									
D31—Boreal taiga silty terraces, frozen	0-18	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.5	50-100
	18-28	25-52	45-73	2-10	0.89-1.15	1.0-9.0	0.10-0.41	0.1-3.5	2.0-11
	28-69	33-70	20-57	2-12	1.05-1.27	3.0-10.0	0.10-0.33	0.1-3.5	0.4-8.0
	69-152	39-73	17-50	2-11	1.23-1.42	0.0-2.0	0.10-0.29	0.1-3.5	0.4-8.0
D31TE2:									
D31—Boreal taiga/tussock organic terraces, frozen	0-42	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	42-54	10-48	47-83	2-15	1.02-1.21	0.0-5.0	0.10-0.40	0.1-3.0	0.4-8.0
	54-152	10-48	47-83	2-15	0.98-1.19	0.0-2.0	0.10-0.40	0.1-3.0	0.4-8.0
D31TF1:									
D31—Subalpine woodland silty colluvial slopes	0-15	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.0-3.0	50-100
	15-22	30-55	43-67	2-9	0.92-1.19	3.0-12.0	0.10-0.34	0.1-3.0	2.0-11
	22-47	40-70	16-50	5-15	1.14-1.40	3.0-16.0	0.03-0.11	0.1-3.0	0.4-8.0
	47-152	45-77	16-50	3-10	1.33-1.58	6.0-23.0	0.02-0.08	0.1-3.0	0.3-4.0
D31—Subalpine scrub loamy residual slopes	0-12	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.0-3.0	50-100
	12-19	31-60	38-65	2-15	0.93-1.25	7.0-21.0	0.10-0.38	0.1-3.0	2.0-11
	19-54	35-75	15-55	4-15	1.20-1.54	5.0-22.0	0.02-0.08	0.1-3.0	0.5-8.0
	54-152	42-70	21-55	2-9	0.98-1.14	13.0-54.0	0.02-0.03	0.1-3.0	0.4-6.0
D31TF2:									
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	0-22	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.0-3.0	50-100
	22-27	25-50	48-72	2-8	0.96-1.21	1.0-10.0	0.10-0.38	0.1-3.0	2.0-11
	27-60	28-62	36-70	2-8	1.21-1.45	4.0-20.0	0.09-0.26	0.1-3.0	0.4-8.0
	60-152	28-51	42-70	2-8	1.14-1.40	0.0-2.0	0.10-0.28	0.1-3.0	0.4-8.0
D31—Subalpine scrub silty till slopes	0-10	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.0-3.0	50-100
	10-21	25-52	46-72	2-8	0.84-1.13	1.0-11.0	0.10-0.34	0.1-3.0	2.0-11
	21-37	28-70	20-70	2-10	1.14-1.37	3.0-13.0	0.08-0.20	0.1-3.0	0.4-8.0
	37-152	35-70	22-55	2-10	1.21-1.46	6.0-23.0	0.02-0.06	0.1-3.0	0.3-4.0
D31TH1:									
D31—Boreal taiga silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.79-0.91	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	15-48	40-80	2-15	0.98-1.23	1.0-9.0	0.10-0.38	0.1-3.0	2.0-11
	28-60	25-50	40-72	2-15	1.10-1.31	1.0-9.0	0.10-0.34	0.1-3.0	0.4-8.0
	60-152	15-50	40-80	2-15	1.06-1.29	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0
D31—Boreal taiga gravelly colluvial slopes	0-4	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	4-8	25-50	45-72	2-15	0.93-1.21	2.0-11.0	0.10-0.38	0.1-3.0	2.0-11
	8-36	30-56	30-55	2-15	1.02-1.27	3.0-13.0	0.09-0.18	0.1-3.0	0.5-8.0
	36-152	52-80	15-44	2-15	1.31-1.54	13.0-33.0	0.07-0.10	0.1-3.0	0.4-6.0
D31—Boreal woodland silty eolian slopes, frozen	0-25	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	25-50	26-50	48-71	2-10	1.06-1.31	2.0-12.0	0.09-0.22	0.1-3.0	0.4-8.0
	50-152	44-74	16-50	2-10	1.18-1.37	0.0-2.0	0.07-0.16	0.1-3.0	0.4-8.0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D31TL1:									
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0
D31—Boreal taiga silty eolian slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	14-50	47-83	2-11	0.95-1.18	1.0-7.0	0.10-0.43	0.1-3.0	2.0-11
	28-53	20-60	35-72	2-15	1.06-1.27	1.0-6.0	0.10-0.36	0.1-3.0	0.4-8.0
	53-152	12-54	44-83	2-11	0.99-1.18	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31UC1:									
D31—Boreal tussock organic plains, frozen	0-41	0-0	0-0	0-0	0.33-0.38	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	41-49	2-50	35-85	2-15	0.97-1.18	1.0-6.0	0.10-0.44	0.1-3.0	2.0-11
	49-56	25-55	30-72	2-15	1.29-1.51	1.0-11.0	0.10-0.41	0.1-3.0	0.4-8.0
	56-152	20-50	35-75	2-15	1.28-1.46	0.0-2.0	0.10-0.41	0.1-3.0	0.4-8.0
D31—Boreal taiga organic eolian slopes, frozen	0-42	0-0	0-0	0-0	0.10-0.30	0.0-4.0	0.10-0.36	0.1-3.0	50-100
	42-48	5-43	47-83	2-15	1.03-1.24	1.0-5.0	0.10-0.38	0.1-3.0	0.4-8.0
	48-152	5-43	46-83	2-15	1.05-1.20	0.0-2.0	0.10-0.39	0.1-3.0	0.4-8.0
D31—Boreal forest loamy high flood plains	0-13	0-0	0-0	0-0	0.80-1.12	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	13-18	44-74	16-50	2-10	1.00-1.27	6.0-17.0	0.10-0.41	0.1-3.0	2.0-11
	18-152	55-86	9-37	2-8	1.26-1.46	16.0-55.0	0.03-0.08	0.1-3.0	0.1-2.5
D31UC2:									
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.37-0.42	1.0-10.0	0.10-0.49	0.0-3.0	50-100
	21-30	14-49	49-83	2-8	0.97-1.22	1.0-10.0	0.10-0.36	0.1-3.0	2.0-11
	30-64	44-74	18-50	2-8	1.20-1.45	3.0-15.0	0.09-0.26	0.1-3.0	0.4-8.0
	64-152	50-77	16-48	2-8	1.45-1.69	0.0-2.0	0.02-0.09	0.1-3.0	0.2-4.0
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-26	14-49	47-83	2-8	0.87-1.14	1.0-9.0	0.10-0.36	0.1-3.0	2.0-11
	26-58	19-70	20-79	2-10	1.12-1.36	4.0-18.0	0.08-0.16	0.1-3.0	0.4-8.0
	58-152	23-72	20-75	2-8	1.28-1.47	0.0-2.0	0.07-0.09	0.1-3.0	0.4-8.0
D31UC3:									
D31—Boreal tussock organic plains, frozen	0-41	0-0	0-0	0-0	0.33-0.38	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	41-49	2-50	35-85	2-15	0.97-1.18	1.0-6.0	0.10-0.44	0.1-3.0	2.0-11
	49-56	25-55	30-72	2-15	1.29-1.51	1.0-11.0	0.10-0.41	0.1-3.0	0.4-8.0
	56-152	20-50	35-75	2-15	1.28-1.46	0.0-2.0	0.10-0.41	0.1-3.0	0.4-8.0
D31—Boreal taiga silty colluvial slopes, frozen	0-21	0-0	0-0	0-0	0.79-0.91	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	21-28	15-48	40-80	2-15	0.98-1.23	1.0-9.0	0.10-0.38	0.1-3.0	2.0-11
	28-60	25-50	40-72	2-15	1.10-1.31	1.0-9.0	0.10-0.34	0.1-3.0	0.4-8.0
	60-152	15-50	40-80	2-15	1.06-1.29	0.0-2.0	0.10-0.34	0.1-3.0	0.4-8.0
D31UC4:									
D31—Boreal woodland rocky low flood plains	0-30	55-86	8-37	1-10	1.24-1.49	13.0-34.0	0.02-0.08	0.1-3.0	0.1-2.5
	30-152	72-88	9-20	1-8	1.50-1.69	20.0-60.0	0.02-0.03	0.1-3.0	0.1-2.5
D31—Boreal forest loamy high flood plains	0-13	0-0	0-0	0-0	0.80-1.12	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	13-18	44-74	16-50	2-10	1.00-1.27	6.0-17.0	0.10-0.41	0.1-3.0	2.0-11
	18-152	55-86	9-37	2-8	1.26-1.46	16.0-55.0	0.03-0.08	0.1-3.0	0.1-2.5

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D31UC5:									
D31—Subalpine scrub silty till slopes	0-10	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.0-3.0	50-100
	10-21	25-52	46-72	2-8	0.84-1.13	1.0-11.0	0.10-0.34	0.1-3.0	2.0-11
	21-37	28-70	20-70	2-10	1.14-1.37	3.0-13.0	0.08-0.20	0.1-3.0	0.4-8.0
	37-152	35-70	22-55	2-10	1.21-1.46	6.0-23.0	0.02-0.06	0.1-3.0	0.3-4.0
D31—Alpine scrub gravelly circles, acid	0-3	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	3-12	28-52	45-70	2-8	0.93-1.21	2.0-13.0	0.10-0.29	0.1-3.0	2.0-11
	12-35	44-72	20-50	2-8	1.19-1.43	2.0-11.0	0.03-0.08	0.1-3.0	0.5-8.0
	35-152	42-72	20-55	2-8	1.08-1.36	9.0-23.0	0.07-0.08	0.1-3.0	0.4-6.0
D31WA1:									
D31—Alpine water, ponded.									
D31YV1:									
D31—Boreal forest loamy mid flood plains	0-5	0-0	0-0	0-0	1.07-1.22	1.0-6.0	0.10-0.36	0.1-3.0	50-100
	5-76	50-75	16-44	2-9	1.01-1.26	8.0-18.0	0.10-0.41	0.1-3.0	0.4-8.0
	76-152	58-79	13-39	2-9	1.31-1.55	8.0-22.0	0.10-0.45	0.1-3.0	0.2-4.0
D31—Boreal taiga loamy high flood plains, frozen	0-9	0-0	0-0	0-0	1.05-1.20	0.0-3.0	0.10-0.36	0.1-3.0	50-100
	9-77	44-74	16-50	2-15	1.01-1.23	4.0-13.0	0.10-0.44	0.1-3.0	0.4-8.0
	77-152	44-74	16-50	2-15	1.16-1.37	0.0-2.0	0.10-0.43	0.1-3.0	0.4-8.0
D31—Boreal scrub sandy low flood plains	0-78	52-77	15-44	2-15	1.11-1.35	8.0-23.0	0.10-0.34	0.1-3.0	0.4-8.0
	78-152	52-77	15-44	2-15	1.26-1.48	10.0-39.0	0.10-0.29	0.1-3.0	0.4-8.0
D31YV2:									
D31—Boreal taiga/tussock organic terraces, frozen	0-42	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	42-54	10-48	47-83	2-15	1.02-1.21	0.0-5.0	0.10-0.40	0.1-3.0	0.4-8.0
	54-152	10-48	47-83	2-15	0.98-1.19	0.0-2.0	0.10-0.40	0.1-3.0	0.4-8.0
D31—Boreal taiga loamy high flood plains, frozen	0-9	0-0	0-0	0-0	1.05-1.20	0.0-3.0	0.10-0.36	0.1-3.0	50-100
	9-77	44-74	16-50	2-15	1.01-1.23	4.0-13.0	0.10-0.44	0.1-3.0	0.4-8.0
	77-152	44-74	16-50	2-15	1.16-1.37	0.0-2.0	0.10-0.43	0.1-3.0	0.4-8.0
D31YV3:									
D31—Boreal taiga/tussock organic terraces, frozen	0-42	0-0	0-0	0-0	0.10-0.30	1.0-10.0	0.10-0.36	0.1-3.0	50-100
	42-54	10-48	47-83	2-15	1.02-1.21	0.0-5.0	0.10-0.40	0.1-3.0	0.4-8.0
	54-152	10-48	47-83	2-15	0.98-1.19	0.0-2.0	0.10-0.40	0.1-3.0	0.4-8.0
D31YV8:									
D31—Boreal water, flowing.									
D31YV9:									
D31—Boreal taiga loamy high flood plains, frozen	0-9	0-0	0-0	0-0	1.05-1.20	0.0-3.0	0.10-0.36	0.1-3.0	50-100
	9-77	44-74	16-50	2-15	1.01-1.23	4.0-13.0	0.10-0.44	0.1-3.0	0.4-8.0
	77-152	44-74	16-50	2-15	1.16-1.37	0.0-2.0	0.10-0.43	0.1-3.0	0.4-8.0
D32TL1:									
D32—Boreal taiga organic plains, frozen	0-41	0-0	0-0	0-0	0.10-0.30	1.0-12.0	0.10-0.36	0.1-2.5	50-100
	41-60	10-48	47-82	2-15	1.07-1.23	0.0-3.0	0.10-0.40	0.1-2.5	0.4-8.0
	60-152	10-48	47-83	2-15	1.08-1.25	0.0-2.0	0.10-0.40	0.1-2.5	0.4-8.0
D32TL2:									
D32—Boreal forest gravelly escarpments, frozen	0-21	0-0	0-0	0-0	0.10-0.30	1.0-12.0	0.10-0.36	0.1-3.0	50-100
	21-56	44-74	16-50	2-10	1.12-1.36	3.0-14.0	0.08-0.26	0.1-3.0	0.4-8.0
	56-152	44-74	16-50	2-10	1.34-1.55	0.0-2.0	0.08-0.18	0.1-3.0	0.4-8.0

Table 9.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter
	cm	*Pct*	*Pct*	*Pct*	*g/cc*	*um/sec*	*cm*	*Pct*	*Pct*
D32TL2:									
D32—Boreal taiga loamy escarpment slopes	0-8	44-74	16-50	2-10	1.27-1.47	2.0-17.0	0.10-0.41	0.1-2.5	2.0-11
	8-28	16-53	32-82	2-15	1.37-1.52	1.0-8.0	0.10-0.35	0.1-2.5	0.5-6.0
	28-152	71-88	9-20	2-15	1.50-1.69	20.0-61.0	0.03-0.08	0.1-2.5	0.1-2.5
D32—Boreal taiga silty eolian slopes, frozen	0-11	0-0	0-0	0-0	0.10-0.30	1.0-12.0	0.10-0.36	0.1-2.5	50-100
	11-70	10-48	47-83	2-10	1.13-1.35	1.0-9.0	0.09-0.36	0.1-2.5	0.4-8.0
	70-152	11-48	47-83	2-10	1.05-1.20	0.0-2.0	0.10-0.40	0.1-2.5	0.4-8.0
D32TL4:									
D32—Boreal taiga organic plains, frozen	0-41	0-0	0-0	0-0	0.10-0.30	1.0-12.0	0.10-0.36	0.1-2.5	50-100
	41-60	10-48	47-82	2-15	1.07-1.23	0.0-3.0	0.10-0.40	0.1-2.5	0.4-8.0
	60-152	10-48	47-83	2-15	1.08-1.25	0.0-2.0	0.10-0.40	0.1-2.5	0.4-8.0

Table 10.--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	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31BH1:								
D31—Boreal forest rocky colluvial slopes	0-8	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	8-14	15.0-35.0	1.3-7.3	3.8-7.3	0	0	0.1-2.5	0
	14-42	2.0-13.7	1.0-9.0	4.4-7.8	0	0	0.1-2.5	0
	42-152	2.0-13.9	1.0-10.0	4.9-7.7	0	0	0.1-2.5	0
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	42.0-91.0	15.6-81.5	3.4-5.5	0	0	1.0-4.5	0
	4-10	2.1-13.2	2.0-20.0	3.9-8.1	0-2	0	1.0-4.5	0
	10-41	2.0-11.2	1.0-9.0	4.2-8.0	0-4	0	1.0-4.5	0
	41-152	2.0-13.0	1.0-10.0	5.0-7.9	0-3	0	1.0-4.5	0
D31—Boreal taiga silty eolian slopes, frozen	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-6.8	4.0-6.8	0	0	0.1-2.5	0
	28-53	2.0-13.9	1.0-10.0	4.2-7.1	0	0	0.1-2.5	0
	53-152	2.0-10.5	1.0-10.0	5.1-7.0	0	0	0.1-2.5	0
D31BH2:								
D31—Boreal forest rocky sedimentary colluvial slopes	0-4	42.0-91.0	15.6-81.5	3.4-5.5	0	0	1.0-4.5	0
	4-10	2.1-13.2	2.0-20.0	3.9-8.1	0-2	0	1.0-4.5	0
	10-41	2.0-11.2	1.0-9.0	4.2-8.0	0-4	0	1.0-4.5	0
	41-152	2.0-13.0	1.0-10.0	5.0-7.9	0-3	0	1.0-4.5	0
D31—Boreal forest rocky colluvial escarpments	0-4	42.0-91.0	15.6-81.5	3.4-5.5	0	0	1.0-4.0	0
	4-10	2.1-11.5	2.0-20.0	5.5-9.0	0-3	0	2.5-5.5	0
	10-43	2.0-11.2	1.0-9.0	5.2-9.0	0-6	0	2.5-5.5	0
	43-152	2.0-11.4	1.0-10.0	5.9-8.2	0-6	0	2.5-5.5	0
D31BH3:								
D31—Boreal taiga silty eolian slopes, frozen	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-6.8	4.0-6.8	0	0	0.1-2.5	0
	28-53	2.0-13.9	1.0-10.0	4.2-7.1	0	0	0.1-2.5	0
	53-152	2.0-10.5	1.0-10.0	5.1-7.0	0	0	0.1-2.5	0
D31—Boreal taiga organic eolian slopes, frozen	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31BH5:								
D31—Boreal taiga/tussock organic terraces, frozen	0-42	42.0-91.0	19.5-96.3	3.8-5.8	0	0	0.1-2.5	0
	42-54	5.0-20.0	1.0-10.0	5.2-7.4	0	0	0.1-2.5	0
	54-152	5.0-20.0	1.0-10.0	5.0-7.0	0	0	0.1-2.5	0
D31—Boreal forest loamy high flood plains	0-13	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-5.1	0
	13-18	2.0-7.7	2.0-20.0	4.9-7.2	0	0	0.1-5.1	0
	18-152	1.6-6.9	1.0-10.0	5.8-7.5	0	0	0.1-5.1	0
D31—Boreal scrub rocky drainages	0-4	42.0-91.0	15.6-86.2	3.4-5.6	0	0	0.1-6.5	0
	4-14	2.1-14.1	2.0-20.0	4.9-7.6	0	0	0.1-6.5	0
	14-152	1.9-13.3	1.0-10.0	5.3-7.6	0	0	0.1-6.5	0
D31BH6:								
D31—Boreal forest gravelly colluvial escarpments	0-14	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	14-22	2.1-14.1	2.0-20.0	4.2-8.2	0	0	0.1-2.5	0
	22-152	2.0-13.9	1.0-10.0	5.4-8.1	0	0	0.1-2.5	0
D31—Boreal rubble land.								
D31BH7:								
D31—Subalpine woodland rocky colluvial slopes	0-4	42.0-91.0	14.8-55.2	3.3-4.8	0	0	0.0-3.0	0
	4-8	15.0-35.0	0.9-9.4	3.4-6.1	0	0	0.1-3.0	0
	8-27	1.9-7.8	1.0-9.0	4.8-6.0	0	0	0.1-3.0	0
	27-152	0.2-7.4	1.0-10.0	6.0-6.7	0	0	0.1-3.0	0
D31—Boreal forest rocky colluvial slopes	0-8	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	8-14	15.0-35.0	1.3-7.3	3.8-7.3	0	0	0.1-2.5	0
	14-42	2.0-13.7	1.0-9.0	4.4-7.8	0	0	0.1-2.5	0
	42-152	2.0-13.9	1.0-10.0	4.9-7.7	0	0	0.1-2.5	0
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-3.0	0
	21-26	2.1-6.2	2.0-20.0	4.3-7.2	0	0	0.1-3.0	0
	26-58	2.0-9.6	1.0-10.0	4.7-7.3	0	0	0.1-3.0	0
	58-152	2.0-6.1	1.0-10.0	5.1-7.1	0	0	0.1-3.0	0
D31CF1:								
D31—Boreal forest gravelly colluvial slopes, frozen	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-3.0	0
	21-26	2.1-6.2	2.0-20.0	4.3-7.2	0	0	0.1-3.0	0
	26-58	2.0-9.6	1.0-10.0	4.7-7.3	0	0	0.1-3.0	0
	58-152	2.0-6.1	1.0-10.0	5.1-7.1	0	0	0.1-3.0	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31CF1:								
D31—Boreal woodland silty eolian slopes, frozen----	0-25	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	25-50	5.0-20.0	1.3-6.1	4.2-6.2	0	0	0.1-2.5	0
	50-152	5.0-18.0	1.3-6.1	4.8-6.2	0	0	0.1-2.5	0
D31—Subalpine woodland silty colluvial slopes, frozen----------	0-21	65.2-103.4	15.0-47.0	4.4-7.0	0	0	0.1-2.0	0
	21-30	2.1-8.0	2.0-20.0	5.6-6.7	0	0	0.1-3.0	0
	30-64	2.0-7.9	1.0-10.0	5.8-7.1	0	0	0.1-3.0	0
	64-152	2.0-7.7	1.0-10.0	5.8-6.6	0	0	0.1-3.0	0
D31HL1:								
D31—Boreal taiga silty colluvial slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-9.0	4.1-7.8	0	0	0.1-2.5	0
	28-60	2.0-13.9	1.0-10.0	4.5-7.4	0	0	0.1-2.5	0
	60-152	2.0-13.9	1.0-10.0	4.9-6.9	0	0	0.1-2.5	0
D31—Boreal taiga organic eolian slopes, frozen----	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0
D31HL2:								
D31—Boreal taiga silty colluvial slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-9.0	4.1-7.8	0	0	0.1-2.5	0
	28-60	2.0-13.9	1.0-10.0	4.5-7.4	0	0	0.1-2.5	0
	60-152	2.0-13.9	1.0-10.0	4.9-6.9	0	0	0.1-2.5	0
D31—Boreal taiga organic eolian slopes, frozen----	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0
D31KT1:								
D31—Boreal taiga organic eolian slopes, frozen----	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0
D31LB1:								
D31—Boreal taiga silty eolian slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-6.8	4.0-6.8	0	0	0.1-2.5	0
	28-53	2.0-13.9	1.0-10.0	4.2-7.1	0	0	0.1-2.5	0
	53-152	2.0-10.5	1.0-10.0	5.1-7.0	0	0	0.1-2.5	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31LB1:								
D31—Boreal taiga organic eolian slopes, frozen----	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0
D31—Boreal forest rocky colluvial slopes----------	0-8	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	8-14	15.0-35.0	1.3-7.3	3.8-7.3	0	0	0.1-2.5	0
	14-42	2.0-13.7	1.0-9.0	4.4-7.8	0	0	0.1-2.5	0
	42-152	2.0-13.9	1.0-10.0	4.9-7.7	0	0	0.1-2.5	0
D31LB2:								
D31—Boreal taiga silty colluvial slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-9.0	4.1-7.8	0	0	0.1-2.5	0
	28-60	2.0-13.9	1.0-10.0	4.5-7.4	0	0	0.1-2.5	0
	60-152	2.0-13.9	1.0-10.0	4.9-6.9	0	0	0.1-2.5	0
D31—Boreal forest rocky sedimentary colluvial slopes--	0-4	42.0-91.0	15.6-81.5	3.4-5.5	0	0	1.0-4.5	0
	4-10	2.1-13.2	2.0-20.0	3.9-8.1	0-2	0	1.0-4.5	0
	10-41	2.0-11.2	1.0-9.0	4.2-8.0	0-4	0	1.0-4.5	0
	41-152	2.0-13.0	1.0-10.0	5.0-7.9	0-3	0	1.0-4.5	0
D31—Boreal forest rocky colluvial slopes----------	0-8	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	8-14	15.0-35.0	1.3-7.3	3.8-7.3	0	0	0.1-2.5	0
	14-42	2.0-13.7	1.0-9.0	4.4-7.8	0	0	0.1-2.5	0
	42-152	2.0-13.9	1.0-10.0	4.9-7.7	0	0	0.1-2.5	0
D31MT1:								
D31—Alpine low scrub gravelly colluvial slopes--	0-11	15.0-35.0	1.3-5.1	3.7-6.3	0	0	0.1-3.0	0
	11-34	6.0-21.0	1.3-5.0	4.2-6.2	0	0	0.1-3.0	0
	34-152	2.0-7.9	1.0-10.0	5.0-6.3	0	0	0.1-3.0	0
D31—Alpine rubble land.								
D31MT2:								
D31—Alpine low scrub gravelly colluvial slopes--	0-11	15.0-35.0	1.3-5.1	3.7-6.3	0	0	0.1-3.0	0
	11-34	6.0-21.0	1.3-5.0	4.2-6.2	0	0	0.1-3.0	0
	34-152	2.0-7.9	1.0-10.0	5.0-6.3	0	0	0.1-3.0	0
D31—Alpine scrub gravelly circles--	0-10	15.0-35.0	1.3-9.0	4.2-6.1	0	0	0.1-3.0	0
	10-31	2.0-13.7	1.0-9.0	5.0-6.2	0	0	0.1-3.0	0
	31-152	2.0-13.9	1.0-10.0	5.5-6.1	0	0	0.1-3.0	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31MT2:								
D31—Alpine rubble land.								
D31MT3:								
D31—Alpine low scrub organic hummocks, frozen--	0-44	37.0-84.0	23.1-77.1	4.1-5.4	0	0	0.1-3.0	0
	44-152	6.0-22.0	1.0-11.0	5.0-6.8	0	0	0.1-3.0	0
D31—Alpine scrub loamy hummocks, frozen----------	0-31	42.0-91.0	15.6-52.3	3.4-4.7	0	0	0.1-3.0	0
	31-57	2.0-7.9	1.0-10.0	5.2-6.6	0	0	0.1-3.0	0
	57-152	2.0-7.7	1.0-10.0	5.2-5.8	0	0	0.1-3.0	0
D31—Alpine low scrub loamy solifluction lobes	0-5	42.0-91.0	21.8-101.8	4.0-5.9	0	0	0.1-3.0	0
	5-21	2.0-7.7	2.0-20.0	5.0-6.5	0	0	0.1-3.0	0
	21-152	1.6-6.9	1.0-10.0	5.5-6.7	0	0	0.1-3.0	0
D31OF1:								
D31—Boreal forest gravelly colluvial slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-3.0	0
	21-26	2.1-6.2	2.0-20.0	4.3-7.2	0	0	0.1-3.0	0
	26-58	2.0-9.6	1.0-10.0	4.7-7.3	0	0	0.1-3.0	0
	58-152	2.0-6.1	1.0-10.0	5.1-7.1	0	0	0.1-3.0	0
D31—Boreal woodland silty eolian slopes, frozen----	0-25	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	25-50	5.0-20.0	1.3-6.1	4.2-6.2	0	0	0.1-2.5	0
	50-152	5.0-18.0	1.3-6.1	4.8-6.2	0	0	0.1-2.5	0
D31—Boreal forest rocky sedimentary colluvial slopes--	0-4	42.0-91.0	15.6-81.5	3.4-5.5	0	0	1.0-4.5	0
	4-10	2.1-13.2	2.0-20.0	3.9-8.1	0-2	0	1.0-4.5	0
	10-41	2.0-11.2	1.0-9.0	4.2-8.0	0-4	0	1.0-4.5	0
	41-152	2.0-13.0	1.0-10.0	5.0-7.9	0-3	0	1.0-4.5	0
D31OM1:								
D31—Alpine scrub silty circles-----	0-11	2.1-8.0	2.0-20.0	5.7-8.1	0-8	0	0.1-5.0	0
	11-29	2.1-8.0	1.0-9.0	5.6-8.2	0-12	0	0.1-8.5	0
	29-152	2.0-7.9	1.0-10.0	6.4-7.5	0-12	0	0.1-8.6	0
D31—Alpine rubble land.								
D31OM2:								
D31—Alpine scrub silty circles-----	0-11	2.1-8.0	2.0-20.0	5.7-8.1	0-8	0	0.1-5.0	0
	11-29	2.1-8.0	1.0-9.0	5.6-8.2	0-12	0	0.1-8.5	0
	29-152	2.0-7.9	1.0-10.0	6.4-7.5	0-12	0	0.1-8.6	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31OM2:								
D31—Subalpine woodland silty colluvial slopes, frozen	0-21	65.2-103.4	15.0-47.0	4.4-7.0	0	0	0.1-2.0	0
	21-30	2.1-8.0	2.0-20.0	5.6-6.7	0	0	0.1-3.0	0
	30-64	2.0-7.9	1.0-10.0	5.8-7.1	0	0	0.1-3.0	0
	64-152	2.0-7.7	1.0-10.0	5.8-6.6	0	0	0.1-3.0	0
D31SD1:								
D31—Alpine low scrub organic hummocks, frozen	0-44	37.0-84.0	23.1-77.1	4.1-5.4	0	0	0.1-3.0	0
	44-152	6.0-22.0	1.0-11.0	5.0-6.8	0	0	0.1-3.0	0
D31—Alpine tussock-scrub silty polygons, frozen	0-27	42.0-91.0	15.6-72.9	3.4-5.3	0	0	0.1-3.0	0
	27-35	15.0-35.0	1.3-5.1	4.0-5.2	0	0	0.1-3.0	0
	35-42	2.0-7.9	1.0-10.0	4.8-6.2	0	0	0.1-3.0	0
	42-152	2.0-7.9	1.0-10.0	5.4-6.2	0	0	0.1-3.0	0
D31TE1:								
D31—Boreal taiga/tussock organic terraces, frozen	0-42	42.0-91.0	19.5-96.3	3.8-5.8	0	0	0.1-2.5	0
	42-54	5.0-20.0	1.0-10.0	5.2-7.4	0	0	0.1-2.5	0
	54-152	5.0-20.0	1.0-10.0	5.0-7.0	0	0	0.1-2.5	0
D31—Boreal taiga silty terraces, frozen	0-18	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	18-28	15.0-35.0	1.3-6.2	4.4-6.5	0	0	0.1-2.5	0
	28-69	2.0-9.6	1.0-10.0	5.2-7.8	0	0	0.1-2.5	0
	69-152	2.0-9.6	1.0-10.0	5.2-7.7	0	0	0.1-2.5	0
D31TE2:								
D31—Boreal taiga/tussock organic terraces, frozen	0-42	42.0-91.0	19.5-96.3	3.8-5.8	0	0	0.1-2.5	0
	42-54	5.0-20.0	1.0-10.0	5.2-7.4	0	0	0.1-2.5	0
	54-152	5.0-20.0	1.0-10.0	5.0-7.0	0	0	0.1-2.5	0
D31TF1:								
D31—Subalpine woodland silty colluvial slopes	0-15	42.0-91.0	19.5-86.2	3.8-5.6	0	0	0.0-3.0	0
	15-22	2.1-8.9	2.0-20.0	4.8-7.3	0	0	0.1-3.0	0
	22-47	4.5-13.5	1.0-9.0	5.1-7.4	0	0	0.1-3.0	0
	47-152	2.9-9.6	1.0-10.0	4.6-7.2	0	0	0.1-3.0	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31TF1:								
D31—Subalpine scrub loamy residual slopes---	0-12	42.0-91.0	15.6-69.0	3.4-5.2	0	0	0.0-3.0	0
	12-19	15.0-35.0	2.5-9.0	3.8-5.6	0	0	0.1-4.0	0
	19-54	6.0-21.0	2.4-8.8	4.6-5.8	0	0	0.1-4.0	0
	54-152	2.0-8.8	1.0-10.0	5.4-6.2	0	0	0.1-4.0	0
D31TF2:								
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen----	0-22	42.0-91.0	16.5-72.9	3.5-5.3	0	0	0.0-3.0	0
	22-27	15.0-35.0	1.3-5.1	4.0-5.8	0	0	0.1-3.0	0
	27-60	2.0-7.9	1.0-10.0	4.5-6.6	0	0	0.1-3.0	0
	60-152	2.0-7.9	1.0-10.0	4.9-6.1	0	0	0.1-3.0	0
D31—Subalpine scrub silty till slopes----------	0-10	42.0-91.0	15.6-61.7	3.4-5.0	0	0	0.0-3.0	0
	10-21	15.0-35.0	1.3-5.1	3.7-6.2	0	0	0.1-3.0	0
	21-37	2.0-7.7	1.0-9.0	4.1-6.9	0	0	0.1-3.0	0
	37-152	2.0-7.9	1.0-10.0	5.0-6.7	0	0	0.1-3.0	0
D31TH1:								
D31—Boreal taiga silty colluvial slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-9.0	4.1-7.8	0	0	0.1-2.5	0
	28-60	2.0-13.9	1.0-10.0	4.5-7.4	0	0	0.1-2.5	0
	60-152	2.0-13.9	1.0-10.0	4.9-6.9	0	0	0.1-2.5	0
D31—Boreal taiga organic eolian slopes, frozen----	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0
D31—Boreal taiga gravelly colluvial slopes----------	0-4	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	4-8	15.0-35.0	1.3-9.0	3.6-6.1	0	0	0.1-2.5	0
	8-36	12.0-30.0	1.3-8.8	4.9-6.0	0	0	0.1-2.5	0
	36-152	2.0-13.9	1.0-10.0	5.0-6.7	0	0	0.1-2.5	0
D31—Boreal woodland silty eolian slopes, frozen----	0-25	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	25-50	5.0-20.0	1.3-6.1	4.2-6.2	0	0	0.1-2.5	0
	50-152	5.0-18.0	1.3-6.1	4.8-6.2	0	0	0.1-2.5	0
D31TL1:								
D31—Boreal taiga organic eolian slopes, frozen----	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31TL1:								
D31—Boreal taiga silty eolian slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-6.8	4.0-6.8	0	0	0.1-2.5	0
	28-53	2.0-13.9	1.0-10.0	4.2-7.1	0	0	0.1-2.5	0
	53-152	2.0-10.5	1.0-10.0	5.1-7.0	0	0	0.1-2.5	0
D31UC1:								
D31—Boreal tussock organic plains, frozen----------	0-41	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	41-49	15.0-35.0	2.0-20.0	4.1-5.1	0	0	0.1-2.5	0
	49-56	5.0-20.0	1.0-10.0	4.5-5.4	0	0	0.1-2.5	0
	56-152	5.0-20.0	1.0-10.0	4.3-6.5	0	0	0.1-2.5	0
D31—Boreal taiga organic eolian slopes, frozen----	0-42	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	42-48	7.0-23.0	1.0-11.0	5.1-6.5	0	0	0.1-2.5	0
	48-152	5.0-20.0	1.0-10.0	6.2-6.4	0	0	0.1-2.5	0
D31—Boreal forest loamy high flood plains----------	0-13	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-5.1	0
	13-18	2.0-7.7	2.0-20.0	4.9-7.2	0	0	0.1-5.1	0
	18-152	1.6-6.9	1.0-10.0	5.8-7.5	0	0	0.1-5.1	0
D31UC2:								
D31—Subalpine woodland silty colluvial slopes, frozen----------	0-21	65.2-103.4	15.0-47.0	4.4-7.0	0	0	0.1-2.0	0
	21-30	2.1-8.0	2.0-20.0	5.6-6.7	0	0	0.1-3.0	0
	30-64	2.0-7.9	1.0-10.0	5.8-7.1	0	0	0.1-3.0	0
	64-152	2.0-7.7	1.0-10.0	5.8-6.6	0	0	0.1-3.0	0
D31—Boreal forest gravelly colluvial slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-3.0	0
	21-26	2.1-6.2	2.0-20.0	4.3-7.2	0	0	0.1-3.0	0
	26-58	2.0-9.6	1.0-10.0	4.7-7.3	0	0	0.1-3.0	0
	58-152	2.0-6.1	1.0-10.0	5.1-7.1	0	0	0.1-3.0	0
D31UC3:								
D31—Boreal tussock organic plains, frozen----------	0-41	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	41-49	15.0-35.0	2.0-20.0	4.1-5.1	0	0	0.1-2.5	0
	49-56	5.0-20.0	1.0-10.0	4.5-5.4	0	0	0.1-2.5	0
	56-152	5.0-20.0	1.0-10.0	4.3-6.5	0	0	0.1-2.5	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31UC3:								
D31—Boreal taiga silty colluvial slopes, frozen----	0-21	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-2.5	0
	21-28	15.0-35.0	1.3-9.0	4.1-7.8	0	0	0.1-2.5	0
	28-60	2.0-13.9	1.0-10.0	4.5-7.4	0	0	0.1-2.5	0
	60-152	2.0-13.9	1.0-10.0	4.9-6.9	0	0	0.1-2.5	0
D31UC4:								
D31—Boreal woodland rocky low flood plains--	0-30	0.9-6.9	1.0-10.0	5.9-7.7	0	0	0.1-2.5	0
	30-152	0.9-6.9	1.0-10.0	6.1-8.0	0	0	0.1-2.5	0
D31—Boreal forest loamy high flood plains----------	0-13	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-5.1	0
	13-18	2.0-7.7	2.0-20.0	4.9-7.2	0	0	0.1-5.1	0
	18-152	1.6-6.9	1.0-10.0	5.8-7.5	0	0	0.1-5.1	0
D31UC5:								
D31—Subalpine scrub silty till slopes----------	0-10	42.0-91.0	15.6-61.7	3.4-5.0	0	0	0.0-3.0	0
	10-21	15.0-35.0	1.3-5.1	3.7-6.2	0	0	0.1-3.0	0
	21-37	2.0-7.7	1.0-9.0	4.1-6.9	0	0	0.1-3.0	0
	37-152	2.0-7.9	1.0-10.0	5.0-6.7	0	0	0.1-3.0	0
D31—Alpine scrub gravelly circles, acid----------	0-3	42.0-91.0	24.4-72.9	4.2-5.3	0	0	0.1-3.0	0
	3-12	15.0-35.0	1.3-5.1	4.3-5.6	0	0	0.1-3.0	0
	12-35	2.0-7.8	1.0-9.0	4.8-6.2	0	0	0.1-3.0	0
	35-152	2.0-7.9	1.0-10.0	4.9-6.3	0	0	0.1-3.0	0
D31WA1:								
D31—Alpine water, ponded.								
D31YV1:								
D31—Boreal forest loamy mid flood plains----------	0-5	42.0-91.0	21.8-107.7	4.0-6.0	0-3	0	1.0-3.0	0
	5-76	2.0-6.1	2.0-15.0	7.5-8.1	0-3	0	1.0-3.0	0
	76-152	2.0-5.9	2.0-15.0	7.3-8.2	0-3	0	1.0-3.0	0
D31—Boreal taiga loamy high flood plains, frozen----	0-9	65.2-103.4	15.0-47.0	3.5-6.0	0	0	1.0-3.0	0
	9-77	2.0-13.9	1.0-10.0	6.2-8.1	0	0	1.0-3.0	0
	77-152	2.0-13.9	1.0-10.0	6.2-8.0	0	0	1.0-3.0	0
D31—Boreal scrub sandy low flood plains----------	0-78	2.0-11.4	2.0-15.0	6.9-8.3	0-7	0	1.0-10.0	0
	78-152	2.0-11.4	2.0-20.0	7.1-8.3	0-7	0	1.0-10.0	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D31YV2:								
D31—Boreal taiga/tussock organic terraces, frozen	0-42	42.0-91.0	19.5-96.3	3.8-5.8	0	0	0.1-2.5	0
	42-54	5.0-20.0	1.0-10.0	5.2-7.4	0	0	0.1-2.5	0
	54-152	5.0-20.0	1.0-10.0	5.0-7.0	0	0	0.1-2.5	0
D31—Boreal taiga loamy high flood plains, frozen	0-9	65.2-103.4	15.0-47.0	3.5-6.0	0	0	1.0-3.0	0
	9-77	2.0-13.9	1.0-10.0	6.2-8.1	0	0	1.0-3.0	0
	77-152	2.0-13.9	1.0-10.0	6.2-8.0	0	0	1.0-3.0	0
D31YV3:								
D31—Boreal taiga/tussock organic terraces, frozen	0-42	42.0-91.0	19.5-96.3	3.8-5.8	0	0	0.1-2.5	0
	42-54	5.0-20.0	1.0-10.0	5.2-7.4	0	0	0.1-2.5	0
	54-152	5.0-20.0	1.0-10.0	5.0-7.0	0	0	0.1-2.5	0
D31YV8:								
D31—Boreal water, flowing.								
D31YV9:								
D31—Boreal taiga loamy high flood plains, frozen	0-9	65.2-103.4	15.0-47.0	3.5-6.0	0	0	1.0-3.0	0
	9-77	2.0-13.9	1.0-10.0	6.2-8.1	0	0	1.0-3.0	0
	77-152	2.0-13.9	1.0-10.0	6.2-8.0	0	0	1.0-3.0	0
D32TL1:								
D32—Boreal taiga organic plains, frozen	0-41	42.0-91.0	15.6-77.1	3.4-5.4	0	0	0.1-1.0	0
	41-60	5.0-20.0	1.0-10.0	4.3-6.2	0	0	0.5-2.5	0
	60-152	5.0-20.0	1.0-10.0	4.6-6.5	0	0	0.5-2.0	0
D32TL2:								
D32—Boreal forest gravelly escarpments, frozen	0-21	42.0-91.0	15.6-77.1	3.4-5.4	0	0	0.1-2.5	0
	21-56	2.0-9.6	1.0-10.0	4.4-7.5	0	0	0.5-3.0	0
	56-152	2.0-9.6	1.0-10.0	5.6-7.6	0	0	0.5-3.0	0
D32—Boreal taiga loamy escarpment slopes	0-8	1.8-7.0	2.0-20.0	6.5-7.5	0	0	0.1-2.5	0
	8-28	1.7-9.5	1.0-9.0	5.2-6.3	0	0	0.1-2.5	0
	28-152	1.6-9.1	1.0-10.0	6.5-7.0	0	0	0.1-2.5	0

Table 10.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	cm	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
D32TL2:								
D32—Boreal taiga silty eolian slopes, frozen----	0-11	42.0-91.0	15.6-81.5	3.4-5.5	0	0	0.1-1.0	0
	11-70	2.0-9.6	1.0-10.0	4.9-7.1	0	0	0.5-2.5	0
	70-152	2.0-9.6	1.0-10.0	7.5-7.7	0	0	0.5-2.0	0
D32TL4:								
D32—Boreal taiga organic plains, frozen----------	0-41	42.0-91.0	15.6-77.1	3.4-5.4	0	0	0.1-1.0	0
	41-60	5.0-20.0	1.0-10.0	4.3-6.2	0	0	0.5-2.5	0
	60-152	5.0-20.0	1.0-10.0	4.6-6.5	0	0	0.5-2.0	0

Table 11.--Soil Carbon

(Soil organic carbon (SOC) and soil inorganic carbon (SIC) are given in kilograms per square meter to a depth of 2 meters or to the representative top depth of bedrock or a cemented soil horizon. SOC and SIC are reported on a volumetric whole soil basis, corrected for representative rock fragments. SOC is converted from horizon soil organic matter of the fraction of the soil less than 2 millimeters in diameter. If soil organic matter is indicated in the database as NULL, SOC is assumed to be zero. SIC is converted from the horizon calcium carbonate content fraction of the soil less than 2 millimeters in diameter. If the horizon calcium carbonate is indicated in the database as NULL, SIC is assumed to be zero. A weighted average of all horizons is used in the calculations. Only major components of the map units are given in the table.)

Map unit symbol, component name, and percentage of map unit	SOC	SIC
	kg/m2	*kg/m2*
D31BH1:		
D31—Boreal forest rocky colluvial slopes (34 percent)	15	0
D31—Boreal forest rocky sedimentary colluvial slopes (24 percent)	13	1
D31—Boreal taiga silty eolian slopes, frozen (17 percent)	37	0
D31BH2:		
D31—Boreal forest rocky sedimentary colluvial slopes (39 percent)	13	1
D31—Boreal forest rocky colluvial escarpments (31 percent)	9	1
D31BH3:		
D31—Boreal taiga silty eolian slopes, frozen (59 percent)	37	0
D31—Boreal taiga organic eolian slopes, frozen (33 percent)	54	0
D31BH5:		
D31—Boreal taiga/tussock organic terraces, frozen (36 percent)	53	0
D31—Boreal forest loamy high flood plains (28 percent)	62	0
D31—Boreal scrub rocky Drainages (19 percent)	13	0
D31BH6:		
D31—Boreal forest gravelly colluvial escarpments (56 percent)	18	0
D31—Boreal rubble land (25 percent)	1	0
D31BH7:		
D31—Subalpine woodland rocky colluvial slopes (26 percent)	5	0
D31—Boreal forest rocky colluvial slopes (24 percent)	15	0
D31—Boreal forest gravelly colluvial slopes, frozen (20 percent)	30	0
D31CF1:		
D31—Boreal forest gravelly colluvial slopes, frozen (32 percent)	30	0
D31—Boreal woodland silty eolian slopes, frozen (29 percent)	34	0
D31—Subalpine woodland silty colluvial slopes, frozen (20 percent)	50	0
D31HL1:		
D31—Boreal taiga silty colluvial slopes, frozen (37 percent)	102	0
D31—Boreal taiga organic eolian slopes, frozen (27 percent)	54	0
D31HL2:		
D31—Boreal taiga silty colluvial slopes, frozen (47 percent)	102	0
D31—Boreal taiga organic eolian slopes, frozen (43 percent)	54	0
D31KT1:		
D31—Boreal taiga organic eolian slopes, frozen (79 percent)	54	0
D31LB1:		
D31—Boreal taiga silty eolian slopes, frozen (31 percent)	37	0
D31—Boreal taiga organic eolian slopes, frozen (26 percent)	54	0
D31—Boreal forest rocky colluvial slopes (23 percent)	15	0

Table 11.--Soil Carbon--Continued

Map unit symbol, component name, and percentage of map unit	SOC	SIC
	kg/m2	*kg/m2*
D31LB2:		
D31—Boreal taiga silty colluvial slopes, frozen (36 percent)	102	0
D31—Boreal forest rocky sedimentary colluvial slopes (34 percent)	13	1
D31—Boreal forest rocky colluvial slopes (27 percent)	15	0
D31MT1:		
D31—Alpine rubble land (66 percent)	0	0
D31—Alpine low scrub gravelly colluvial slopes (22 percent)	13	0
D31MT2:		
D31—Alpine low scrub gravelly colluvial slopes (32 percent)	13	0
D31—Alpine scrub gravelly circles (30 percent)	12	0
D31—Alpine rubble land (24 percent)	0	0
D31MT3:		
D31—Alpine low scrub organic hummocks, frozen (25 percent)	87	0
D31—Alpine scrub loamy hummocks, frozen (25 percent)	38	0
D31—Alpine low scrub loamy solifluction lobes (22 percent)	18	0
D31OF1:		
D31—Boreal forest gravelly colluvial slopes, frozen (27 percent)	30	0
D31—Boreal woodland silty eolian slopes, frozen (24 percent)	34	0
D31—Boreal forest rocky sedimentary colluvial slopes (21 percent)	13	1
D31OM1:		
D31—Alpine scrub silty circles (57 percent)	16	5
D31—Alpine rubble land (30 percent)	0	0
D31OM2:		
D31—Alpine scrub silty circles (60 percent)	16	5
D31—Subalpine woodland silty colluvial slopes, frozen (18 percent)	50	0
D31SD1:		
D31—Alpine low scrub organic hummocks, frozen (48 percent)	87	0
D31—Alpine tussock-scrub silty polygons, frozen (29 percent)	43	0
D31TE1:		
D31—Boreal taiga/tussock organic terraces, frozen (62 percent)	53	0
D31—Boreal taiga silty terraces, frozen (20 percent)	35	0
D31TE2:		
D31—Boreal taiga/tussock organic terraces, frozen (78 percent)	53	0
D31TF1:		
D31—Subalpine woodland silty colluvial slopes (55 percent)	26	0
D31—Subalpine scrub loamy residual slopes (34 percent)	20	0
D31TF2:		
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen (45 percent)	38	0
D31—Subalpine scrub silty till slopes (41 percent)	20	0
D31TH1:		
D31—Boreal taiga silty colluvial slopes, frozen (28 percent)	102	0
D31—Boreal taiga organic eolian slopes, frozen (22 percent)	54	0
D31—Boreal taiga gravelly colluvial slopes (19 percent)	15	0
D31—Boreal woodland silty eolian slopes, frozen (17 percent)	34	0
D31TL1:		
D31—Boreal taiga organic eolian slopes, frozen (44 percent)	54	0
D31—Boreal taiga silty eolian slopes, frozen (39 percent)	37	0

Table 11.--Soil Carbon--Continued

Map unit symbol, component name, and percentage of map unit	SOC	SIC
	kg/m2	*kg/m2*
D31UC1:		
D31—Boreal tussock organic plains, frozen (42 percent)	87	0
D31—Boreal taiga organic eolian slopes, frozen (24 percent)	54	0
D31—Boreal forest loamy high flood plains (21 percent)	62	0
D31UC2:		
D31—Subalpine woodland silty colluvial slopes, frozen (40 percent)	50	0
D31—Boreal forest gravelly colluvial slopes, frozen (31 percent)	30	0
D31UC3:		
D31—Boreal tussock organic plains, frozen (65 percent)	87	0
D31—Boreal taiga silty colluvial slopes, frozen (18 percent)	102	0
D31UC4:		
D31—Boreal woodland rocky low flood plains (32 percent)	5	0
D31—Boreal forest loamy high flood plains (25 percent)	62	0
D31UC5:		
D31—Subalpine scrub silty till slopes (35 percent)	20	0
D31—Alpine scrub gravelly circles, acid (30 percent)	15	0
D31WA1:		
D31—Alpine water, ponded (95 percent)	0	0
D31YV1:		
D31—Boreal forest loamy mid flood plains (36 percent)	42	2
D31—Boreal taiga loamy high flood plains, frozen (32 percent)	68	0
D31—Boreal scrub sandy low flood plains (26 percent)	20	2
D31YV2:		
D31—Boreal taiga/tussock organic terraces, frozen (55 percent)	53	0
D31—Boreal taiga loamy high flood plains, frozen (32 percent)	68	0
D31YV3:		
D31—Boreal taiga/tussock organic terraces, frozen (90 percent)	53	0
D31YV8:		
D31—Boreal water, flowing (70 percent)	0	0
D31YV9:		
D31—Boreal taiga loamy high flood plains, frozen (78 percent)	68	0
D32TL1:		
D32—Boreal taiga organic plains, frozen (79 percent)	53	0
D32TL2:		
D32—Boreal forest gravelly escarpments, frozen (40 percent)	33	0
D32—Boreal taiga loamy escarpment slopes (30 percent)	12	0
D32—Boreal taiga silty eolian slopes, frozen (20 percent)	29	0
D32TL4:		
D32—Boreal taiga organic plains, frozen (83 percent)	53	0

Table 12.--Soil Features

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

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31BH1:									
D31—Boreal forest rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal forest rocky sedimentary colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Low
D31—Boreal taiga silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal taiga silty colluvial slopes, frozen	Permafrost	50-100	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31—Boreal woodland silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal taiga silty drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	High	Moderate
D31BH2:									
D31—Boreal forest rocky sedimentary colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Low
D31—Boreal forest rocky colluvial escarpments	No restriction	---	---	---	0	0	Moderate	Low	Low
D31—Boreal forest rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal scrub rocky colluvial escarpments	No restriction	---	---	---	0	0	Moderate	Low	Low
D31—Boreal bedrock	Lithic bedrock	0-0	---	Indurated	0	0	Low	Low	Low
D31BH3:									
D31—Boreal taiga silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal woodland gravelly residual slopes	No restriction	---	---	---	0	0	Low	Low	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31BH5:									
D31—Boreal taiga/tussock organic terraces, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal forest loamy high flood plains	No restriction	---	---	---	0	0	Low	Low	Moderate
D31—Boreal scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	Moderate	Moderate
D31—Boreal woodland rocky low flood plains	No restriction	---	---	---	0	0	Low	Low	Low
D31—Boreal water, flowing	No restriction	---	---	---	70-140	100-200	High	High	Moderate
D31BH6:									
D31—Boreal forest gravelly colluvial escarpments	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal rubble land	Lithic bedrock	45-60	---	Indurated	0	0	Low	Low	Low
D31—Boreal forest loamy depressions, frozen	Permafrost	50-115	---	Strongly cemented, frozen	40-85	60-120	Moderate	Moderate	Moderate
D31—Boreal taiga gravelly drainages	Permafrost	50-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31BH7:									
D31—Subalpine woodland rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal forest rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal forest gravelly colluvial slopes, frozen	Permafrost	50-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Boreal forest rocky sedimentary colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Low
D31—Boreal woodland silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	Moderate	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31CF1:									
D31—Boreal forest gravelly colluvial slopes, frozen	Permafrost	50-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Boreal woodland silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Subalpine woodland silty colluvial slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Subalpine woodland rocky residual slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal taiga gravelly drainages	Permafrost	50-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31HL1:									
D31—Boreal taiga silty colluvial slopes, frozen	Permafrost	50-100	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	Moderate	Moderate
D31—Boreal woodland rocky low flood plains	No restriction	---	---	---	0	0	Low	Low	Low
D31—Boreal forest loamy high flood plains, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31HL2:									
D31—Boreal taiga silty colluvial slopes, frozen	Permafrost	50-100	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal taiga silty drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	High	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	cm		cm	cm			
D31KT1:									
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal taiga silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal moss organic depressions	No restriction	---	---	---	70-140	100-200	High	High	High
D31—Boreal scrub-sedge organic depressions	No restriction	---	---	---	60-105	90-150	High	High	High
D31LB1:									
D31—Boreal taiga silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal forest rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal forest rocky sedimentary colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Low
D31—Boreal taiga silty drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	High	Moderate
D31LB2:									
D31—Boreal taiga silty colluvial slopes, frozen	Permafrost	50-100	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31—Boreal forest rocky sedimentary colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Low
D31—Boreal forest rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal scrub rocky colluvial escarpments	No restriction	---	---	---	0	0	Moderate	Low	Low
D31MT1:									
D31—Alpine rubble land	No restriction	---	---	---	0	0	High	Low	Moderate
D31—Alpine low scrub gravelly colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Alpine scrub gravelly circles	No restriction	---	---	---	0	0	Moderate	Low	High

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31MT1:									
D31—Alpine scrub gravelly circles, acid	No restriction	---	---	---	0	0	Moderate	Low	High
D31MT2:									
D31—Alpine low scrub gravelly colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Alpine scrub gravelly circles	No restriction	---	---	---	0	0	Moderate	Low	High
D31—Alpine rubble land	No restriction	---	---	---	0	0	High	Low	Moderate
D31—Alpine scrub gravelly circles, acid	No restriction	---	---	---	0	0	Moderate	Low	High
D31—Alpine scrub loamy hummocks, frozen	Permafrost	50-80	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31MT3:									
D31—Alpine low scrub organic hummocks, frozen	Permafrost	39-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Alpine scrub loamy hummocks, frozen	Permafrost	50-80	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31—Alpine low scrub loamy solifluction lobes	No restriction	---	---	---	0	0	Low	Moderate	Moderate
D31—Subalpine scrub silty till slopes	No restriction	---	---	---	0	0	Moderate	High	Moderate
D31—Alpine scrub gravelly circles, acid	No restriction	---	---	---	0	0	Moderate	Low	High
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31OF1:									
D31—Boreal forest gravelly colluvial slopes, frozen	Permafrost	50-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Boreal woodland silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal forest rocky sedimentary colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Low

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31OF1:									
D31—Boreal forest rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal woodland rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	Moderate	Moderate
D31OM1:									
D31—Alpine scrub silty circles	No restriction	---	---	---	0	0	Moderate	Moderate	Low
D31—Alpine rubble land	No restriction	---	---	---	0	0	High	Low	Moderate
D31—Alpine bedrock	Lithic bedrock	0-0	---	Indurated	0	0	Low	Low	Moderate
D31OM2:									
D31—Alpine scrub silty circles	No restriction	---	---	---	0	0	Moderate	Moderate	Low
D31—Subalpine woodland silty colluvial slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Alpine bedrock	Lithic bedrock	0-0	---	Indurated	0	0	Low	Low	Moderate
D31—Subalpine woodland silty colluvial slopes	No restriction	---	---	---	0	0	High	High	Moderate
D31SD1:									
D31—Alpine low scrub organic hummocks, frozen	Permafrost	39-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Alpine tussock-scrub silty Polygons, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31—Subalpine woodland silty colluvial slopes	No restriction	---	---	---	0	0	High	High	Moderate
D31—Subalpine scrub loamy colluvial slopes, frozen	Permafrost	50-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Alpine rubble land	No restriction	---	---	---	0	0	High	Low	Moderate
D31TE1:									
D31—Boreal taiga/tussock organic terraces, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal taiga silty terraces, frozen	Permafrost	50-115	---	Strongly cemented, frozen	10-40	10-60	Moderate	Moderate	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31TE1:									
D31—Boreal forest silty drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	High	Moderate
D31—Boreal grass organic depressions	No restriction	---	---	---	70-140	100-200	High	High	High
D31TE2:									
D31—Boreal taiga/tussock organic terraces, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal forest silty drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	High	Moderate
D31—Boreal grass organic depressions	No restriction	---	---	---	70-140	100-200	High	High	High
D31TF1:									
D31—Subalpine woodland silty colluvial slopes	No restriction	---	---	---	0	0	High	High	Moderate
D31—Subalpine scrub loamy residual slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Subalpine scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	High	Moderate
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31TF2:									
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31—Subalpine scrub silty till slopes	No restriction	---	---	---	0	0	Moderate	High	Moderate
D31—Subalpine scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	High	Moderate
D31—Subalpine grass organic swales	No restriction	---	---	---	70-140	100-200	High	High	Moderate
D31TH1:									
D31—Boreal taiga silty colluvial slopes, frozen	Permafrost	50-100	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31TH1:									
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal taiga gravelly colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Boreal woodland silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal forest loamy depressions, frozen	Permafrost	50-115	---	Strongly cemented, frozen	40-85	60-120	Moderate	Moderate	Moderate
D31—Boreal taiga silty drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	High	Moderate
D31TL1:									
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal taiga silty eolian slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	Moderate
D31—Boreal forest loamy colluvial slopes	Permafrost	50-100	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31—Boreal taiga gravelly drainages	Permafrost	50-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Boreal moss organic depressions	No restriction	---	---	---	70-140	100-200	High	High	High
D31UC1:									
D31—Boreal tussock organic plains, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	High
D31—Boreal taiga organic eolian slopes, frozen	Permafrost	40-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal forest loamy high flood plains	No restriction	---	---	---	0	0	Low	Low	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31UC1:									
D31—Boreal woodland rocky low flood plains	No restriction	---	---	---	0	0	Low	Low	Low
D31—Boreal water, flowing	No restriction	---	---	---	70-140	100-200	High	High	Moderate
D31UC2:									
D31—Subalpine woodland silty colluvial slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Boreal forest gravelly colluvial slopes, frozen	Permafrost	50-90	---	Strongly cemented, frozen	10-40	10-60	High	Moderate	Moderate
D31—Subalpine woodland rocky colluvial slopes, Cold	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31—Subalpine scrub loamy colluvial slopes, frozen	Permafrost	50-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	Moderate	Moderate
D31UC3:									
D31—Boreal tussock organic plains, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	High
D31—Boreal taiga silty colluvial slopes, frozen	Permafrost	50-100	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31—Boreal taiga silty drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	High	Moderate
D31—Boreal forest rocky colluvial slopes	No restriction	---	---	---	0	0	Moderate	Low	Moderate
D31UC4:									
D31—Boreal woodland rocky low flood plains	No restriction	---	---	---	0	0	Low	Low	Low
D31—Boreal forest loamy high flood plains	No restriction	---	---	---	0	0	Low	Low	Moderate
D31—Boreal taiga/tussock organic terraces, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal scrub organic depressions	No restriction	---	---	---	0	0	High	High	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31UC4:									
D31—Boreal riverwash	No restriction	---	---	---	0	0	Low	High	Moderate
D31—Boreal forest loamy high flood plains, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D31UC5:									
D31—Subalpine scrub silty till slopes	No restriction	---	---	---	0	0	Moderate	High	Moderate
D31—Alpine scrub gravelly circles, acid	No restriction	---	---	---	0	0	Moderate	Low	High
D31—Alpine scrub loamy hummocks, frozen	Permafrost	50-80	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D31—Subalpine scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	High	Moderate
D31WA1:									
D31—Alpine water, ponded	No restriction	---	---	---	70-140	100-200	High	High	Moderate
D31—Subalpine scrub rocky drainages	No restriction	---	---	---	0	0	Moderate	High	Moderate
D31YV1:									
D31—Boreal forest loamy mid flood plains	No restriction	---	---	---	0	0	Moderate	High	Low
D31—Boreal taiga loamy high flood plains, frozen	Permafrost	50-120	---	Strongly cemented, frozen	40-85	60-120	Moderate	High	Moderate
D31—Boreal scrub sandy low flood plains	No restriction	---	---	---	0	0	Moderate	High	Low
D31—Boreal riverwash	No restriction	---	---	---	0	0	Low	High	Moderate
D31YV2:									
D31—Boreal taiga/tussock organic terraces, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal taiga loamy high flood plains, frozen	Permafrost	50-120	---	Strongly cemented, frozen	40-85	60-120	Moderate	High	Moderate
D31—Boreal water, ponded	No restriction	---	---	---	70-140	100-200	High	High	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D31YV2:									
D31—Boreal scrub organic depressions	No restriction	---	---	---	0	0	High	High	Moderate
D31YV3:									
D31—Boreal taiga/tussock organic terraces, frozen	Permafrost	45-90	---	Strongly cemented, frozen	60-105	90-150	High	High	Moderate
D31—Boreal grass organic depressions	No restriction	---	---	---	70-140	100-200	High	High	High
D31YV8:									
D31—Boreal water, flowing	No restriction	---	---	---	70-140	100-200	High	High	Moderate
D31—Boreal scrub sandy low flood plains	No restriction	---	---	---	0	0	Moderate	High	Low
D31—Boreal riverwash	No restriction	---	---	---	0	0	Low	High	Moderate
D31—Boreal forest loamy mid flood plains	No restriction	---	---	---	0	0	Moderate	High	Low
D31YV9:									
D31—Boreal taiga loamy high flood plains, frozen	Permafrost	50-120	---	Strongly cemented, frozen	40-85	60-120	Moderate	High	Moderate
D31—Boreal scrub sandy low flood plains	No restriction	---	---	---	0	0	Moderate	High	Low
D31—Boreal scrub organic depressions	No restriction	---	---	---	0	0	High	High	Moderate
D31—Boreal scrub loamy depressions	No restriction	---	---	---	0	0	High	Moderate	Moderate
D32TL1:									
D32—Boreal taiga organic plains, frozen	Permafrost	50-100	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D32—Boreal woodland loamy drainages, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	High
D32—Boreal forest gravelly escarpments, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate
D32—Boreal moss organic depressions	No restriction	---	---	---	70-140	100-200	High	Moderate	High
D32TL2:									
D32—Boreal forest gravelly escarpments, frozen	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	Moderate

Table 12.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		cm	*cm*		*cm*	*cm*			
D32TL2:									
D32—Boreal taiga loamy Escarpment slopes-----	No restriction	---	---	---	0	0	Low	Moderate	Low
D32—Boreal taiga silty eolian slopes, frozen	Permafrost	50-120	---	Strongly cemented, frozen	40-85	60-120	Moderate	High	Moderate
D32—Boreal taiga organic plains, frozen	Permafrost	50-100	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D32—Boreal woodland loamy drainages, frozen----------	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	High
D32TL4:									
D32—Boreal taiga organic plains, frozen	Permafrost	50-100	---	Strongly cemented, frozen	60-105	90-150	High	Moderate	High
D32—Boreal woodland loamy drainages, frozen----------	Permafrost	45-90	---	Strongly cemented, frozen	40-85	60-120	High	Moderate	High
D32—Boreal moss organic depressions---	No restriction	---	---	---	70-140	100-200	High	Moderate	High

Table 13.--Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated. Depth to water table is based on a representative value. In the "Water table" column, more than one value given for a month for the upper and lower limits indicates that the soil has both a perched and an apparent water table.)

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31BH1:									
D31—Boreal forest rocky colluvial slopes	A								
		Jan-Dec	---	---	---	---	None	---	None
D31—Boreal forest rocky sedimentary colluvial slopes	A								
		Jan-Dec	---	---	---	---	None	---	None
D31—Boreal taiga silty eolian slopes, frozen	D								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None
D31BH2:									
D31—Boreal forest rocky sedimentary colluvial slopes	A								
		Jan-Dec	---	---	---	---	None	---	None
D31—Boreal forest rocky colluvial escarpments	A								
		Jan-Dec	---	---	---	---	None	---	None
D31BH3:									
D31—Boreal taiga silty eolian slopes, frozen	D								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31BH3:									
D31—Boreal taiga organic eolian slopes, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31BH5:									
D31—Boreal taiga/tussock organic terraces, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal forest loamy high flood plains	A								
		May	---	---	---	---	None	Very brief	Rare
		June	---	---	---	---	None	Very brief	Rare
		July	---	---	---	---	None	Very brief	Rare
		August	---	---	---	---	None	Very brief	Rare
		September	---	---	---	---	None	Very brief	Rare
D31—Boreal scrub rocky drainages	B/D								
		Jan-Dec	---	---	---	---	None	---	None
D31BH6:									
D31—Boreal forest gravelly colluvial escarpments	A								
		Jan-Dec	---	---	---	---	None	---	None
D31—Boreal rubble land	D								
		Jan-Dec	---	---	---	---	None	---	None
D31BH7:									
D31—Subalpine woodland rocky colluvial slopes	A								
		Jan-Dec	---	---	---	---	None	---	None
D31—Boreal forest rocky colluvial slopes	A								
		Jan-Dec	---	---	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31BH7:									
D31—Boreal forest gravelly colluvial slopes frozen	**D**								
		January	10	152	---	---	None	---	None
		February	10	152	---	---	None	---	None
		March	10	152	---	---	None	---	None
		April	10	152	---	---	None	---	None
		May	10	152	---	---	None	---	None
		June	25	152	---	---	None	---	None
		July	35	152	---	---	None	---	None
		August	60	152	---	---	None	---	None
		September	60	152	---	---	None	---	None
		October	40	152	---	---	None	---	None
		November	25	152	---	---	None	---	None
		December	10	152	---	---	None	---	None
D31CF1:									
D31—Boreal forest gravelly colluvial slopes, frozen	**D**								
		January	10	152	---	---	None	---	None
		February	10	152	---	---	None	---	None
		March	10	152	---	---	None	---	None
		April	10	152	---	---	None	---	None
		May	10	152	---	---	None	---	None
		June	25	152	---	---	None	---	None
		July	35	152	---	---	None	---	None
		August	60	152	---	---	None	---	None
		September	60	152	---	---	None	---	None
		October	40	152	---	---	None	---	None
		November	25	152	---	---	None	---	None
		December	10	152	---	---	None	---	None
D31—Boreal woodland silty eolian slopes, frozen	**D**								
		January	8	152	---	---	None	---	None
		February	8	152	---	---	None	---	None
		March	8	152	---	---	None	---	None
		April	8	152	---	---	None	---	None
		May	8	152	---	---	None	---	None
		June	8	152	---	---	None	---	None
		July	8	152	---	---	None	---	None
		August	8	152	---	---	None	---	None
		September	8	152	---	---	None	---	None
		October	8	152	---	---	None	---	None
		November	8	152	---	---	None	---	None
		December	8	152	---	---	None	---	None
D31—Subalpine woodland silty colluvial slopes, frozen	**D**								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31HL1:									
D31—Boreal taiga silty colluvial slopes, frozen	**D**								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None
D31—Boreal taiga organic eolian slopes, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31HL2:									
D31—Boreal taiga silty colluvial slopes, frozen	**D**								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None
D31—Boreal taiga organic eolian slopes, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31KT1:									
D31—Boreal taiga organic eolian slopes, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31LB1:									
D31—Boreal taiga silty eolian slopes, frozen	D								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None
D31—Boreal taiga organic eolian slopes, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal forest rocky colluvial slopes	A								
		Jan-Dec	---	---	---	---	None	---	None
D31LB2:									
D31—Boreal taiga silty colluvial slopes, frozen	D								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31LB2:									
D31—Boreal forest rocky sedimentary colluvial slopes	A	Jan-Dec	---	---	---	---	None	---	None
D31—Boreal forest rocky colluvial slopes	A	Jan-Dec	---	---	---	---	None	---	None
D31MT1:									
D31—Alpine rubble land	D	Jan-Dec	---	---	---	---	None	---	None
D31—Alpine low scrub gravelly colluvial slopes	A	Jan-Dec	---	---	---	---	None	---	None
D31MT2:									
D31—Alpine low scrub gravelly colluvial slopes	A	Jan-Dec	---	---	---	---	None	---	None
D31—Alpine scrub gravelly circles	A	Jan-Dec	---	---	---	---	None	---	None
D31—Alpine rubble land	D	Jan-Dec	---	---	---	---	None	---	None
D31MT3:									
D31—Alpine low scrub organic hummocks, frozen	D	January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	15	152	---	---	None	---	None
		July	25	152	---	---	None	---	None
		August	30	152	---	---	None	---	None
		September	30	152	---	---	None	---	None
		October	25	152	---	---	None	---	None
		November	10	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D31—Alpine scrub loamy hummocks, frozen	D	January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	15	152	---	---	None	---	None
		July	25	152	---	---	None	---	None
		August	30	152	---	---	None	---	None
		September	30	152	---	---	None	---	None
		October	25	152	---	---	None	---	None
		November	10	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D31—Alpine low scrub loamy solifluction lobes	B/D	Jan-Dec	---	---	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31OF1:									
D31—Boreal forest gravelly colluvial slopes, frozen	D								
		January	10	152	---	---	None	---	None
		February	10	152	---	---	None	---	None
		March	10	152	---	---	None	---	None
		April	10	152	---	---	None	---	None
		May	10	152	---	---	None	---	None
		June	25	152	---	---	None	---	None
		July	35	152	---	---	None	---	None
		August	60	152	---	---	None	---	None
		September	60	152	---	---	None	---	None
		October	40	152	---	---	None	---	None
		November	25	152	---	---	None	---	None
		December	10	152	---	---	None	---	None
D31—Boreal woodland silty eolian slopes, frozen	D								
		January	8	152	---	---	None	---	None
		February	8	152	---	---	None	---	None
		March	8	152	---	---	None	---	None
		April	8	152	---	---	None	---	None
		May	8	152	---	---	None	---	None
		June	8	152	---	---	None	---	None
		July	8	152	---	---	None	---	None
		August	8	152	---	---	None	---	None
		September	8	152	---	---	None	---	None
		October	8	152	---	---	None	---	None
		November	8	152	---	---	None	---	None
		December	8	152	---	---	None	---	None
D31—Boreal forest rocky sedimentary colluvial slopes	A								
		Jan-Dec	---	---	---	---	None	---	None
D31OM1:									
D31—Alpine scrub silty circles	B								
		Jan-Dec	---	---	---	---	None	---	None
D31—Alpine rubble land	D								
		Jan-Dec	---	---	---	---	None	---	None
D31OM2:									
D31—Alpine scrub silty circles	B								
		Jan-Dec	---	---	---	---	None	---	None
D31—Subalpine woodland silty colluvial slopes, frozen	D								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31SD1:									
D31—Alpine low scrub organic hummocks, frozen	**D**								
		January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	15	152	---	---	None	---	None
		July	25	152	---	---	None	---	None
		August	30	152	---	---	None	---	None
		September	30	152	---	---	None	---	None
		October	25	152	---	---	None	---	None
		November	10	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D31—Alpine tussock-scrub silty polygons, frozen	**D**								
		January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	15	152	---	---	None	---	None
		July	25	152	---	---	None	---	None
		August	30	152	---	---	None	---	None
		September	30	152	---	---	None	---	None
		October	25	152	---	---	None	---	None
		November	10	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D31TE1:									
D31—Boreal taiga/tussock organic terraces, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal taiga silty terraces, frozen	**D**								
		January	10	152	---	---	None	---	None
		February	10	152	---	---	None	---	None
		March	10	152	---	---	None	---	None
		April	10	152	---	---	None	---	None
		May	10	152	---	---	None	---	None
		June	25	152	---	---	None	---	None
		July	35	152	---	---	None	---	None
		August	60	152	---	---	None	---	None
		September	60	152	---	---	None	---	None
		October	40	152	---	---	None	---	None
		November	25	152	---	---	None	---	None
		December	10	152	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31TE2:									
D31—Boreal taiga/tussock organic terraces, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31TF1:									
D31—Subalpine woodland silty colluvial slopes	C/D								
		January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	10	152	---	---	None	---	None
		July	35	152	---	---	None	---	None
		August	45	152	---	---	None	---	None
		September	45	152	---	---	None	---	None
		October	35	152	---	---	None	---	None
		November	25	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D31—Subalpine scrub loamy residual slopes	B								
		Jan-Dec	---	---	---	---	None	---	None
D31TF2:									
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	D								
		January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	15	152	---	---	None	---	None
		July	25	152	---	---	None	---	None
		August	30	152	---	---	None	---	None
		September	30	152	---	---	None	---	None
		October	25	152	---	---	None	---	None
		November	10	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D31—Subalpine scrub silty till slopes	B								
		Jan-Dec	---	---	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31TH1:									
D31—Boreal taiga silty colluvial slopes, frozen	**D**								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None
D31—Boreal taiga organic eolian slopes, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal taiga gravelly colluvial slopes	**A**								
		Jan-Dec	---	---	---	---	None	---	None
D31—Boreal woodland silty eolian slopes, frozen	**D**								
		January	8	152	---	---	None	---	None
		February	8	152	---	---	None	---	None
		March	8	152	---	---	None	---	None
		April	8	152	---	---	None	---	None
		May	8	152	---	---	None	---	None
		June	8	152	---	---	None	---	None
		July	8	152	---	---	None	---	None
		August	8	152	---	---	None	---	None
		September	8	152	---	---	None	---	None
		October	8	152	---	---	None	---	None
		November	8	152	---	---	None	---	None
		December	8	152	---	---	None	---	None
D31TL1:									
D31—Boreal taiga organic eolian slopes, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31TL1:									
D31—Boreal taiga silty eolian slopes, frozen	**D**								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None
D31UC1:									
D31—Boreal tussock organic plains, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal taiga organic eolian slopes, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal forest loamy high flood plains	**A**								
		May	---	---	---	---	None	Very brief	Rare
		June	---	---	---	---	None	Very brief	Rare
		July	---	---	---	---	None	Very brief	Rare
		August	---	---	---	---	None	Very brief	Rare
		September	---	---	---	---	None	Very brief	Rare

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31UC2:									
D31—Subalpine woodland silty colluvial slopes, frozen	**D**								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None
D31—Boreal forest gravelly colluvial slopes, frozen	**D**								
		January	10	152	---	---	None	---	None
		February	10	152	---	---	None	---	None
		March	10	152	---	---	None	---	None
		April	10	152	---	---	None	---	None
		May	10	152	---	---	None	---	None
		June	25	152	---	---	None	---	None
		July	35	152	---	---	None	---	None
		August	60	152	---	---	None	---	None
		September	60	152	---	---	None	---	None
		October	40	152	---	---	None	---	None
		November	25	152	---	---	None	---	None
		December	10	152	---	---	None	---	None
D31UC3:									
D31—Boreal tussock organic plains, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal taiga silty colluvial slopes, frozen	**D**								
		January	50	152	---	---	None	---	None
		February	50	152	---	---	None	---	None
		March	50	152	---	---	None	---	None
		April	50	152	---	---	None	---	None
		May	50	152	---	---	None	---	None
		June	50	152	---	---	None	---	None
		July	50	152	---	---	None	---	None
		August	50	152	---	---	None	---	None
		September	50	152	---	---	None	---	None
		October	50	152	---	---	None	---	None
		November	50	152	---	---	None	---	None
		December	50	152	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31UC4:									
D31—Boreal woodland rocky Low flood plains	B								
		April	0	152	---	---	None	Brief	Frequent
		May	0	152	---	---	None	Brief	Frequent
		June	0	152	---	---	None	Brief	Frequent
		July	0	152	---	---	None	Brief	Frequent
		August	0	152	---	---	None	Brief	Frequent
		September	0	152	---	---	None	Brief	Frequent
		October	0	152	---	---	None	Brief	Frequent
D31—Boreal forest loamy high flood plains	A								
		May	---	---	---	---	None	Very brief	Rare
		June	---	---	---	---	None	Very brief	Rare
		July	---	---	---	---	None	Very brief	Rare
		August	---	---	---	---	None	Very brief	Rare
		September	---	---	---	---	None	Very brief	Rare
D31UC5:									
D31—Subalpine scrub silty till slopes	B								
		Jan-Dec	---	---	---	---	None	---	None
D31—Alpine scrub gravelly circles, acid	A								
		Jan-Dec	---	---	---	---	None	---	None
D31WA1:									
D31—Alpine water, ponded	D								
		---	---	---	---	---	---	---	---
D31YV1:									
D31—Boreal forest loamy mid flood plains	B								
		April	0	60	---	---	None	Brief	Occasional
		May	0	60	---	---	None	Brief	Occasional
		June	0	60	---	---	None	Brief	Occasional
		July	0	60	---	---	None	Brief	Occasional
		August	0	60	---	---	None	Brief	Occasional
		September	0	60	---	---	None	Brief	Occasional
		October	0	60	---	---	None	Brief	Occasional
D31—Boreal taiga loamy high flood plains, frozen	D								
		January	10	152	---	---	None	---	---
		February	10	152	---	---	None	---	---
		March	10	152	---	---	None	---	---
		April	60	152	---	---	None	Brief	Rare
		May	0	152	---	---	None	Brief	Rare
		June	0	152	---	---	None	Brief	Rare
		July	0	152	---	---	None	Brief	Rare
		August	130	152	---	---	None	Brief	Rare
		September	130	152	---	---	None	Brief	Rare
		October	100	152	---	---	None	Brief	Rare
		November	0	10	---	---	None	---	---
			75	152					
		December	0	50	---	---	None	---	---
			65	152					
D31—Boreal scrub sandy Low flood plains	C								
		May	0	152	---	---	None	Brief	Frequent
		June	0	152	---	---	None	Brief	Frequent
		July	0	152	---	---	None	Brief	Frequent
		August	0	152	---	---	None	Brief	Frequent
		September	0	152	---	---	None	Brief	Frequent
		October	0	152	---	---	None	Brief	Frequent

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31YV2:									
D31—Boreal taiga/tussock organic terraces, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31—Boreal taiga loamy high flood plains, frozen	D								
		January	10	152	---	---	None	---	---
		February	10	152	---	---	None	---	---
		March	10	152	---	---	None	---	---
		April	60	152	---	---	None	Brief	Rare
		May	0	152	---	---	None	Brief	Rare
		June	0	152	---	---	None	Brief	Rare
		July	0	152	---	---	None	Brief	Rare
		August	130	152	---	---	None	Brief	Rare
		September	130	152	---	---	None	Brief	Rare
		October	100	152	---	---	None	Brief	Rare
		November	0	10	---	---	None	---	---
			75	152					
		December	0	50	---	---	None	---	---
			65	152					
D31YV3:									
D31—Boreal taiga/tussock organic terraces, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-15	Very long	Frequent	---	None
		July	0	152	0-15	Very long	Frequent	---	None
		August	0	152	0-15	Very long	Frequent	---	None
		September	0	152	0-15	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D31YV8:									
D31—Boreal water, flowing	D								
		---	---	---	---	---	---	---	---

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D31YV9:									
D31—Boreal taiga loamy high flood plains, frozen	**D**								
		January	10	152	---	---	None	---	---
		February	10	152	---	---	None	---	---
		March	10	152	---	---	None	---	---
		April	60	152	---	---	None	Brief	Rare
		May	0	152	---	---	None	Brief	Rare
		June	0	152	---	---	None	Brief	Rare
		July	0	152	---	---	None	Brief	Rare
		August	130	152	---	---	None	Brief	Rare
		September	130	152	---	---	None	Brief	Rare
		October	100	152	---	---	None	Brief	Rare
		November	0	10	---	---	None	---	---
			75	152					
		December	0	50	---	---	None	---	---
			65	152					
D32TL1:									
D32—Boreal taiga organic plains, frozen	**D**								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-12	Very long	Frequent	---	None
		July	0	152	0-12	Very long	Frequent	---	None
		August	0	152	0-12	Very long	Frequent	---	None
		September	0	152	0-12	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None
D32TL2:									
D32—Boreal forest gravelly escarpments, frozen	**D**								
		January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	5	152	---	---	None	---	None
		July	10	152	---	---	None	---	None
		August	20	152	---	---	None	---	None
		September	20	152	---	---	None	---	None
		October	20	152	---	---	None	---	None
		November	5	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D32—Boreal taiga loamy escarpment slopes	**B**								
		January	0	30	---	---	None	---	None
		February	0	30	---	---	None	---	None
		March	0	30	---	---	None	---	None
		April	0	30	---	---	None	---	None
		May	0	30	---	---	None	---	None
		November	0	30	---	---	None	---	None
		December	0	30	---	---	None	---	None

Table 13.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			cm	*cm*	*cm*				
D32TL2:									
D32—Boreal taiga silty eolian slopes, frozen	C								
		January	5	152	---	---	None	---	None
		February	5	152	---	---	None	---	None
		March	5	152	---	---	None	---	None
		April	5	152	---	---	None	---	None
		May	5	152	---	---	None	---	None
		June	5	152	---	---	None	---	None
		July	10	152	---	---	None	---	None
		August	20	152	---	---	None	---	None
		September	20	152	---	---	None	---	None
		October	20	152	---	---	None	---	None
		November	5	152	---	---	None	---	None
		December	5	152	---	---	None	---	None
D32TL4:									
D32—Boreal taiga organic plains, frozen	D								
		January	5	152	---	---	---	---	None
		February	5	152	---	---	---	---	None
		March	5	152	---	---	---	---	None
		April	5	152	---	---	---	---	None
		May	5	152	---	---	---	---	None
		June	0	152	0-12	Very long	Frequent	---	None
		July	0	152	0-12	Very long	Frequent	---	None
		August	0	152	0-12	Very long	Frequent	---	None
		September	0	152	0-12	Very long	Frequent	---	None
		October	10	152	---	---	---	---	None
		November	5	152	---	---	---	---	None
		December	5	152	---	---	---	---	None

Table 14.--Land Management—Planting and Soil Rutting Hazard

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:							
D31—Boreal forest rocky colluvial slopes	34	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.50		
D31—Boreal forest rocky sedimentary colluvial slopes	24	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
				Rock fragments	0.50		
D31—Boreal taiga silty eolian slopes, frozen--	17	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Wetness	0.50	Low strength	1.00
						Wetness	0.50
D31BH2:							
D31—Boreal forest rocky sedimentary colluvial slopes	39	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
				Rock fragments	0.50		
D31—Boreal forest rocky colluvial escarpments--	31	Moderately suited		Unsuited		Slight	
		Slope	0.50	Slope	1.00	Strength	0.10
		Rock fragments	0.50	Rock fragments	1.00		
D31BH3:							
D31—Boreal taiga silty eolian slopes, frozen--	59	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Wetness	0.50	Low strength	1.00
						Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen--	33	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
				Slope	0.50		
D31BH5:							
D31—Boreal taiga/tussock organic terraces, frozen-------	36	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31—Boreal forest loamy high flood plains------	28	Well suited		Moderately suited		Severe	
				Rock fragments	0.50	Low strength	1.00

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH5:							
D31—Boreal scrub rocky drainages	19	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	1.00
				Slope	0.50		
D31BH6:							
D31—Boreal forest gravelly colluvial escarpments	56	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	1.00		
D31—Boreal rubble land	25	Moderately suited		Unsuited		Slight	
		Sandiness	0.50	Rock fragments	1.00	Strength	0.10
		Rock fragments	0.50	Slope	0.50		
				Sandiness	0.50		
D31BH7:							
D31—Subalpine woodland rocky colluvial slopes	26	Moderately suited		Unsuited		Moderate	
		Sandiness	0.50	Rock fragments	1.00	Low strength	0.50
		Rock fragments	0.50	Slope	1.00		
				Sandiness	0.50		
D31—Boreal forest rocky colluvial slopes	24	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.50		
D31—Boreal forest gravelly slopes, frozen	20	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Slope	0.75	Low strength	1.00
				Rock fragments	0.75		
D31CF1:							
D31—Boreal forest gravelly colluvial slopes, frozen	32	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Slope	0.75	Low strength	1.00
				Rock fragments	0.75		
D31—Boreal woodland silty eolian slopes, frozen	29	Unsuited		Unsuited		Severe	
		Restrictive layer	1.00	Slope	1.00	Low strength	1.00
		Wetness	0.50	Wetness	0.75	Wetness	0.50
		Rock fragments	0.50	Rock fragments	0.75		
				Restrictive layer	0.50		

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31CF1:							
D31—Subalpine woodland silty colluvial slopes, frozen	20	Moderately suited		Unsuited		Severe	
		Rock fragments	0.50	Slope	1.00	Low strength	1.00
		Wetness	0.50	Rock fragments	0.50	Wetness	0.50
				Wetness	0.50		
D31HL1:							
D31—Boreal taiga silty colluvial slopes, frozen	37	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Slope	0.50	Low strength	1.00
				Wetness	0.50	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	27	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
				Slope	0.50		
D31HL2:							
D31—Boreal taiga silty colluvial slopes, frozen	47	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Slope	0.50	Low strength	1.00
				Wetness	0.50	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	43	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
				Slope	0.50		
D31KT1:							
D31—Boreal taiga organic eolian slopes, frozen	79	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
				Slope	0.50		
D31LB1:							
D31—Boreal taiga silty eolian slopes, frozen	31	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Wetness	0.50	Low strength	1.00
						Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	26	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
				Slope	0.50		

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB1:							
D31—Boreal forest rocky colluvial slopes	23	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.50		
D31LB2:							
D31—Boreal taiga silty colluvial slopes, frozen	36	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Slope	0.50	Low strength	1.00
				Wetness	0.50	Wetness	0.50
D31—Boreal forest rocky sedimentary colluvial slopes	34	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
				Rock fragments	0.50		
D31—Boreal forest rocky colluvial slopes	27	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.50		
D31MT1:							
D31—Alpine rubble land	66	Unsuited		Unsuited		Slight	
		Rock fragments	1.00	Rock fragments	1.00		
		Slope	0.50	Slope	1.00		
		Sandiness	0.50	Sandiness	0.50		
D31—Alpine low scrub gravelly colluvial slopes	22	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.75		
D31MT2:							
D31—Alpine low scrub gravelly colluvial slopes	32	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.75		
D31—Alpine scrub gravelly circles	30	Moderately suited		Unsuited		Slight	
		Rock fragments	0.50	Slope	1.00	Strength	0.10
		Slope	0.50	Rock fragments	0.75		
D31—Alpine rubble land	24	Unsuited		Unsuited		Slight	
		Rock fragments	1.00	Rock fragments	1.00		
		Slope	0.50	Slope	1.00		
		Sandiness	0.50	Sandiness	0.50		

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31MT3:							
D31—Alpine low scrub organic hummocks, frozen	25	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Slope	0.75	Wetness	0.50
				Restrictive layer	0.50		
D31—Alpine scrub loamy hummocks, frozen	25	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Slope	0.50	Wetness	0.50
				Restrictive layer	0.50		
				Rock fragments	0.50		
D31—Alpine low scrub loamy solifluction lobes	22	Moderately suited		Unsuited		Severe	
		Rock fragments	0.50	Slope	1.00	Low strength	1.00
		Slope	0.50	Rock fragments	0.75		
D31OF1:							
D31—Boreal forest gravelly colluvial slopes, frozen	27	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Slope	0.75	Low strength	1.00
				Rock fragments	0.75		
D31—Boreal woodland silty eolian slopes, frozen	24	Unsuited		Unsuited		Severe	
		Restrictive layer	1.00	Slope	1.00	Low strength	1.00
		Wetness	0.50	Wetness	0.75	Wetness	0.50
		Rock fragments	0.50	Rock fragments	0.75		
				Restrictive layer	0.50		
D31—Boreal forest rocky sedimentary colluvial slopes	21	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
				Rock fragments	0.50		
D31OM1:							
D31—Alpine scrub silty circles	57	Moderately suited		Unsuited		Severe	
		Rock fragments	0.50	Slope	1.00	Low strength	1.00
		Slope	0.50	Rock fragments	0.75		
D31—Alpine rubble land	30	Unsuited		Unsuited		Slight	
		Rock fragments	1.00	Rock fragments	1.00		
		Slope	0.50	Slope	1.00		
		Sandiness	0.50	Sandiness	0.50		

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31OM2:							
D31—Alpine scrub silty circles	60	Moderately suited		Unsuited		Severe	
		Rock fragments	0.50	Slope	1.00	Low strength	1.00
		Slope	0.50	Rock fragments	0.75		
D31—Subalpine woodland silty colluvial slopes, frozen	18	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.50	Wetness	0.50
		Wetness	0.50	Wetness	0.50		
D31SD1:							
D31—Alpine low scrub organic hummocks, frozen	48	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Slope	0.50	Wetness	0.50
				Restrictive layer	0.50		
D31—Alpine tussock-scrub silty polygons, frozen	29	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31TE1:							
D31—Boreal taiga/tussock organic terraces, frozen	62	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31—Boreal taiga silty terraces, frozen	20	Well suited		Poorly suited		Severe	
				Slope	0.75	Low strength	1.00
D31TE2:							
D31—Boreal taiga/tussock organic terraces, frozen	78	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31TF1:							
D31—Subalpine woodland silty colluvial slopes	55	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Slope	0.50	Low strength	1.00
				Rock fragments	0.50	Wetness	0.50
				Wetness	0.50		
D31—Subalpine scrub loamy residual slopes	34	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	1.00

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31TF2:							
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Moderately suited Wetness	 0.50	Poorly suited Wetness Slope Rock fragments	 0.75 0.75 0.50	Severe Low strength Wetness	 1.00 0.50
D31—Subalpine scrub silty till slopes	41	Moderately suited Rock fragments	 0.50	Poorly suited Rock fragments Slope	 0.75 0.50	Severe Low strength	 1.00
D31TH1:							
D31—Boreal taiga silty colluvial slopes, frozen	28	Moderately suited Wetness	 0.50	Moderately suited Slope Wetness	 0.50 0.50	Severe Low strength Wetness	 1.00 0.50
D31—Boreal taiga organic eolian slopes, frozen	22	Unsuited Restrictive layer Wetness	 1.00 0.50	Poorly suited Wetness Restrictive layer Slope	 0.75 0.50 0.50	Severe Low strength Wetness	 1.00 0.50
D31—Boreal taiga gravelly colluvial slopes	19	Moderately suited Rock fragments	 0.50	Unsuited Slope Rock fragments	 1.00 0.75	Slight Strength	 0.10
D31—Boreal woodland silty eolian slopes, frozen	17	Unsuited Restrictive layer Wetness Rock fragments	 1.00 0.50 0.50	Unsuited Slope Wetness Rock fragments Restrictive layer	 1.00 0.75 0.75 0.50	Severe Low strength Wetness	 1.00 0.50
D31TL1:							
D31—Boreal taiga organic eolian slopes, frozen	44	Unsuited Restrictive layer Wetness	 1.00 0.50	Poorly suited Wetness Restrictive layer Slope	 0.75 0.50 0.50	Severe Low strength Wetness	 1.00 0.50
D31—Boreal taiga silty eolian slopes, frozen	39	Moderately suited Wetness	 0.50	Moderately suited Wetness	 0.50	Severe Low strength Wetness	 1.00 0.50

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC1:							
D31—Boreal tussock organic plains, frozen	42	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen--	24	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Slope	0.50	Wetness	0.50
				Restrictive layer	0.50		
D31—Boreal forest loamy high flood plains------	21	Well suited		Moderately suited		Severe	
				Rock fragments	0.50	Low strength	1.00
D31UC2:							
D31—Subalpine woodland silty colluvial slopes, frozen----------	40	Moderately suited		Unsuited		Severe	
		Rock fragments	0.50	Slope	1.00	Low strength	1.00
		Wetness	0.50	Rock fragments	0.50	Wetness	0.50
				Wetness	0.50		
D31—Boreal forest gravelly colluvial slopes, frozen---------	31	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Slope	0.75	Low strength	1.00
				Rock fragments	0.75		
D31UC3:							
D31—Boreal tussock organic plains, frozen	65	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31—Boreal taiga silty colluvial slopes, frozen----------	18	Moderately suited		Moderately suited		Severe	
		Wetness	0.50	Slope	0.50	Low strength	1.00
				Wetness	0.50	Wetness	0.50
D31UC4:							
D31—Boreal woodland rocky low flood plains	32	Moderately suited		Poorly suited		Slight	
		Rock fragments	0.50	Rock fragments	0.75	Strength	0.10
D31—Boreal forest loamy high flood plains	25	Well suited		Moderately suited		Severe	
				Rock fragments	0.50	Low strength	1.00
D31UC5:							
D31—Subalpine scrub silty till slopes------	35	Moderately suited		Poorly suited		Severe	
		Rock fragments	0.50	Rock fragments	0.75	Low strength	1.00
				Slope	0.50		

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC5:							
D31—Alpine scrub gravelly circles, acid	30	Poorly suited		Unsuited		Severe	
		Rock fragments	0.75	Rock fragments	1.00	Low strength	1.00
				Slope	0.50		
D31WA1:							
D31—Alpine water, ponded	95	Not rated		Not rated		Not rated	
D31YV1:							
D31—Boreal forest loamy mid flood plains	36	Well suited		Well suited		Moderate	
						Low strength	0.50
D31—Boreal taiga loamy high flood plains, frozen	32	Well suited		Moderately suited		Severe	
				Slope	0.50	Low strength	1.00
D31—Boreal scrub sandy low flood plains	26	Well suited		Well suited		Moderate	
						Low strength	0.50
D31YV2:							
D31—Boreal taiga/tussock organic terraces, frozen	55	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31—Boreal taiga loamy high flood plains, frozen	32	Well suited		Well suited		Severe	
						Low strength	1.00
D31YV3:							
D31—Boreal taiga/tussock organic terraces, frozen	90	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D31YV8:							
D31—Boreal water, flowing	70	Not rated		Not rated		Not rated	
D31YV9:							
D31—Boreal taiga loamy high flood plains, frozen	78	Well suited		Well suited		Severe	
						Low strength	1.00

Table 14.--Land Management—Planting and Soil Rutting Hazard--Continued

Map symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D32TL1:							
D32—Boreal taiga organic plains, frozen	79	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50
D32TL2:							
D32—Boreal forest gravelly escarpments, frozen	40	Moderately suited		Unsuited		Severe	
		Wetness	0.50	Slope	1.00	Low strength	1.00
		Slope	0.50	Wetness	0.75	Wetness	0.50
				Rock fragments	0.50		
D32—Boreal taiga loamy escarpment slopes	30	Moderately suited		Unsuited		Severe	
		Slope	0.50	Slope	1.00	Low strength	1.00
		Rock fragments	0.50	Rock fragments	0.75		
D32—Boreal taiga silty eolian slopes, frozen	20	Moderately suited		Poorly suited		Severe	
		Wetness	0.50	Wetness	0.75	Low strength	1.00
				Slope	0.50	Wetness	0.50
D32TL4:							
D32—Boreal taiga organic plains, frozen	83	Unsuited		Poorly suited		Severe	
		Restrictive layer	1.00	Wetness	0.75	Low strength	1.00
		Wetness	0.50	Restrictive layer	0.50	Wetness	0.50

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:							
D31—Boreal forest rocky colluvial slopes	34	Severe Slope/erodibility	0.75	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
D31—Boreal forest rocky sedimentary colluvial slopes	24	Very severe Slope/erodibility	0.95	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
D31—Boreal taiga silty eolian slopes, frozen	17	Slight		Moderate Slope/erodibility	0.50	Poorly suited Low strength Wetness	1.00 1.00
D31BH2:							
D31—Boreal forest rocky sedimentary colluvial slopes	39	Very severe Slope/erodibility	0.95	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
D31—Boreal forest rocky colluvial escarpments	31	Very severe Slope/erodibility	0.95	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
D31BH3:							
D31—Boreal taiga silty eolian slopes, frozen	59	Slight		Moderate Slope/erodibility	0.50	Poorly suited Low strength Wetness	1.00 1.00
D31—Boreal taiga organic eolian slopes, frozen	33	Slight		Moderate Slope/erodibility	0.50	Poorly suited Low strength Ponding	1.00 1.00
D31BH5:							
D31—Boreal taiga/tussock organic terraces, frozen	36	Slight		Moderate Slope/erodibility	0.50	Poorly suited Low strength Ponding	1.00 1.00
D31—Boreal forest loamy high flood plains	28	Slight		Slight		Poorly suited Low strength	1.00

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH5:							
D31—Boreal scrub rocky drainages	19	Slight		Moderate		Moderately suited	
				Slope/erodibility	0.50	Slope	0.50
						Rock fragments	0.50
						Low strength	0.50
D31BH6:							
D31—Boreal forest gravelly colluvial escarpments	56	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Low strength	1.00
						Rock fragments	0.50
D31—Boreal rubble land	25	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Sandiness	0.50
D31BH7:							
D31—Subalpine woodland rocky colluvial slopes	26	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
D31—Boreal forest rocky colluvial slopes	24	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
D31—Boreal forest gravelly colluvial slopes, frozen	20	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Low strength	1.00
						Wetness	1.00
D31CF1:							
D31—Boreal forest gravelly colluvial slopes, frozen	32	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Low strength	1.00
						Wetness	1.00
D31—Boreal woodland silty eolian slopes, frozen	29	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
						Wetness	1.00
D31—Subalpine woodland silty colluvial slopes, frozen	20	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	1.00
						Wetness	1.00

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31HL1:							
D31—Boreal taiga silty colluvial slopes, frozen	37	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Wetness	1.00
						Slope	1.00
D31—Boreal taiga organic eolian slopes, frozen	27	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31HL2:							
D31—Boreal taiga silty colluvial slopes, frozen	47	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Wetness	1.00
						Slope	1.00
D31—Boreal taiga organic eolian slopes, frozen	43	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31KT1:							
D31—Boreal taiga organic eolian slopes, frozen	79	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31LB1:							
D31—Boreal taiga silty eolian slopes, frozen	31	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Wetness	1.00
D31—Boreal taiga organic eolian slopes, frozen	26	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31—Boreal forest rocky colluvial slopes	23	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
D31LB2:							
D31—Boreal taiga silty colluvial slopes, frozen	36	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Wetness	1.00
						Slope	1.00

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB2:							
D31—Boreal forest rocky sedimentary colluvial slopes	34	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
D31—Boreal forest rocky colluvial slopes	27	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
D31MT1:							
D31—Alpine rubble land	66	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Sandiness	0.50
						Stickiness; high plasticity index	0.50
D31—Alpine low scrub gravelly colluvial slopes	22	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Rock fragments	0.50
D31MT2:							
D31—Alpine low scrub gravelly colluvial slopes	32	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Rock fragments	0.50
D31—Alpine scrub gravelly circles	30	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
D31—Alpine rubble land	24	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Sandiness	0.50
						Stickiness; high plasticity index	0.50
D31MT3:							
D31—Alpine low scrub organic hummocks, frozen	25	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
D31—Alpine scrub loamy hummocks, frozen	25	Slight		Severe		Poorly suited	
				Slope/erodibility	0.95	Low strength	1.00
						Slope	0.50

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31MT3:							
D31—Alpine low scrub loamy solifluction lobes	22	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	0.50
						Rock fragments	0.50
D31OF1:							
D31—Boreal forest gravelly colluvial slopes, frozen	27	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Low strength	1.00
						Wetness	1.00
D31—Boreal woodland silty eolian slopes, frozen	24	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
						Wetness	1.00
D31—Boreal forest rocky sedimentary colluvial slopes	21	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
D31OM1:							
D31—Alpine scrub silty circles	57	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	0.50
						Low strength	0.50
D31—Alpine rubble land	30	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	1.00
						Sandiness	0.50
						Stickiness; high plasticity index	0.50
D31OM2:							
D31—Alpine scrub silty circles	60	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	0.50
						Low strength	0.50
D31—Subalpine woodland silty colluvial slopes, frozen	18	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Slope	1.00
						Low strength	1.00
						Wetness	1.00

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31SD1:							
D31—Alpine low scrub organic hummocks, frozen	48	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
D31—Alpine tussock-scrub silty polygons, frozen	29	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Wetness	1.00
D31TE1:							
D31—Boreal taiga/tussock organic terraces, frozen	62	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31—Boreal taiga silty terraces, frozen	20	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
						Wetness	1.00
D31TE2:							
D31—Boreal taiga/tussock organic terraces, frozen	78	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31TF1:							
D31—Subalpine woodland silty colluvial slopes	55	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
						Wetness	1.00
D31—Subalpine scrub loamy residual slopes	34	Slight		Slight		Poorly suited	
						Low strength	1.00
D31TF2:							
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
						Wetness	1.00

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31TF2:							
D31—Subalpine scrub silty till slopes	41	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Rock fragments	1.00
						Slope	1.00
						Low strength	0.50
D31TH1:							
D31—Boreal taiga silty colluvial slopes, frozen	28	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Wetness	1.00
						Slope	1.00
D31—Boreal taiga organic eolian slopes, frozen	22	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31—Boreal taiga gravelly colluvial slopes	19	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Rock fragments	0.50
D31—Boreal woodland silty eolian slopes, frozen	17	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
						Wetness	1.00
D31TL1:							
D31—Boreal taiga organic eolian slopes, frozen	44	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31—Boreal taiga silty eolian slopes, frozen	39	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Wetness	1.00
D31UC1:							
D31—Boreal tussock organic plains, frozen	42	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC1:							
D31—Boreal taiga organic eolian slopes, frozen	24	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Ponding	1.00
						Slope	1.00
D31—Boreal forest loamy high flood plains	21	Slight		Slight		Poorly suited	
						Low strength	1.00
D31UC2:							
D31—Subalpine woodland silty colluvial slopes, frozen	40	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Slope	1.00
						Low strength	1.00
						Wetness	1.00
D31—Boreal forest gravelly colluvial slopes, frozen	31	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Slope	1.00
						Low strength	1.00
						Wetness	1.00
D31UC3:							
D31—Boreal tussock organic plains, frozen	65	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31—Boreal taiga silty colluvial slopes, frozen	18	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Low strength	1.00
						Wetness	1.00
						Slope	1.00
D31UC4:							
D31—Boreal woodland rocky low flood plains	32	Slight		Slight		Poorly suited	
						Flooding	1.00
						Wetness	1.00
D31—Boreal forest loamy high flood plains	25	Slight		Slight		Poorly suited	
						Low strength	1.00
D31UC5:							
D31—Subalpine scrub silty till slopes	35	Moderate		Moderate		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.50	Rock fragments	1.00
						Slope	1.00
						Low strength	0.50

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC5:							
D31—Alpine scrub gravelly circles, acid	30	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Rock fragments	1.00
						Slope	0.50
						Low strength	0.50
D31WA1:							
D31—Alpine water, ponded	95	Not rated		Not rated		Not rated	
D31YV1:							
D31—Boreal forest loamy mid flood plains	36	Slight		Slight		Poorly suited	
						Flooding	1.00
D31—Boreal taiga loamy high flood plains, frozen	32	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Wetness	1.00
						Low strength	0.50
D31—Boreal scrub sandy low flood plains	26	Slight		Slight		Poorly suited	
						Flooding	1.00
						Wetness	1.00
D31YV2:							
D31—Boreal taiga/tussock organic terraces, frozen	55	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31—Boreal taiga loamy high flood plains, frozen	32	Slight		Slight		Poorly suited	
						Wetness	1.00
						Low strength	0.50
D31YV3:							
D31—Boreal taiga/tussock organic terraces, frozen	90	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D31YV8:							
D31—Boreal water, flowing	70	Not rated		Not rated		Not rated	
D31YV9:							
D31—Boreal taiga loamy high flood plains, frozen	78	Slight		Slight		Poorly suited	
						Wetness	1.00
						Low strength	0.50

Table 15.--Land Management—Hazard of Erosion and Suitability for Roads--Continued

Map symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D32TL1:							
D32—Boreal taiga organic plains, frozen	79	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00
D32TL2:							
D32—Boreal forest gravelly escarpments, frozen----	40	Severe		Severe		Poorly suited	
		Slope/erodibility	0.75	Slope/erodibility	0.95	Low strength	1.00
						Slope	1.00
						Wetness	1.00
D32—Boreal taiga loamy escarpment slopes------	30	Very severe		Severe		Poorly suited	
		Slope/erodibility	0.95	Slope/erodibility	0.95	Slope	1.00
						Wetness	1.00
						Low strength	0.50
D32—Boreal taiga silty eolian slopes, frozen--	20	Moderate		Severe		Poorly suited	
		Slope/erodibility	0.50	Slope/erodibility	0.95	Wetness	1.00
						Slope	0.50
						Low strength	0.50
D32TL4:							
D32—Boreal taiga organic plains, frozen	83	Slight		Moderate		Poorly suited	
				Slope/erodibility	0.50	Low strength	1.00
						Ponding	1.00

Table 16.--Land Management—Site Preparation

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:					
D31—Boreal forest rocky colluvial slopes	34	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
D31—Boreal forest rocky sedimentary colluvial slopes	24	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
D31—Boreal taiga silty eolian slopes, frozen	17	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31BH2:					
D31—Boreal forest rocky sedimentary colluvial slopes	39	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
D31—Boreal forest rocky colluvial escarpments	31	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
D31BH3:					
D31—Boreal taiga silty eolian slopes, frozen	59	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	33	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31BH5:					
D31—Boreal taiga/tussock organic terraces, frozen	36	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Boreal forest loamy high flood plains	28	Well suited		Well suited	

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH5:					
D31—Boreal scrub rocky drainages	19	Poorly suited		Poorly suited	
		Rock fragments	0.50	Rock fragments	0.50
D31BH6:					
D31—Boreal forest gravelly colluvial escarpments	56	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
D31—Boreal rubble land	25	Poorly suited		Poorly suited	
		Restrictive layer	0.50	Slope	0.50
		Slope	0.50	Rock fragments	0.50
D31BH7:					
D31—Subalpine woodland rocky colluvial slopes	26	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Rock fragments	0.50	Rock fragments	0.50
D31—Boreal forest rocky colluvial slopes	24	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
D31—Boreal forest gravelly colluvial slopes, frozen	20	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Rock fragments	0.50
D31CF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	32	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Rock fragments	0.50
D31—Boreal woodland silty eolian slopes, frozen	29	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Wetness	0.50
				Restrictive layer	0.50
				Rock fragments	0.50
D31—Subalpine woodland silty colluvial slopes, frozen	20	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Wetness	0.50

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31HL1:					
D31—Boreal taiga silty colluvial slopes, frozen	37	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	27	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31HL2:					
D31—Boreal taiga silty colluvial slopes, frozen	47	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	43	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31KT1:					
D31—Boreal taiga organic eolian slopes, frozen	79	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31LB1:					
D31—Boreal taiga silty eolian slopes, frozen	31	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	26	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Boreal forest rocky colluvial slopes	23	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
D31LB2:					
D31—Boreal taiga silty colluvial slopes, frozen	36	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31—Boreal forest rocky sedimentary colluvial slopes	34	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB2:					
D31—Boreal forest rocky colluvial slopes	27	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
D31MT1:					
D31—Alpine rubble land--	66	Unsuited		Unsuited	
		Rock fragments	1.00	Slope	1.00
		Slope	1.00	Rock fragments	1.00
D31—Alpine low scrub gravelly colluvial slopes	22	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
D31MT2:					
D31—Alpine low scrub gravelly colluvial slopes	32	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
D31—Alpine scrub gravelly circles	30	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
D31—Alpine rubble land--	24	Unsuited		Unsuited	
		Rock fragments	1.00	Slope	1.00
		Slope	1.00	Rock fragments	1.00
D31MT3:					
D31—Alpine low scrub organic hummocks, frozen	25	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
		Slope	0.50	Slope	0.50
				Restrictive layer	0.50
D31—Alpine scrub loamy hummocks, frozen	25	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Alpine low scrub loamy solifluction lobes	22	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
D31OF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	27	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Rock fragments	0.50

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31OF1:					
D31—Boreal woodland silty eolian slopes, frozen	24	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Wetness	0.50
				Restrictive layer	0.50
				Rock fragments	0.50
D31—Boreal forest rocky sedimentary colluvial slopes	21	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
D31OM1:					
D31—Alpine scrub silty circles	57	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
D31—Alpine rubble land	30	Unsuited		Unsuited	
		Rock fragments	1.00	Slope	1.00
		Slope	1.00	Rock fragments	1.00
D31OM2:					
D31—Alpine scrub silty circles	60	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
		Rock fragments	0.50	Rock fragments	0.50
D31—Subalpine woodland silty colluvial slopes, frozen	18	Unsuited		Unsuited	
		Wetness	1.00	Slope	1.00
		Slope	1.00	Wetness	0.50
D31SD1:					
D31—Alpine low scrub organic hummocks, frozen	48	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Alpine tussock-scrub silty polygons, frozen	29	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31TE1:					
D31—Boreal taiga/tussock organic terraces, frozen	62	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TE1:					
D31—Boreal taiga silty terraces, frozen	20	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50		
D31TE2:					
D31—Boreal taiga/tussock organic terraces, frozen	78	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31TF1:					
D31—Subalpine woodland silty colluvial slopes	55	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Wetness	0.50
D31—Subalpine scrub loamy residual slopes	34	Well suited		Poorly suited	
				Rock fragments	0.50
D31TF2:					
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
		Slope	0.50	Slope	0.50
D31—Subalpine scrub silty till slopes	41	Poorly suited		Unsuited	
		Rock fragments	0.50	Rock fragments	1.00
		Slope	0.50	Slope	0.50
D31TH1:					
D31—Boreal taiga silty colluvial slopes, frozen	28	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31—Boreal taiga organic eolian slopes, frozen	22	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Boreal taiga gravelly colluvial slopes	19	Poorly suited		Poorly suited	
		Slope	0.50	Slope	0.50
		Rock fragments	0.50	Rock fragments	0.50

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TH1:					
D31—Boreal woodland silty eolian slopes, frozen	17	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Wetness	0.50
				Restrictive layer	0.50
				Rock fragments	0.50
D31TL1:					
D31—Boreal taiga organic eolian slopes, frozen	44	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Boreal taiga silty eolian slopes, frozen	39	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31UC1:					
D31—Boreal tussock organic plains, frozen	42	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Boreal taiga organic eolian slopes, frozen	24	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Wetness	0.50
				Restrictive layer	0.50
D31—Boreal forest loamy high flood plains	21	Well suited		Well suited	
D31UC2:					
D31—Subalpine woodland silty colluvial slopes, frozen	40	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Wetness	0.50
D31—Boreal forest gravelly colluvial slopes, frozen	31	Unsuited		Poorly suited	
		Wetness	1.00	Slope	0.50
		Slope	0.50	Rock fragments	0.50
D31UC3:					
D31—Boreal tussock organic plains, frozen	65	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC3:					
D31—Boreal taiga silty colluvial slopes, frozen	18	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D31UC4:					
D31—Boreal woodland rocky low flood plains	32	Well suited		Poorly suited	
				Rock fragments	0.50
D31—Boreal forest loamy high flood plains	25	Well suited		Well suited	
D31UC5:					
D31—Subalpine scrub silty till slopes	35	Poorly suited		Unsuited	
		Rock fragments	0.50	Rock fragments	1.00
		Slope	0.50	Slope	0.50
D31—Alpine scrub gravelly circles, acid	30	Unsuited		Unsuited	
		Rock fragments	1.00	Rock fragments	1.00
D31WA1:					
D31—Alpine water, ponded	95	Not rated		Not rated	
D31YV1:					
D31—Boreal forest loamy mid flood plains	36	Well suited		Well suited	
D31—Boreal taiga loamy high flood plains, frozen	32	Unsuited		Well suited	
		Wetness	1.00		
D31—Boreal scrub sandy low flood plains	26	Well suited		Well suited	
D31YV2:					
D31—Boreal taiga/tussock organic terraces, frozen	55	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D31—Boreal taiga loamy high flood plains, frozen	32	Unsuited		Well suited	
		Wetness	1.00		
D31YV3:					
D31—Boreal taiga/tussock organic terraces, frozen	90	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50

Table 16.--Land Management—Site Preparation--Continued

Map symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31YV8:					
D31—Boreal water, flowing	70	Not rated		Not rated	
D31YV9:					
D31—Boreal taiga loamy high flood plains, frozen	78	Unsuited		Well suited	
		Wetness	1.00		
D32TL1:					
D32—Boreal taiga organic plains, frozen	79	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50
D32TL2:					
D32—Boreal forest gravelly escarpments, frozen	40	Unsuited		Unsuited	
		Wetness	1.00	Slope	1.00
		Slope	1.00	Wetness	0.50
D32—Boreal taiga loamy escarpment slopes	30	Unsuited		Unsuited	
		Slope	1.00	Slope	1.00
				Rock fragments	0.50
D32—Boreal taiga silty eolian slopes, frozen	20	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
D32TL4:					
D32—Boreal taiga organic plains, frozen	83	Unsuited		Poorly suited	
		Wetness	1.00	Wetness	0.50
				Restrictive layer	0.50

Table 17.--Land Management—Site Restoration

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:					
D31—Boreal forest rocky colluvial slopes	34	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Moderate Available water	0.50
D31—Boreal forest rocky sedimentary colluvial slopes	24	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Moderate Available water	0.50
D31—Boreal taiga silty eolian slopes, frozen	17	Low		High Wetness	1.00
D31BH2:					
D31—Boreal forest rocky sedimentary colluvial slopes	39	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Moderate Available water	0.50
D31—Boreal forest rocky colluvial escarpments	31	High Texture/slope/surface layer thickness/rock fragments	1.00	High Available water	1.00
D31BH3:					
D31—Boreal taiga silty eolian slopes, frozen	59	Low		High Wetness	1.00
D31—Boreal taiga organic eolian slopes, frozen	33	Low		High Wetness	1.00
D31BH5:					
D31—Boreal taiga/tussock organic terraces, frozen	36	Low Texture/rock fragments	0.10	High Wetness	1.00
D31—Boreal forest loamy high flood plains	28	Low		Low	
D31—Boreal scrub rocky drainages	19	Low		Low	

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH6:					
D31—Boreal forest gravelly colluvial escarpments	56	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Low	
D31—Boreal rubble land	25	High Texture/rock fragments	1.00	Low	
D31BH7:					
D31—Subalpine woodland rocky colluvial slopes	26	Moderate Texture/surface layer thickness/rock fragments	0.50	High Available water Soil reaction	1.00 0.50
D31—Boreal forest rocky colluvial slopes	24	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Moderate Available water	0.50
D31—Boreal forest gravelly colluvial slopes, frozen	20	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00
D31CF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	32	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00
D31—Boreal woodland silty eolian slopes, frozen	29	Low Texture/rock fragments	0.10	High Wetness	1.00
D31—Subalpine woodland silty colluvial slopes, frozen	20	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	High Wetness	1.00

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31HL1:					
D31—Boreal taiga silty colluvial slopes, frozen	37	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00
D31—Boreal taiga organic eolian slopes, frozen	27	Low		High Wetness	1.00
D31HL2:					
D31—Boreal taiga silty colluvial slopes, frozen	47	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00
D31—Boreal taiga organic eolian slopes, frozen	43	Low		High Wetness	1.00
D31KT1:					
D31—Boreal taiga organic eolian slopes, frozen	79	Low		High Wetness	1.00
D31LB1:					
D31—Boreal taiga silty eolian slopes, frozen	31	Low		High Wetness	1.00
D31—Boreal taiga organic eolian slopes, frozen	26	Low		High Wetness	1.00
D31—Boreal forest rocky colluvial slopes	23	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Moderate Available water	0.50
D31LB2:					
D31—Boreal taiga silty colluvial slopes, frozen	36	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB2:					
D31—Boreal forest rocky sedimentary colluvial slopes	34	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Moderate Available water	0.50
D31—Boreal forest rocky colluvial slopes	27	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Moderate Available water	0.50
D31MT1:					
D31—Alpine rubble land	66	Low		Not rated	
D31—Alpine low scrub gravelly colluvial slopes	22	Low Texture/slope/rock fragments	0.10	Low	
D31MT2:					
D31—Alpine low scrub gravelly colluvial slopes	32	Low Texture/slope/rock fragments	0.10	Low	
D31—Alpine scrub gravelly circles	30	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Low	
D31—Alpine rubble land	24	Low		Not rated	
D31MT3:					
D31—Alpine low scrub organic hummocks, frozen	25	Low Texture/rock fragments	0.10	High Wetness	1.00
D31—Alpine scrub loamy hummocks, frozen	25	Low Texture/rock fragments	0.10	High Wetness Soil reaction	1.00 0.50
D31—Alpine low scrub loamy solifluction lobes	22	Low Texture/slope/rock fragments	0.10	Low	

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31OF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	27	Low		High	
		Texture/surface layer thickness/rock fragments	0.10	Wetness	1.00
D31—Boreal woodland silty eolian slopes, frozen	24	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
D31—Boreal forest rocky sedimentary colluvial slopes	21	Moderate		Moderate	
		Texture/slope/surface layer thickness/rock fragments	0.50	Available water	0.50
D31OM1:					
D31—Alpine scrub silty circles	57	Low		Low	
		Texture/slope/rock fragments	0.10		
D31—Alpine rubble land	30	Low		Not rated	
D31OM2:					
D31—Alpine scrub silty circles	60	Low		Low	
		Texture/slope/rock fragments	0.10		
D31—Subalpine woodland silty colluvial slopes, frozen	18	Moderate		High	
		Texture/slope/surface layer thickness/rock fragments	0.50	Wetness	1.00
D31SD1:					
D31—Alpine low scrub organic hummocks, frozen	48	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
D31—Alpine tussock-scrub silty polygons, frozen	29	Low		High	
				Wetness	1.00
				Soil reaction	0.50

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TE1:					
D31—Boreal taiga/tussock organic terraces, frozen	62	Low Texture/rock fragments	0.10	High Wetness	1.00
D31—Boreal taiga silty terraces, frozen	20	Moderate Texture/surface layer thickness/rock fragments	0.50	High Wetness Available water	1.00 0.50
D31TE2:					
D31—Boreal taiga/tussock organic terraces, frozen	78	Low Texture/rock fragments	0.10	High Wetness	1.00
D31TF1:					
D31—Subalpine woodland silty colluvial slopes	55	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness Soil reaction	1.00 0.50
D31—Subalpine scrub loamy residual slopes	34	Low		Moderate Soil reaction	0.50
D31TF2:					
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00
D31—Subalpine scrub silty till slopes	41	Low Texture/rock fragments	0.10	Moderate Soil reaction	0.50
D31TH1:					
D31—Boreal taiga silty colluvial slopes, frozen	28	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00
D31—Boreal taiga organic eolian slopes, frozen	22	Low		High Wetness	1.00

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TH1:					
D31—Boreal taiga gravelly colluvial slopes	19	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	Low	
D31—Boreal woodland silty eolian slopes, frozen	17	Low Texture/rock fragments	0.10	High Wetness	1.00
D31TL1:					
D31—Boreal taiga organic eolian slopes, frozen	44	Low		High Wetness	1.00
D31—Boreal taiga silty eolian slopes, frozen	39	Low		High Wetness	1.00
D31UC1:					
D31—Boreal tussock organic plains, frozen	42	Low		High Wetness	1.00
D31—Boreal taiga organic eolian slopes, frozen	24	Low		High Wetness	1.00
D31—Boreal forest loamy high flood plains	21	Low		Low	
D31UC2:					
D31—Subalpine woodland silty colluvial slopes, frozen	40	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	High Wetness	1.00
D31—Boreal forest gravelly colluvial slopes, frozen	31	Low Texture/surface layer thickness/rock fragments	0.10	High Wetness	1.00
D31UC3:					
D31—Boreal tussock organic plains, frozen	65	Low		High Wetness	1.00

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC3:					
D31—Boreal taiga silty colluvial slopes, frozen	18	Low		High	
		Texture/surface layer thickness/rock fragments	0.10	Wetness	1.00
D31UC4:					
D31—Boreal woodland rocky low flood plains	32	High		High	
		Texture/rock fragments	1.00	Wetness	1.00
				Available water	0.50
D31—Boreal forest loamy high flood plains	25	Low		Low	
D31UC5:					
D31—Subalpine scrub silty till slopes	35	Low		Moderate	
		Texture/rock fragments	0.10	Soil reaction	0.50
D31—Alpine scrub gravelly circles, acid	30	Moderate		Low	
		Texture/surface layer thickness/rock fragments	0.50		
D31WA1:					
D31—Alpine water, ponded	95	Not rated		Not rated	
D31YV1:					
D31—Boreal forest loamy mid flood plains	36	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
D31—Boreal taiga loamy high flood plains, frozen	32	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
D31—Boreal scrub sandy low flood plains	26	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
				Salinity	0.50
D31YV2:					
D31—Boreal taiga/tussock organic terraces, frozen	55	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00
D31—Boreal taiga loamy high flood plains, frozen	32	Low		High	
		Texture/rock fragments	0.10	Wetness	1.00

Table 17.--Land Management—Site Restoration--Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31YV3:					
D31—Boreal taiga/tussock organic terraces, frozen	90	Low Texture/rock fragments	0.10	High Wetness	1.00
D31YV8:					
D31—Boreal water, flowing	70	Not rated		Not rated	
D31YV9:					
D31—Boreal taiga loamy high flood plains, frozen	78	Low Texture/rock fragments	0.10	High Wetness	1.00
D32TL1:					
D32—Boreal taiga organic plains, frozen	79	Low Texture/rock fragments	0.10	High Wetness	1.00
D32TL2:					
D32—Boreal forest gravelly escarpments, frozen	40	Low Texture/rock fragments	0.10	High Wetness	1.00
D32—Boreal taiga loamy escarpment slopes	30	Moderate Texture/slope/surface layer thickness/rock fragments	0.50	High Wetness Available water	1.00 0.50
D32—Boreal taiga silty eolian slopes, frozen	20	Low Texture/rock fragments	0.10	High Wetness	1.00
D32TL4:					
D32—Boreal taiga organic plains, frozen	83	Low Texture/rock fragments	0.10	High Wetness	1.00

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:							
D31—Boreal forest rocky colluvial slopes	34	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Droughty	0.76	Cobble content	0.85	Slope	0.00
		Stone content	0.95	Stones	0.99	Hard to reclaim (rock fragments)	0.00
D31—Boreal forest rocky sedimentary colluvial slopes	24	Fair		Poor		Poor	
		Too acid	0.95	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.98	Cobble content	0.86	Rock fragments	0.00
						Slope	0.00
D31—Boreal taiga silty eolian slopes, frozen	17	Fair		Fair		Fair	
		Droughty	0.36	No permafrost depth limitation	0.01	No permafrost depth limitation	0.01
		Too acid	0.50	Wetness	0.22	Wetness	0.22
		Water erosion	0.90			No rock fragments	1.00
D31BH2:							
D31—Boreal forest rocky sedimentary colluvial slopes	39	Fair		Poor		Poor	
		Too acid	0.95	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.98	Cobble content	0.86	Rock fragments	0.00
						Slope	0.00
D31—Boreal forest rocky colluvial escarpments	31	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.00	Stones	0.00	Rock fragments	0.00
		Cobble content	0.24	Cobble content	0.00	Slope	0.00
D31BH3:							
D31—Boreal taiga silty eolian slopes, frozen	59	Fair		Fair		Fair	
		Droughty	0.36	No permafrost depth limitation	0.01	No permafrost depth limitation	0.01
		Too acid	0.50	Wetness	0.22	Wetness	0.22
		Water erosion	0.90			No rock fragments	1.00
D31—Boreal taiga organic eolian slopes, frozen	33	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
		Too acid	0.84				

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH5:							
D31—Boreal taiga/tussock organic terraces, frozen	36	Fair		Poor		Not rated	
		Water erosion	0.06	Wetness	0.00		
		Droughty	0.39	Depth to permafrost	0.00		
		Too acid	0.88				
D31—Boreal forest loamy high flood plains	28	Poor		Good		Poor	
		Wind erosion	0.00			Rock fragments	0.00
		Droughty	0.66			Hard to reclaim (rock fragments)	0.20
		Too sandy	0.86			Too sandy	0.86
D31—Boreal scrub rocky drainages	19	Poor		Good		Poor	
		Wind erosion	0.00			Rock fragments	0.00
		Droughty	0.22			Hard to reclaim (rock fragments)	0.00
		Low content of organic matter	0.98				
D31BH6:							
D31—Boreal forest gravelly colluvial escarpments	56	Fair		Poor		Poor	
		Droughty	0.13	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Cobble content	0.79	Cobble content	0.10	Rock fragments	0.00
						Slope	0.00
D31—Boreal rubble land	25	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.02	Cobble content	0.00	Slope	0.00
		Cobble content	0.61			Depth to bedrock	0.02
D31BH7:							
D31—Subalpine woodland rocky colluvial slopes	26	Poor		Poor		Poor	
		Wind erosion	0.00	Cobble content	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.00	Slope	0.00	Rock fragments	0.00
		Cobble content	0.42			Slope	0.00
D31—Boreal forest rocky colluvial slopes	24	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Droughty	0.76	Cobble content	0.85	Slope	0.00
		Stone content	0.95	Stones	0.99	Hard to reclaim (rock fragments)	0.00
D31—Boreal forest gravelly colluvial slopes, frozen	20	Fair		Poor		Poor	
		Droughty	0.07	Wetness	0.00	Wetness	0.00
		Too acid	0.74	Slope	0.00	Rock fragments	0.00
		Water erosion	0.99	No permafrost depth limitation	0.05	Slope	0.00

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31CF1:							
D31—Boreal forest gravelly colluvial slopes, frozen	32	Fair		Poor		Poor	
		Droughty	0.07	Wetness	0.00	Wetness	0.00
		Too acid	0.74	Slope	0.00	Rock fragments	0.00
		Water erosion	0.99	No permafrost depth limitation	0.05	Slope	0.00
D31—Boreal woodland silty eolian slopes, frozen	29	Fair		Poor		Poor	
		Droughty	0.02	Wetness	0.00	Wetness	0.00
		Too acid	0.50	Depth to permafrost	0.00	Depth to permafrost	0.00
				Slope	0.00	Rock fragments	0.00
D31—Subalpine woodland silty colluvial slopes, frozen	20	Fair		Poor		Poor	
		Droughty	0.92	Depth to permafrost	0.00	Slope	0.00
		Too acid	0.97	Slope	0.00	Depth to permafrost	0.00
				Wetness	0.22	Rock fragments	0.00
D31HL1:							
D31—Boreal taiga silty colluvial slopes, frozen	37	Poor		Poor		Poor	
		Wind erosion	0.00	Depth to permafrost	0.00	Depth to permafrost	0.00
		Droughty	0.60	Wetness	0.22	Slope	0.16
		Too acid	0.61			Wetness	0.22
D31—Boreal taiga organic eolian slopes, frozen	27	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
D31HL2:							
D31—Boreal taiga silty colluvial slopes, frozen	47	Poor		Poor		Poor	
		Wind erosion	0.00	Depth to permafrost	0.00	Depth to permafrost	0.00
		Droughty	0.60	Wetness	0.22	Slope	0.16
		Too acid	0.61			Wetness	0.22
D31—Boreal taiga organic eolian slopes, frozen	43	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
		Too acid	0.84				
D31KT1:							
D31—Boreal taiga organic eolian slopes, frozen	79	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
		Too acid	0.84				

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB1:							
D31—Boreal taiga silty eolian slopes, frozen--	31	Fair		Fair		Fair	
		Droughty	0.36	No permafrost depth limitation	0.01	No permafrost depth limitation	0.01
		Too acid	0.50				
		Water erosion	0.90	Wetness	0.22	Wetness	0.22
						No rock fragments	1.00
D31—Boreal taiga organic eolian slopes, frozen--	26	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
		Too acid	0.84				
D31—Boreal forest rocky colluvial slopes-------	23	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Droughty	0.76	Cobble content	0.85	Slope	0.00
		Stone content	0.95	Stones	0.99	Hard to reclaim (rock fragments)	0.00
D31LB2:							
D31—Boreal taiga silty colluvial slopes, frozen----------	36	Poor		Poor		Poor	
		Wind erosion	0.00	Depth to permafrost	0.00	Depth to permafrost	0.00
		Droughty	0.60	Wetness	0.22	Slope	0.16
		Too acid	0.61			Wetness	0.22
D31—Boreal forest rocky sedimentary colluvial slopes----------	34	Fair		Poor		Poor	
		Too acid	0.95	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.98	Cobble content	0.86	Rock fragments	0.00
						Slope	0.00
D31—Boreal forest rocky colluvial slopes	27	Fair		Poor		Poor	
		Too acid	0.50	Slope	0.00	Rock fragments	0.00
		Droughty	0.76	Cobble content	0.85	Slope	0.00
		Stone content	0.95	Stones	0.99	Hard to reclaim (rock fragments)	0.00
D31MT1:							
D31—Alpine rubble land--	66	Not rated		Poor		Not rated	
				Slope	0.00		
				Cobble content	0.00		
				Stones	0.00		
D31—Alpine low scrub gravelly colluvial slopes----------	22	Poor		Poor		Poor	
		Wind erosion	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Stone content	0.23	Stones	0.25	Rock fragments	0.00
		Too acid	0.50	Cobble content	0.99	Slope	0.00

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31MT2:							
D31—Alpine low scrub gravelly colluvial slopes	32	Poor		Poor		Poor	
		Wind erosion	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Stone content	0.23	Stones	0.25		
		Too acid	0.50	Cobble content	0.99	Rock fragments	0.00
						Slope	0.00
D31—Alpine scrub gravelly circles	30	Poor		Poor		Poor	
		Stone content	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Too acid	0.50	Stones	0.00		
		Droughty	0.80			Rock fragments	0.00
						Slope	0.00
D31—Alpine rubble land	24	Not rated		Poor		Not rated	
				Slope	0.00		
				Cobble content	0.00		
				Stones	0.00		
D31MT3:							
D31—Alpine low scrub organic hummocks, frozen	25	Fair		Poor		Not rated	
		Droughty	0.06	Wetness	0.00		
		Too acid	0.84	Depth to permafrost	0.00		
		Water erosion	0.90	Slope	0.50		
D31—Alpine scrub loamy hummocks, frozen	25	Fair		Poor		Not rated	
		Droughty	0.24	Wetness	0.00		
		Too acid	0.68	No permafrost depth limitation	0.04		
D31—Alpine low scrub loamy solifluction lobes	22	Fair		Poor		Poor	
		Stone content	0.39	Slope	0.00	Slope	0.00
		Too sandy	0.44	Stones	0.33	Rock fragments	0.00
		Too acid	0.74			Hard to reclaim (rock fragments)	0.32
D31OF1:							
D31—Boreal forest gravelly colluvial colluvial slopes, frozen	27	Fair		Poor		Poor	
		Droughty	0.07	Wetness	0.00	Wetness	0.00
		Too acid	0.74	Slope	0.00	Rock fragments	0.00
		Water erosion	0.99	No permafrost depth limitation	0.05	Slope	0.00

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31OF1:							
D31—Boreal woodland silty eolian slopes, frozen	24	Fair		Poor		Poor	
		Droughty	0.02	Wetness	0.00	Wetness	0.00
		Too acid	0.50	Depth to permafrost	0.00	Depth to permafrost	0.00
				Slope	0.00	Rock fragments	0.00
D31—Boreal forest rocky sedimentary colluvial slopes	21	Fair		Poor		Poor	
		Too acid	0.95	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Droughty	0.98	Cobble content	0.86	Rock fragments	0.00
						Slope	0.00
D31OM1:							
D31—Alpine scrub silty circles	57	Poor		Poor		Poor	
		Wind erosion	0.00	Slope	0.00	Rock fragments	0.00
		Stone content	0.00	Stones	0.00	Slope	0.00
		Droughty	0.92			Hard to reclaim (rock fragments)	0.00
D31—Alpine rubble land	30	Not rated		Poor		Not rated	
				Slope	0.00		
				Cobble content	0.00		
				Stones	0.00		
D31OM2:							
D31—Alpine scrub silty circles	60	Poor		Poor		Poor	
		Wind erosion	0.00	Slope	0.00	Rock fragments	0.00
		Stone content	0.00	Stones	0.00	Slope	0.00
		Droughty	0.92			Hard to reclaim (rock fragments)	0.00
D31—Subalpine woodland silty colluvial slopes, frozen	18	Fair		Poor		Poor	
		Droughty	0.92	Slope	0.00	Slope	0.00
		Too acid	0.97	Depth to permafrost	0.00	Depth to permafrost	0.00
				Wetness	0.22	Rock fragments	0.00
D31SD1:							
D31—Alpine low scrub organic hummocks, frozen	48	Fair		Poor		Not rated	
		Droughty	0.06	Wetness	0.00		
		Too acid	0.84	Depth to permafrost	0.00		
		Water erosion	0.90				
D31—Alpine tussock-scrub silty polygons, frozen	29	Poor		Poor		Not rated	
		Wind erosion	0.00	Wetness	0.00		
		Droughty	0.05	Depth to permafrost	0.00		
		Too acid	0.50				

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31TE1:							
D31—Boreal taiga/tussock organic terraces, frozen	62	Fair		Poor		Not rated	
		Water erosion	0.06	Wetness	0.00		
		Droughty	0.39	Depth to permafrost	0.00		
		Too acid	0.88				
D31—Boreal taiga silty terraces, frozen	20	Fair		Poor		Poor	
		Too acid	0.50	Wetness	0.00	Wetness	0.00
		Droughty	0.92	Depth to permafrost	0.00	Depth to permafrost	0.00
		Water erosion	0.99	Slope	0.82	Slope	0.00
D31TE2:							
D31—Boreal taiga/tussock organic terraces, frozen	78	Fair		Poor		Not rated	
		Water erosion	0.06	Wetness	0.00		
		Droughty	0.39	Depth to permafrost	0.00		
		Too acid	0.88				
D31TF1:							
D31—Subalpine woodland silty colluvial slopes	55	Fair		Poor		Poor	
		Droughty	0.28	Wetness	0.00	Wetness	0.00
		Too acid	0.92			Rock fragments	0.00
						Hard to reclaim (rock fragments)	0.00
D31—Subalpine scrub loamy residual slopes	34	Poor		Good		Poor	
		Droughty	0.00			Hard to reclaim (rock fragments)	0.00
		Too acid	0.50			Rock fragments	0.00
D31TF2:							
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Fair		Poor		Poor	
		Droughty	0.41	Wetness	0.00	Wetness	0.00
		Too acid	0.50	Depth to permafrost	0.00	Depth to permafrost	0.00
				Slope	0.92	Slope	0.00
D31—Subalpine scrub silty till slopes	41	Poor		Fair		Poor	
		Wind erosion	0.00	Stones	0.01	Rock fragments	0.00
		Stone content	0.00			Hard to reclaim (rock fragments)	0.00
		Droughty	0.45			Slope	0.00

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31TH1:							
D31—Boreal taiga silty colluvial slopes, frozen	28	Poor		Poor		Poor	
		Wind erosion	0.00	Depth to permafrost	0.00	Depth to permafrost	0.00
		Droughty	0.60	Wetness	0.22	Slope	0.16
		Too acid	0.61			Wetness	0.22
D31—Boreal taiga organic eolian slopes, frozen	22	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
		Too acid	0.84				
D31—Boreal taiga gravelly colluvial slopes	19	Poor		Poor		Poor	
		Wind erosion	0.00	Slope	0.00	Hard to reclaim (rock fragments)	0.00
		Too acid	0.50			Rock fragments	0.00
		Too sandy	0.86			Slope	0.00
D31—Boreal woodland silty eolian slopes, frozen	17	Fair		Poor		Poor	
		Droughty	0.02	Wetness	0.00	Wetness	0.00
		Too acid	0.50	Depth to permafrost	0.00	Depth to permafrost	0.00
				Slope	0.00	Rock fragments	0.00
D31TL1:							
D31—Boreal taiga organic eolian slopes, frozen	44	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
		Too acid	0.84				
D31—Boreal taiga silty eolian slopes, frozen	39	Fair		Fair		Fair	
		Droughty	0.36	No permafrost depth limitation	0.01	No permafrost depth limitation	0.01
		Too acid	0.50				
		Water erosion	0.90	Wetness	0.22	Wetness	0.22
						No rock fragments	1.00
D31UC1:							
D31—Boreal tussock organic plains, frozen	42	Fair		Poor		Not rated	
		Too acid	0.50	Wetness	0.00		
		Droughty	0.65	Depth to permafrost	0.00		
		Water erosion	0.68				

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC1:							
D31—Boreal taiga organic eolian slopes, frozen--	24	Fair		Poor		Not rated	
		Droughty	0.15	Wetness	0.00		
		Water erosion	0.37	Depth to permafrost	0.00		
		Too acid	0.84				
D31—Boreal forest loamy high flood plains	21	Poor		Good		Poor	
		Wind erosion	0.00			Rock fragments	0.00
		Droughty	0.66			Hard to reclaim (rock fragments)	0.20
		Too sandy	0.86			Too sandy	0.86
D31UC2:							
D31—Subalpine woodland silty colluvial slopes, frozen----------	40	Fair		Poor		Poor	
		Droughty	0.92	Depth to permafrost	0.00	Slope	0.00
		Too acid	0.97	Slope	0.00	Depth to permafrost	0.00
				Wetness	0.22	Rock fragments	0.00
D31—Boreal forest gravelly colluvial slopes, frozen---------	31	Fair		Poor		Poor	
		Droughty	0.07	Wetness	0.00	Wetness	0.00
		Too acid	0.74	Slope	0.00	Rock fragments	0.00
		Water erosion	0.99	No permafrost depth limitation	0.05	Slope	0.00
D31UC3:							
D31—Boreal tussock organic plains, frozen	65	Fair		Poor		Not rated	
		Too acid	0.50	Wetness	0.00		
		Droughty	0.65	Depth to permafrost	0.00		
		Water erosion	0.68				
D31—Boreal taiga silty colluvial slopes, frozen----------	18	Poor		Poor		Poor	
		Wind erosion	0.00	Depth to permafrost	0.00	Depth to permafrost	0.00
		Droughty	0.60	Wetness	0.22	Slope	0.16
		Too acid	0.61			Wetness	0.22
D31UC4:							
D31—Boreal woodland rocky low flood plains	32	Poor		Poor		Poor	
		Too sandy	0.00	Wetness	0.00	Wetness	0.00
		Wind erosion	0.00	Cobble content	0.73	Rock fragments	0.00
		Droughty	0.00			Too sandy	0.00
D31—Boreal forest loamy high flood plains	25	Poor		Good		Poor	
		Wind erosion	0.00			Rock fragments	0.00
		Droughty	0.66			Hard to reclaim (rock fragments)	0.20
		Too sandy	0.86			Too sandy	0.86

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC5:							
D31—Subalpine scrub silty till slopes	35	Poor		Fair		Poor	
		Wind erosion	0.00	Stones	0.01	Rock fragments	0.00
		Stone content	0.00			Hard to reclaim (rock fragments)	0.00
		Droughty	0.45			Slope	0.00
D31—Alpine scrub gravelly circles, acid	30	Fair		Fair		Poor	
		Too acid	0.50	Cobble content	0.89	Rock fragments	0.00
		Stone content	0.84	Stones	0.94	Hard to reclaim (rock fragments)	0.00
		Droughty	0.90				
D31WA1:							
D31—Alpine water, ponded	95	Not rated		Not rated		Not rated	
D31YV1:							
D31—Boreal forest loamy mid flood plains	36	Poor		Poor		Poor	
		Wind erosion	0.00	Wetness	0.00	Wetness	0.00
		Water erosion	0.90				
D31—Boreal taiga loamy high flood plains, frozen	32	Poor		Poor		Poor	
		Wind erosion	0.00	Wetness	0.00	Wetness	0.00
		Water erosion	0.68	Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal scrub sandy low flood plains	26	Good		Poor		Poor	
				Wetness	0.00	Wetness	0.00
						Hard to reclaim (rock fragments)	0.88
						Rock fragments	0.92
D31YV2:							
D31—Boreal taiga/tussock organic terraces, frozen	55	Fair		Poor		Not rated	
		Water erosion	0.06	Wetness	0.00		
		Droughty	0.39	Depth to permafrost	0.00		
		Too acid	0.88				
D31—Boreal taiga loamy high flood plains, frozen	32	Poor		Poor		Poor	
		Wind erosion	0.00	Wetness	0.00	Wetness	0.00
		Water erosion	0.68	Depth to permafrost	0.00	Depth to permafrost	0.00

Table 18.--Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source of reclamation material		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
D31YV3:							
D31—Boreal taiga/tussock organic terraces, frozen	90	Fair		Poor		Not rated	
		Water erosion	0.06	Wetness	0.00		
		Droughty	0.39	Depth to permafrost	0.00		
		Too acid	0.88				
D31YV8:							
D31—Boreal water, flowing	70	Not rated		Not rated		Not rated	
D31YV9:							
D31—Boreal taiga loamy high flood plains, frozen	78	Poor		Poor		Poor	
		Wind erosion	0.00	Wetness	0.00	Wetness	0.00
		Water erosion	0.68	Depth to permafrost	0.00	Depth to permafrost	0.00
D32TL1:							
D32—Boreal taiga organic plains, frozen	79	Fair		Poor		Not rated	
		Water erosion	0.06	Wetness	0.00		
		Too acid	0.54	Depth to permafrost	0.00		
		Droughty	0.68				
D32TL2:							
D32—Boreal forest gravelly escarpments, frozen	40	Poor		Poor		Poor	
		Wind erosion	0.00	Wetness	0.00	Wetness	0.00
		Droughty	0.13	Depth to permafrost	0.00	Depth to permafrost	0.00
		Too acid	0.88	Slope	0.00	Rock fragments	0.00
D32—Boreal taiga loamy escarpment slopes	30	Poor		Poor		Poor	
		Too sandy	0.00	Wetness	0.00	Wetness	0.00
		Droughty	0.66	Slope	0.00	Slope	0.00
		Too acid	0.80			Rock fragments	0.00
D32—Boreal taiga silty eolian slopes, frozen	20	Fair		Poor		Poor	
		Droughty	0.83	Wetness	0.00	Wetness	0.00
		Too acid	0.99	Depth to permafrost	0.00	Depth to permafrost	0.00
		Water erosion	0.99			Slope	0.37
D32TL4:							
D32—Boreal taiga organic plains, frozen	83	Fair		Poor		Not rated	
		Water erosion	0.06	Wetness	0.00		
		Too acid	0.54	Depth to permafrost	0.00		
		Droughty	0.68				

Table 19.--Source of Gravel and Sand

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:					
D31—Boreal forest rocky colluvial slopes	34	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.29	Bottom layer	0.02
D31—Boreal forest rocky sedimentary colluvial slopes	24	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.34	Thickest layer	0.00
D31—Boreal taiga silty eolian slopes, frozen	17	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		No permafrost depth limitation	0.01	No permafrost depth limitation	0.01
D31BH2:					
D31—Boreal forest rocky sedimentary colluvial slopes	39	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.34	Thickest layer	0.00
D31—Boreal forest rocky colluvial escarpments	31	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
D31BH3:					
D31—Boreal taiga silty eolian slopes, frozen	59	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer depth limitation	0.00
		No permafrost depth limitation	0.01	No permafrost	0.01
D31—Boreal taiga organic eolian slopes, frozen	33	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31BH5:					
D31—Boreal taiga/tussock organic terraces, frozen	36	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH5:					
D31—Boreal forest loamy high flood plains	28	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.07
D31—Boreal scrub rocky drainages	19	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.02
D31BH6:					
D31—Boreal forest gravelly colluvial escarpments	56	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
D31—Boreal rubble land	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
D31BH7:					
D31—Subalpine woodland rocky colluvial slopes	26	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
D31—Boreal forest rocky colluvial slopes	24	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.29	Bottom layer	0.02
D31—Boreal forest gravelly colluvial slopes, frozen	20	Fair		Poor	
		No permafrost depth limitation	0.05	Bottom layer	0.00
		Thickest layer	0.12	Thickest layer	0.00
		Bottom layer	0.22	No permafrost depth limitation	0.05
D31CF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	32	Fair		Poor	
		No permafrost depth limitation	0.05	Bottom layer	0.00
		Thickest layer	0.12	Thickest layer	0.00
		Bottom layer	0.22	No permafrost depth limitation	0.05
D31—Boreal woodland silty eolian slopes, frozen	29	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Depth to permafrost	0.00	Thickest layer	0.00
		Bottom layer	0.18	Depth to permafrost	0.00
D31—Subalpine woodland silty colluvial slopes, frozen	20	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Bottom layer	0.00	Bottom layer	0.04

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31HL1:					
D31—Boreal taiga silty colluvial slopes, frozen----	37	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga organic eolian slopes, frozen-------	27	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31HL2:					
D31—Boreal taiga silty colluvial slopes, frozen----	47	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga organic eolian slopes, frozen-------	43	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31KT1:					
D31—Boreal taiga organic eolian slopes, frozen-------	79	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31LB1:					
D31—Boreal taiga silty eolian slopes, frozen-------	31	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		No permafrost depth limitation	0.01	No permafrost depth limitation	0.01
D31—Boreal taiga organic eolian slopes, frozen-------	26	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal forest rocky colluvial slopes------	23	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.29	Bottom layer	0.02
D31LB2:					
D31—Boreal taiga silty colluvial slopes, frozen----	36	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB2:					
D31—Boreal forest rocky sedimentary colluvial slopes	34	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.34	Thickest layer	0.00
D31—Boreal forest rocky colluvial slopes	27	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.29	Bottom layer	0.02
D31MT1:					
D31—Alpine rubble land	66	Not rated		Not rated	
D31—Alpine low scrub gravelly colluvial slopes	22	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.30	Bottom layer	0.07
D31MT2:					
D31—Alpine low scrub gravelly colluvial slopes	32	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.30	Bottom layer	0.07
D31—Alpine scrub gravelly circles	30	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.38	Thickest layer	0.00
D31—Alpine rubble land	24	Not rated		Not rated	
D31MT3:					
D31—Alpine low scrub organic hummocks, frozen	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Alpine scrub loamy hummocks, frozen	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		No permafrost depth limitation	0.04	No permafrost depth limitation	0.04
D31—Alpine low scrub loamy solifluction lobes	22	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Organic matter content	0.00	Organic matter content	0.00
		Bottom layer	0.00	Bottom layer	0.10
D31OF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	27	Fair		Poor	
		No permafrost depth limitation	0.05	Bottom layer	0.00
		Thickest layer	0.12	Thickest layer	0.00
		Bottom layer	0.22	No permafrost depth limitation	0.05

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31OF1:					
D31—Boreal woodland silty eolian slopes, frozen	24	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Depth to permafrost	0.00	Thickest layer	0.00
		Bottom layer	0.18	Depth to permafrost	0.00
D31—Boreal forest rocky sedimentary colluvial slopes	21	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.34	Thickest layer	0.00
D31OM1:					
D31—Alpine scrub silty circles	57	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.30	Thickest layer	0.00
D31—Alpine rubble land	30	Not rated		Not rated	
D31OM2:					
D31—Alpine scrub silty circles	60	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.30	Thickest layer	0.00
D31—Subalpine woodland silty colluvial slopes, frozen	18	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Bottom layer	0.00	Bottom layer	0.04
D31SD1:					
D31—Alpine low scrub organic hummocks, frozen	48	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Alpine tussock-scrub silty polygons, frozen	29	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31TE1:					
D31—Boreal taiga/tussock organic terraces, frozen	62	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga silty terraces, frozen	20	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TE2:					
D31—Boreal taiga/tussock organic terraces, frozen	78	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31TF1:					
D31—Subalpine woodland silty colluvial slopes	55	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.15	Bottom layer	0.03
D31—Subalpine scrub loamy residual slopes	34	Fair		Fair	
		Thickest layer	0.12	Bottom layer	0.02
		Bottom layer	0.88	Thickest layer	0.03
D31TF2:					
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Subalpine scrub silty till slopes	41	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.15	Thickest layer	0.00
D31TH1:					
D31—Boreal taiga silty colluvial slopes, frozen	28	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga organic eolian slopes, frozen	22	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga gravelly colluvial slopes	19	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.50	Bottom layer	0.08
D31—Boreal woodland silty eolian slopes, frozen	17	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Depth to permafrost	0.00	Thickest layer	0.00
		Bottom layer	0.18	Depth to permafrost	0.00

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TL1:					
D31—Boreal taiga organic eolian slopes, frozen-------	44	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga silty eolian slopes, frozen-------	39	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		No permafrost depth limitation	0.01	No permafrost depth limitation	0.01
D31UC1:					
D31—Boreal tussock organic plains, frozen------	42	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga organic eolian slopes, frozen-------	24	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal forest loamy high flood plains-----	21	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.07
D31UC2:					
D31—Subalpine woodland silty colluvial slopes, frozen----	40	Poor		Poor	
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
		Bottom layer	0.00	Bottom layer	0.04
D31—Boreal forest gravelly colluvial slopes, frozen----	31	Fair		Poor	
		No permafrost depth limitation	0.05	Bottom layer	0.00
		Thickest layer	0.12	Thickest layer	0.00
		Bottom layer	0.22	No permafrost depth limitation	0.05
D31UC3:					
D31—Boreal tussock organic plains, frozen------	65	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga silty colluvial slopes, frozen----	18	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC4:					
D31—Boreal woodland rocky low flood plains	32	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.06
		Bottom layer	0.34	Bottom layer	0.15
D31—Boreal forest loamy high flood plains	25	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.07
D31UC5:					
D31—Subalpine scrub silty till slopes	35	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.15	Thickest layer	0.00
D31—Alpine scrub gravelly circles, acid	30	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.20	Bottom layer	0.01
D31WA1:					
D31—Alpine water, ponded	95	Not rated		Not rated	
D31YV1:					
D31—Boreal forest loamy mid flood plains	36	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.04
D31—Boreal taiga loamy high flood plains, frozen	32	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal scrub sandy low flood plains	26	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
D31YV2:					
D31—Boreal taiga/tussock organic terraces, frozen	55	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31—Boreal taiga loamy high flood plains, frozen	32	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00

Table 19.--Source of Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Source of gravel		Source of sand	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31YV3:					
D31—Boreal taiga/tussock organic terraces, frozen	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D31YV8:					
D31—Boreal water, flowing	70	Not rated		Not rated	
D31YV9:					
D31—Boreal taiga loamy high flood plains, frozen	78	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D32TL1:					
D32—Boreal taiga organic plains, frozen	79	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D32TL2:					
D32—Boreal forest gravelly escarpments, frozen	40	Poor		Poor	
		Depth to permafrost	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Depth to permafrost	0.00
D32—Boreal taiga loamy escarpment slopes	30	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.10	Bottom layer	0.13
D32—Boreal taiga silty eolian slopes, frozen	20	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00
D32TL4:					
D32—Boreal taiga organic plains, frozen	83	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
		Depth to permafrost	0.00	Depth to permafrost	0.00

Table 20.--Camp and Picnic Areas

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:					
D31—Boreal forest rocky colluvial slopes	34	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31—Boreal forest rocky sedimentary colluvial slopes	24	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31—Boreal taiga silty eolian slopes, frozen	17	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.90	Slow water movement	0.60
		Slow water movement	0.60	Depth to saturated zone	0.60
D31BH2:					
D31—Boreal forest rocky sedimentary colluvial slopes	39	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31—Boreal forest rocky colluvial escarpments	31	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.35	Large stones content	0.35
D31BH3:					
D31—Boreal taiga silty eolian slopes, frozen	59	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.90	Slow water movement	0.60
		Slow water movement	0.60	Depth to saturated zone	0.60
D31—Boreal taiga organic eolian slopes, frozen	33	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.94	Slow water movement	0.94

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH5:					
D31—Boreal taiga/tussock organic terraces, frozen	36	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31—Boreal forest loamy high flood plains	28	Very limited		Not limited	
		Flooding	1.00		
D31—Boreal scrub rocky drainages	19	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
D31BH6:					
D31—Boreal forest gravelly colluvial escarpments	56	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
D31—Boreal rubble land	25	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Gravel	0.85	Gravel content	0.85
		Large stones content	0.16	Large stones content	0.16
D31BH7:					
D31—Subalpine woodland rocky colluvial slopes	26	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.60	Slow water movement	0.60
				Gravel content	0.08
D31—Boreal forest rocky colluvial slopes	24	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31—Boreal forest gravelly colluvial slopes, frozen	20	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00
		Permafrost	0.95	Permafrost	0.95
		Slow water movement	0.15	Slow water movement	0.15
D31CF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	32	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00
		Permafrost	0.95	Permafrost	0.95
		Slow water movement	0.15	Slow water movement	0.15

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31CF1:					
D31—Boreal woodland silty eolian slopes, frozen	29	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
				Gravel content	0.76
D31—Subalpine woodland silty colluvial slopes, frozen----	20	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Depth to saturated zone	0.60
		Large stones content	0.19	Large stones content	0.19
D31HL1:					
D31—Boreal taiga silty colluvial slopes, frozen----	37	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Slope	0.84
		Slope	0.84	Depth to saturated zone	0.60
D31—Boreal taiga organic eolian slopes, frozen-------	27	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.94	Slow water movement	0.94
D31HL2:					
D31—Boreal taiga silty colluvial slopes, frozen----	47	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Slope	0.84
		Slope	0.84	Depth to saturated zone	0.60
D31—Boreal taiga organic eolian slopes, frozen-------	43	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.94	Slow water movement	0.94
D31KT1:					
D31—Boreal taiga organic eolian slopes, frozen-------	79	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.94	Slow water movement	0.94

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB1:					
D31—Boreal taiga silty eolian slopes, frozen	31	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.90	Slow water movement	0.60
		Slow water movement	0.60	Depth to saturated zone	0.60
D31—Boreal taiga organic eolian slopes, frozen	26	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.94	Slow water movement	0.94
D31—Boreal forest rocky colluvial slopes	23	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31LB2:					
D31—Boreal taiga silty colluvial slopes, frozen	36	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Slope	0.84
		Slope	0.84	Depth to saturated zone	0.60
D31—Boreal forest rocky sedimentary colluvial slopes	34	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31—Boreal forest rocky colluvial slopes	27	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31MT1:					
D31—Alpine rubble land	66	Not rated		Not rated	
D31—Alpine low scrub gravelly colluvial slopes	22	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
D31MT2:					
D31—Alpine low scrub gravelly colluvial slopes	32	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
D31—Alpine scrub gravelly circles	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
		Gravel	0.28	Gravel content	0.28

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31MT2:					
D31—Alpine rubble land-------	24	Not rated		Not rated	
D31MT3:					
D31—Alpine low scrub organic hummocks, frozen----------	25	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slope	1.00	Slope	1.00
D31—Alpine scrub loamy hummocks, frozen----------	25	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Permafrost	0.96	Permafrost	0.96
		Slope	0.16	Gravel content	0.29
				Slope	0.16
D31—Alpine low scrub loamy solifluction lobes----------	22	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31OF1:					
D31—Boreal forest gravelly colluvial slopes, frozen----	27	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00
		Permafrost	0.95	Permafrost	0.95
		Slow water movement	0.15	Slow water movement	0.15
D31—Boreal woodland silty eolian slopes, frozen	24	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
				Gravel content	0.76
D31—Boreal forest rocky sedimentary colluvial slopes	21	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31OM1:					
D31—Alpine scrub silty circles----------	57	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
		Slow water movement	0.15	Slow water movement	0.15
D31—Alpine rubble land-------	30	Not rated		Not rated	

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31OM2:					
D31—Alpine scrub silty circles	60	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
		Slow water movement	0.15	Slow water movement	0.15
D31—Subalpine woodland silty colluvial slopes, frozen	18	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Depth to saturated zone	0.60
		Large stones content	0.19	Large stones content	0.19
D31SD1:					
D31—Alpine low scrub organic hummocks, frozen	48	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slope	0.96	Slope	0.96
D31—Alpine tussock-scrub silty polygons, frozen	29	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31TE1:					
D31—Boreal taiga/tussock organic terraces, frozen	62	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31—Boreal taiga silty terraces, frozen	20	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31TE2:					
D31—Boreal taiga/tussock organic terraces, frozen	78	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TF1:					
D31—Subalpine woodland silty colluvial slopes	55	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
D31—Subalpine scrub loamy residual slopes	34	Not limited		Not limited	
D31TF2:					
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
		Large stones content	0.19	Large stones content	0.19
D31—Subalpine scrub silty till slopes	41	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
		Slow water movement	0.15	Slow water movement	0.15
D31TH1:					
D31—Boreal taiga silty colluvial slopes, frozen	28	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Slope	0.84
		Slope	0.84	Depth to saturated zone	0.60
D31—Boreal taiga organic eolian slopes, frozen	22	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.94	Slow water movement	0.94
D31—Boreal taiga gravelly colluvial slopes	19	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
D31—Boreal woodland silty eolian slopes, frozen	17	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
				Gravel content	0.76

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TL1:					
D31—Boreal taiga organic eolian slopes, frozen	44	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.94	Slow water movement	0.94
D31—Boreal taiga silty eolian slopes, frozen	39	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.90	Slow water movement	0.60
		Slow water movement	0.60	Depth to saturated zone	0.60
D31UC1:					
D31—Boreal tussock organic plains, frozen	42	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31—Boreal taiga organic eolian slopes, frozen	24	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slope	1.00	Slope	1.00
D31—Boreal forest loamy high flood plains	21	Very limited		Not limited	
		Flooding	1.00		
D31UC2:					
D31—Subalpine woodland silty colluvial slopes, frozen	40	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Depth to saturated zone	0.60
		Large stones content	0.19	Large stones content	0.19
D31—Boreal forest gravelly colluvial slopes, frozen	31	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00
		Permafrost	0.95	Permafrost	0.95
		Slow water movement	0.15	Slow water movement	0.15

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC3:					
D31—Boreal tussock organic plains, frozen	65	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31—Boreal taiga silty colluvial slopes, frozen	18	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.90	Slope	0.84
		Slope	0.84	Depth to saturated zone	0.60
D31UC4:					
D31—Boreal woodland rocky low flood plains	32	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Flooding	0.40
		Gravel	0.23	Gravel content	0.23
		Too sandy	0.02	Too sandy	0.02
D31—Boreal forest loamy high flood plains	25	Very limited		Not limited	
		Flooding	1.00		
D31UC5:					
D31—Subalpine scrub silty till slopes	35	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
		Slow water movement	0.15	Slow water movement	0.15
D31—Alpine scrub gravelly circles, acid	30	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
D31WA1:					
D31—Alpine water, ponded	95	Not rated		Not rated	
D31YV1:					
D31—Boreal forest loamy mid flood plains	36	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.15
		Slow water movement	0.15		
D31—Boreal taiga loamy high flood plains, frozen	32	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.60
		Slow water movement	0.60		

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31YV1:					
D31—Boreal scrub sandy low flood plains	26	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Flooding	0.40
		Salinity	0.03	Salinity	0.03
D31YV2:					
D31—Boreal taiga/tussock organic terraces, frozen	55	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31—Boreal taiga loamy high flood plains, frozen	32	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.60
		Slow water movement	0.60		
D31YV3:					
D31—Boreal taiga/tussock organic terraces, frozen	90	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60
D31YV8:					
D31—Boreal water, flowing	70	Not rated		Not rated	
D31YV9:					
D31—Boreal taiga loamy high flood plains, frozen	78	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	1.00	Slow water movement	0.60
		Slow water movement	0.60		
D32TL1:					
D32—Boreal taiga organic plains, frozen	79	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60

Table 20.--Camp and Picnic Areas--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D32TL2:					
D32—Boreal forest gravelly escarpments, frozen	40	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
		Slow water movement	0.15	Gravel content	0.46
				Slow water movement	0.15
D32—Boreal taiga loamy escarpment slopes	30	Very limited		Very limited	
		Depth to saturated zone	1.00	Slope	1.00
		Slope	1.00	Depth to saturated zone	1.00
D32—Boreal taiga silty eolian slopes, frozen	20	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	0.63	Slope	0.63
		Slow water movement	0.15	Slow water movement	0.15
D32TL4:					
D32—Boreal taiga organic plains, frozen	83	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Ponding	1.00
		Ponding	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Slow water movement	0.60	Slow water movement	0.60

Table 21.--Trail Management

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH1:					
D31—Boreal forest rocky colluvial slopes	34	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31—Boreal forest rocky sedimentary colluvial slopes	24	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31—Boreal taiga silty eolian slopes, frozen	17	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31BH2:					
D31—Boreal forest rocky sedimentary colluvial slopes	39	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31—Boreal forest rocky colluvial escarpments	31	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.35	Large stones content	0.35
D31BH3:					
D31—Boreal taiga silty eolian slopes, frozen	59	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31—Boreal taiga organic eolian slopes, frozen	33	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31BH5:					
D31—Boreal taiga/tussock organic terraces, frozen	36	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31—Boreal forest loamy high flood plains	28	Not limited		Not limited	

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31BH5:					
D31—Boreal scrub rocky drainages	19	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
D31BH6:					
D31—Boreal forest gravelly colluvial escarpments	56	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	1.00	Large stones content	1.00
D31—Boreal rubble land	25	Somewhat limited		Somewhat limited	
		Large stones content	0.16	Large stones content	0.16
D31BH7:					
D31—Subalpine woodland rocky colluvial slopes	26	Very limited		Somewhat limited	
		Slope	1.00	Slope	0.08
D31—Boreal forest rocky colluvial slopes	24	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31—Boreal forest gravelly colluvial slopes, frozen	20	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Water erosion	1.00	Water erosion	1.00
		Slope	1.00	Permafrost	0.95
		Permafrost	0.95		
D31CF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	32	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Water erosion	1.00	Water erosion	1.00
		Slope	1.00	Permafrost	0.95
		Permafrost	0.95		
D31—Boreal woodland silty eolian slopes, frozen	29	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	0.56
D31—Subalpine woodland silty colluvial slopes, frozen	20	Very limited		Very limited	
		Slope	1.00	Permafrost	1.00
		Permafrost	1.00	Slope	0.56
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
		Large stones content	0.19	Large stones content	0.19

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31HL1:					
D31—Boreal taiga silty colluvial slopes, frozen	37	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31—Boreal taiga organic eolian slopes, frozen	27	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31HL2:					
D31—Boreal taiga silty colluvial slopes, frozen	47	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31—Boreal taiga organic eolian slopes, frozen	43	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31KT1:					
D31—Boreal taiga organic eolian slopes, frozen	79	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31LB1:					
D31—Boreal taiga silty eolian slopes, frozen	31	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31—Boreal taiga organic eolian slopes, frozen	26	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31—Boreal forest rocky colluvial slopes	23	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31LB2:					
D31—Boreal taiga silty colluvial slopes, frozen	36	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31—Boreal forest rocky sedimentary colluvial slopes	34	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31—Boreal forest rocky colluvial slopes	27	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31MT1:					
D31—Alpine rubble land	66	Not rated		Not rated	
D31—Alpine low scrub gravelly colluvial slopes	22	Very limited		Very limited	
		Slope	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00
D31MT2:					
D31—Alpine low scrub gravelly colluvial slopes	32	Very limited		Very limited	
		Slope	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00
D31—Alpine scrub gravelly circles	30	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.76	Large stones content	0.76
D31—Alpine rubble land	24	Not rated		Not rated	
D31MT3:					
D31—Alpine low scrub organic hummocks, frozen	25	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Water erosion	1.00	Water erosion	1.00
		Slope	0.50		
D31—Alpine scrub loamy hummocks, frozen	25	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Permafrost	0.96	Permafrost	0.96
D31—Alpine low scrub loamy solifluction lobes	22	Very limited		Very limited	
		Slope	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31OF1:					
D31—Boreal forest gravelly colluvial slopes, frozen	27	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Water erosion	1.00	Water erosion	1.00
		Slope	1.00	Permafrost	0.95
		Permafrost	0.95		
D31—Boreal woodland silty eolian slopes, frozen	24	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	0.56
D31—Boreal forest rocky sedimentary colluvial slopes	21	Very limited		Very limited	
		Slope	1.00	Slope	1.00
D31OM1:					
D31—Alpine scrub silty circles	57	Very limited		Very limited	
		Slope	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00
D31—Alpine rubble land	30	Not rated		Not rated	
D31OM2:					
D31—Alpine scrub silty circles	60	Very limited		Very limited	
		Slope	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00
D31—Subalpine woodland silty colluvial slopes, frozen	18	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
		Large stones content	0.19	Large stones content	0.19
D31SD1:					
D31—Alpine low scrub organic hummocks, frozen	48	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Water erosion	1.00	Water erosion	1.00
D31—Alpine tussock-scrub silty polygons, frozen	29	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TE1:					
D31—Boreal taiga/tussock organic terraces, frozen	62	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31—Boreal taiga silty terraces, frozen	20	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Water erosion	1.00	Water erosion	1.00
		Permafrost	1.00	Permafrost	1.00
		Slope	0.18		
D31TE2:					
D31—Boreal taiga/tussock organic terraces, frozen	78	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31TF1:					
D31—Subalpine woodland silty colluvial slopes	55	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
D31—Subalpine scrub loamy residual slopes	34	Not limited		Not limited	
D31TF2:					
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Permafrost	1.00	Permafrost	1.00
		Large stones content	0.19	Large stones content	0.19
		Slope	0.08		
D31—Subalpine scrub silty till slopes	41	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
D31TH1:					
D31—Boreal taiga silty colluvial slopes, frozen	28	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31—Boreal taiga organic eolian slopes, frozen	22	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31TH1:					
D31—Boreal taiga gravelly colluvial slopes	19	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	0.56
D31—Boreal woodland silty eolian slopes, frozen	17	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	0.56
D31TL1:					
D31—Boreal taiga organic eolian slopes, frozen	44	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31—Boreal taiga silty eolian slopes, frozen	39	Somewhat limited		Somewhat limited	
		Permafrost	0.99	Permafrost	0.99
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31UC1:					
D31—Boreal tussock organic plains, frozen	42	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31—Boreal taiga organic eolian slopes, frozen	24	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
		Water erosion	1.00	Water erosion	1.00
D31—Boreal forest loamy high flood plains	21	Not limited		Not limited	
D31UC2:					
D31—Subalpine woodland silty colluvial slopes, frozen	40	Very limited		Very limited	
		Slope	1.00	Permafrost	1.00
		Permafrost	1.00	Slope	0.56
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
		Large stones content	0.19	Large stones content	0.19

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31UC2:					
D31—Boreal forest gravelly colluvial slopes, frozen	31	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Water erosion	1.00	Water erosion	1.00
		Slope	1.00	Permafrost	0.95
		Permafrost	0.95		
D31UC3:					
D31—Boreal tussock organic plains, frozen	65	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31—Boreal taiga silty colluvial slopes, frozen	18	Very limited		Very limited	
		Water erosion	1.00	Water erosion	1.00
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	0.22	Depth to saturated zone	0.22
D31UC4:					
D31—Boreal woodland rocky low flood plains	32	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.40	Flooding	0.40
		Too sandy	0.02	Too sandy	0.02
D31—Boreal forest loamy high flood plains	25	Not limited		Not limited	
D31UC5:					
D31—Subalpine scrub silty till slopes	35	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
D31—Alpine scrub gravelly circles, acid	30	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
D31WA1:					
D31—Alpine water, ponded	95	Not rated		Not rated	
D31YV1:					
D31—Boreal forest loamy mid flood plains	36	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
D31—Boreal taiga loamy high flood plains, frozen	32	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D31YV1:					
D31—Boreal scrub sandy low flood plains	26	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.40	Flooding	0.40
D31YV2:					
D31—Boreal taiga/tussock organic terraces, frozen	55	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31—Boreal taiga loamy high flood plains, frozen	32	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
D31YV3:					
D31—Boreal taiga/tussock organic terraces, frozen	90	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D31YV8:					
D31—Boreal water, flowing	70	Not rated		Not rated	
D31YV9:					
D31—Boreal taiga loamy high flood plains, frozen	78	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
D32TL1:					
D32—Boreal taiga organic plains, frozen	79	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00
D32TL2:					
D32—Boreal forest gravelly escarpments, frozen	40	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00
		Permafrost	1.00	Permafrost	1.00
D32—Boreal taiga loamy escarpment slopes	30	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slope	1.00	Slope	1.00

Table 21.--Trail Management--Continued

Map symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
D32TL2:					
D32—Boreal taiga silty eolian slopes, frozen	20	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Water erosion	1.00	Water erosion	1.00
D32TL4:					
D32—Boreal taiga organic plains, frozen	83	Very limited		Very limited	
		Permafrost	1.00	Permafrost	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Organic matter content	1.00	Organic matter content	1.00
		Ponding	1.00	Ponding	1.00

Table 22.--Hydric Soils

(Only the soil components that are rated as hydric are listed in the table.)

Map symbol and map unit name	Component name	Pct. of map unit	Hydric rating	Landform	Hydric soils criteria			
					Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
D31BH1: Boreal Sedimentary Hills	D31—Boreal woodland silty eolian slopes, frozen	9	Yes	Hills	2B3	Yes	No	No
	D31—Boreal taiga silty drainages, frozen	5	Yes	Drainageways	2B3	Yes	No	No
D31BH3: Boreal Hills with Common Permafrost	D31—Boreal taiga organic eolian slopes, frozen	33	Yes	Hills	3, 1	No	No	Yes
D31BH5: Boreal Valley Bottoms	D31—Boreal taiga/tussock organic terraces, frozen	36	Yes	Terraces	3, 1	No	No	Yes
D31BH7: Boreal and Subalpine Hills with Common Permafrost	D31—Boreal woodland silty eolian slopes, frozen	10	Yes	Hills	2B3	Yes	No	No
D31CF1: Boreal and Subalpine Hills with Extensive Permafrost	D31—Boreal woodland silty eolian slopes, frozen	29	Yes	Hills	2B3	Yes	No	No
D31HL1: Boreal Eolian Hills with Common Permafrost	D31—Boreal taiga organic eolian slopes, frozen	27	Yes	Hills	1, 3	No	No	Yes
D31HL2: Boreal Eolian Hills with Extensive Permafrost	D31—Boreal taiga organic eolian slopes, frozen	43	Yes	Hills	1, 3	No	No	Yes
	D31—Boreal taiga silty drainages, frozen	10	Yes	Drainageways	2B3	Yes	No	No
D31KT1: Boreal Eolian Plains with Extensive Permafrost, Wet	D31—Boreal taiga organic eolian slopes, frozen	79	Yes	Hills	3, 1	No	No	Yes
	D31—Boreal moss organic depressions	7	Yes	Thermokarst depressions of loess plains	3, 1	No	No	Yes
	D31—Boreal scrub-sedge organic depressions	4	Yes	Thermokarst depressions of loess plains	1	No	No	No

Table 22.--Hydric Soils--Continued

Map symbol and map unit name	Component name	Pct. of map unit	Hydric rating	Landform	Hydric soils criteria			
					Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
D31LB1:								
Boreal Hills with Common Permafrost, Thin Surface	D31—Boreal taiga organic eolian slopes, frozen	26	Yes	Hills	1, 3	No	No	Yes
	D31—Boreal taiga silty drainages, frozen	6	Yes	Drainageways	2B3	Yes	No	No
D31MT3:								
Alpine Rounded Mountains with Common Permafrost	D31—Alpine low scrub organic hummocks, frozen	25	Yes	Solifluction lobes on rounded mountains	1	No	No	No
	D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	9	Yes	Turf hummocks on mountains, hills	2B3	Yes	No	No
D31OF1:								
Boreal Hills with Common Permafrost, Nonacid	D31—Boreal woodland silty eolian slopes, frozen	24	Yes	Hills	2B3	Yes	No	No
D31SD1:								
Alpine Rounded Mountains with Extensive Permafrost	D31—Alpine low scrub organic hummocks, frozen	48	Yes	Solifluction lobes on rounded mountains	1	No	No	No
	D31—Alpine tussock-scrub silty polygons, frozen	29	Yes	High-center polygons on rounded mountains	2B3	Yes	No	No
	D31—Subalpine scrub loamy colluvial slopes, frozen	7	Yes	Nonsorted circles on hills and rounded mountains	2B3	Yes	No	No
D31TE1:								
Boreal Eolian Terraces with Extensive Permafrost	D31—Boreal taiga/tussock organic terraces, frozen	62	Yes	Terraces	3, 1	No	No	Yes
	D31—Boreal forest silty drainages, frozen	10	Yes	Drainageways	2B3	Yes	No	No
	D31—Boreal grass organic depressions	8	Yes	Thermokarst depressions of terraces	3, 1	No	No	Yes
D31TE2:								
Boreal Terraces with Extensive Permafrost, Wet	D31—Boreal taiga/tussock organic terraces, frozen	78	Yes	Terraces	3, 1	No	No	Yes
	D31—Boreal forest silty drainages, frozen	12	Yes	Drainageways	2B3	Yes	No	No
	D31—Boreal grass organic depressions	10	Yes	Thermokarst depressions of terraces	3, 1	No	No	Yes

Table 22.--Hydric Soils--Continued

Map symbol and map unit name	Component name	Pct. of map unit	Hydric rating	Landform	Hydric soils criteria			
					Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
D31TF1:								
Subalpine Hills	D31—Subalpine scrub rocky drainages	6	Yes	Drainageways	2B3	Yes	No	No
	D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	5	Yes	Turf hummocks on mountains, hills	2B3	Yes	No	No
D31TF2:								
Subalpine Glaciated Hills	D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	45	Yes	Turf hummocks on mountains, hills	2B3	Yes	No	No
	D31—Subalpine scrub rocky drainages	8	Yes	Drainageways	2B3	Yes	No	No
	D31—Subalpine grass organic swales	6	Yes	Swales of hills	3, 1	No	No	Yes
D31TH1:								
Boreal Hills with Extensive Permafrost	D31—Boreal taiga organic eolian slopes, frozen	22	Yes	Hills	1, 3	No	No	Yes
	D31—Boreal woodland silty eolian slopes, frozen	17	Yes	Hills	2B3	Yes	No	No
	D31—Boreal taiga silty drainages, frozen	6	Yes	Drainageways	2B3	Yes	No	No
D31TL1:								
Boreal Eolian Plains with Extensive Permafrost, Moist	D31—Boreal taiga organic eolian slopes, frozen	44	Yes	Hills	1, 3	No	No	Yes
	D31—Boreal moss organic depressions	3	Yes	Thermokarst depressions of loess plains	1, 3	No	No	Yes
D31UC1:								
Boreal Eolian Hills with Common Permafrost, Wet	D31—Boreal tussock organic plains, frozen	42	Yes	Plains	3, 1	No	No	Yes
	D31—Boreal taiga organic eolian slopes, frozen	24	Yes	Hills	1, 3	No	No	Yes
D31UC2:								
Subalpine and Boreal Hills	D31—Subalpine scrub loamy colluvial slopes, frozen	10	Yes	Nonsorted circles on hills and rounded mountains	2B3	Yes	No	No
D31UC3:								
Boreal Plains with Extensive Permafrost	D31—Boreal tussock organic plains, frozen	65	Yes	Plains	1, 3	No	No	Yes
	D31—Boreal taiga silty drainages, frozen	10	Yes	Drainageways	2B3	Yes	No	No

Table 22.--Hydric Soils--Continued

Map symbol and map unit name	Component name	Pct. of map unit	Hydric rating	Landform	Hydric soils criteria			
					Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
D31UC4:								
Boreal Flood Plains with Common Permafrost	D31—Boreal taiga/tussock organic terraces, frozen	13	Yes	Terraces	3, 1	No	No	Yes
	D31—Boreal scrub organic depressions	11	Yes	Depressions of terraces	3, 2B3	Yes	No	Yes
D31UC5:								
Alpine Glaciated Mountains	D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	12	Yes	Turf hummocks on mountains, hills	2B3	Yes	No	No
	D31—Subalpine scrub rocky drainages	10	Yes	Drainageways	2B3	Yes	No	No
D31WA1:								
Alpine and Subalpine Water	D31—Subalpine scrub rocky drainages	5	Yes	Drainageways	2B3	Yes	No	No
D31YV2:								
Boreal Terraces and Flood Plains with Common Permafrost	D31—Boreal taiga/tussock organic terraces, frozen	55	Yes	Terraces	3, 1	No	No	Yes
	D31—Boreal scrub organic depressions	6	Yes	Depressions of terraces	3, 2B3	Yes	No	Yes
D31YV3:								
Boreal Terraces with Extensive Permafrost	D31—Boreal taiga/tussock organic terraces, frozen	90	Yes	Terraces	3, 1	No	No	Yes
	D31—Boreal grass organic depressions	10	Yes	Thermokarst depressions of terraces	3, 1	No	No	Yes
D31YV9:								
Boreal High Flood Plains	D31—Boreal scrub organic depressions	7	Yes	Depressions of terraces	2B3, 3	Yes	No	Yes
	D31—Boreal scrub loamy depressions	4	Yes	Depressions of terraces	2B3	Yes	No	No
D32TL1:								
Boreal Eolian Plains with Common Permafrost	D32—Boreal taiga organic plains, frozen	79	Yes	Loess plains	3, 1	No	No	Yes
	D32—Boreal woodland loamy drainages, frozen	9	Yes	Drainageways	2B3	Yes	No	No
	D32—Boreal moss organic depressions	4	Yes	Thermokarst depressions of loess plains	3, 1	No	No	Yes

Table 22.--Hydric Soils--Continued

Map symbol and map unit name	Component name	Pct. of map unit	Hydric rating	Landform	Hydric soils criteria			
					Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
D32TL2:								
Boreal Escarpments with Common Permafrost	D32—Boreal taiga organic plains, frozen	7	Yes	Loess plains	3, 1	No	No	Yes
	D32—Boreal woodland loamy drainages, frozen	3	Yes	Drainageways	2B3	Yes	No	No
D32TL4:								
Boreal Eolian Plains with Extensive Permafrost	D32—Boreal taiga organic plains, frozen	83	Yes	Loess plains	3, 1	No	No	Yes
	D32—Boreal woodland loamy drainages, frozen	10	Yes	Drainageways	2B3	Yes	No	No
	D32—Boreal moss organic depressions	7	Yes	Thermokarst depressions of loess plains	3, 1	No	No	Yes

Explanation of hydric criteria codes:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   - A. are somewhat poorly drained and have a water table at the surface (0 centimeters) during the growing season, or
   - B. are poorly drained or very poorly drained and have either:
     1) a water table at the surface (0 centimeters) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 50 centimeters, or
     2) a water table at a depth of 15 centimeters or less during the growing season if permeability is equal to or greater than 42.3 micrometers per second in all layers within a depth of 50 centimeters, or
     3) a water table at a depth of 25 centimeters or less during the growing season if permeability is less than 42.3 micrometers per second in any layer within a depth of 50 centimeters.
3. Soils that are frequently ponded for periods of long or very long duration during the growing season.
4. Soils that are frequently flooded for periods of long or very long duration during the growing season.

Table 23.--Classification of the Soils

Key:

ORDER
Suborder
Great Group
Subgroup
Series or higher category

ENTISOLS	
Aquents	
Cryaquents	
Typic Cryaquents	
D31—Boreal scrub loamy depressions	**Coarse-loamy, mixed, superactive, nonacid Typic Cryaquents**
D31—Subalpine scrub rocky drainages	**Sandy-skeletal, mixed Typic Cryaquents**
Fluvents	
Cryofluvents	
Typic Cryofluvents	
D31—Boreal forest loamy mid flood plains	**Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents**
D31—Boreal scrub sandy low flood plains	**Coarse-loamy, mixed, superactive, calcareous Typic Cryofluvents**
Oxyaquic Cryofluvents	
D31—Boreal scrub rocky drainages	**Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryofluvents**
Orthents	
Cryorthents	
Typic Cryorthents	
D31—Boreal forest gravelly colluvial escarpments	**Loamy-skeletal, mixed, superactive, nonacid Typic Cryorthents**
D31—Boreal forest loamy high flood plains	**Sandy or sandy-skeletal, mixed Typic Cryorthents**
D31—Boreal woodland rocky low flood plains	**Sandy or sandy-skeletal, mixed Typic Cryorthents**
Oxyaquic Cryorthents	
D31—Subalpine scrub silty till slopes	**Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryorthents**
D31—Subalpine woodland silty colluvial slopes	**Loamy-skeletal, mixed, superactive, nonacid Oxyaquic Cryorthents**
Gelorthents	
Oxyaquic Gelorthents	
D31—Alpine low scrub loamy solifluction lobes	**Sandy or sandy-skeletal, mixed, subgelic Oxyaquic Gelorthents**

Table 23.--Classification of the Soils--Continued

HISTOSOLS	
Fibrists	
Cryofibrists	
Terric Cryofibrists	
D31—Boreal scrub-sedge organic depressions	**Loamy, dysic Terric Cryofibrists**
D31—Boreal scrub organic depressions	**Loamy, mixed, euic Terric Cryofibrists**
D31—Subalpine grass organic swales	**Loamy, mixed, euic Terric Cryofibrists**
D31—Boreal scrub organic depressions	**Loamy, mixed, superactive, euic Terric Cryofibrists**
Hydric Cryofibrists	
D31—Boreal grass organic depressions	**Dysic Hydric Cryofibrists**
D31—Boreal moss organic depressions	**Dysic Hydric Cryofibrists**
D32—Boreal moss organic depressions	**Dysic Hydric Cryofibrists**
INCEPTISOLS	
Cryepts	
Dystrocryepts	
Typic Dystrocryepts	
D31—Subalpine woodland rocky residual slopes	**Loamy-skeletal, mixed, superactive Typic Dystrocryepts**
Calcicryepts	
Ustic Calcicryepts	
D31—Boreal scrub rocky colluvial escarpments	**Loamy-skeletal, mixed, superactive Ustic Calcicryepts**
Haplocryepts	
Ustic Haplocryepts	
D31—Boreal forest rocky colluvial escarpments	**Loamy-skeletal, mixed, superactive Ustic Haplocryepts**
Typic Haplocryepts	
D31—Subalpine woodland rocky colluvial slopes	**Fragmental, mixed Typic Haplocryepts**
D31—Boreal forest rocky colluvial slopes	**Loamy-skeletal, mixed, superactive Typic Haplocryepts**
D31—Boreal forest rocky sedimentary colluvial slopes	**Loamy-skeletal, mixed, superactive Typic Haplocryepts**
D31—Boreal taiga gravelly colluvial slopes	**Loamy-skeletal, mixed, superactive Typic Haplocryepts**
D31—Boreal woodland gravelly residual slopes	**Loamy-skeletal, mixed, superactive Typic Haplocryepts**
D31—Boreal woodland rocky colluvial slopes	**Loamy-skeletal, mixed, superactive Typic Haplocryepts**
D31—Subalpine scrub loamy residual slopes	**Loamy-skeletal, mixed, superactive Typic Haplocryepts**
D31—Subalpine woodland rocky colluvial slopes, cold	**Loamy-skeletal, mixed, superactive Typic Haplocryepts**
D32—Boreal taiga loamy escarpment slopes	**Sandy or sandy-skeletal, mixed Typic Haplocryepts**
Gelepts	
Haplogelepts	
Typic Haplogelepts	
D31—Alpine low scrub gravelly colluvial slopes	**Loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts**
D31—Alpine scrub gravelly circles, acid	**Loamy-skeletal, mixed, superactive, acid, subgelic Typic Haplogelepts**
D31—Alpine scrub gravelly circles	**Loamy-skeletal, mixed, superactive, nonacid, subgelic Typic Haplogelepts**

Table 23.--Classification of the Soils--Continued

MOLLISOLS	
Gelolls	
Haplogelolls	
Typic Haplogelolls	
D31—Alpine scrub silty circles	**Loamy-skeletal, mixed, superactive, calcareous, subgelic Typic Haplogelolls**
GELISOLS	
Histels	
Fibristels	
Terric Fibristels	
D31—Boreal tussock organic plains, frozen	**Loamy, mixed, dysic, subgelic Terric Fibristels**
D31—Alpine low scrub organic hummocks, frozen	**Loamy, mixed, euic, subgelic Terric Fibristels**
D31—Boreal taiga organic eolian slopes, frozen	**Loamy, mixed, euic, subgelic Terric Fibristels**
D31—Boreal taiga/tussock organic terraces, frozen	**Loamy, mixed, euic, subgelic Terric Fibristels**
D32—Boreal taiga organic plains, frozen	**Loamy, mixed, euic, subgelic Terric Fibristels**
Orthels	
Aquorthels	
Fluvaquentic Aquorthels	
D32—Boreal woodland loamy drainages, frozen	**Coarse-loamy, mixed, superactive, acid, subgelic Fluvaquentic Aquorthels**
D31—Boreal forest silty drainages, frozen	**Coarse-loamy, mixed, superactive, nonacid, subgelic Fluvaquentic Aquorthels**
D31—Boreal taiga silty drainages, frozen	**Coarse-loamy, mixed, superactive, nonacid, subgelic Fluvaquentic Aquorthels**
Haplorthels	
Typic Haplorthels	
D31—Boreal forest loamy depressions, frozen	**Coarse-loamy, mixed, superactive, nonacid, subgelic Typic Haplorthels**
D32—Boreal taiga silty eolian slopes, frozen	**Coarse-loamy, mixed, superactive, nonacid, subgelic Typic Haplorthels**
Fluventic Haplorthels	
D31—Boreal taiga silty terraces, frozen	**Coarse-loamy, mixed, superactive, acid, subgelic Fluventic Haplorthels**
D31—Boreal forest loamy high flood plains, frozen	**Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels**
D31—Boreal taiga loamy high flood plains, frozen	**Coarse-loamy, mixed, superactive, nonacid, subgelic Fluventic Haplorthels**

Table 23.--Classification of the Soils--Continued

Folistic Haplorthels	
D31—Boreal taiga silty colluvial slopes, frozen	Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haplorthels
D31—Boreal forest loamy colluvial slopes	Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haplorthels
D32—Boreal forest gravelly escarpments, frozen	Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haplorthels
D31—Boreal forest gravelly colluvial slopes, frozen	Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
D31—Boreal taiga gravelly drainages	Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
D31—Subalpine woodland silty colluvial slopes, frozen	Loamy-skeletal, mixed, superactive, nonacid, subgelic Folistic Haplorthels
Turbels	
Haploturbels	
Folistic Haploturbels	
D31—Boreal taiga silty eolian slopes, frozen	Coarse-loamy, mixed, superactive, acid, subgelic Folistic Haploturbels
D31—Alpine scrub loamy hummocks, frozen	Coarse-loamy, mixed, superactive, nonacid, subgelic Folistic Haploturbels
Histoturbels	
Typic Histoturbels	
D31—Subalpine tussock-scrub loamy colluvial slopes, frozen	Coarse-loamy, mixed, superactive, acid, subgelic Typic Histoturbels
D31—Subalpine scrub loamy colluvial slopes, frozen	Coarse-loamy, mixed, superactive, nonacid, subgelic Typic Histoturbels
D31—Alpine tussock-scrub silty polygons, frozen	Coarse-silty, mixed, superactive, acid, subgelic Typic Histoturbels
D31—Boreal woodland silty eolian slopes, frozen	Loamy-skeletal, mixed, superactive, acid, subgelic Typic Histoturbels

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