USDA Natural Resources
Conservation Service

Ecological site F229XY020AK
Boreal Woodland Loamy Frozen Slopes

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 229X–Interior Alaska Lowlands

The Interior Alaska Lowlands MLRA includes the flood plains and terraces along the upper reaches of the Tanana and Kuskokwim Rivers and the middle reaches of the Yukon River. This area makes up 39,065 square miles. The northern portion of this area that contains the cities of Fairbanks and North Pole are the second most densely populated lands in Alaska. Other towns along the road system include Nenana, Delta Junction, and Tok; and parts of Fort Wainwright and Fort Greely, the two largest military reservations in Alaska. Elsewhere, the area is mostly undeveloped wild land and is sparsely populated. In the western part of the area, the communities of Tanana, Galena, and McGrath are accessible only by air or by river. Parts of the Denali National Park and Preserve and Tetlin National Wildlife Refuge are in this area. The Trans-Alaska Pipeline parallels the Alaska Highway from Delta Junction to Fairbanks.

This area is on broad, nearly level, braided to meandering flood plains, stream terraces, and outwash plains. In many places, shallow basins and undulating stream terraces are dotted with hundreds of small and medium size lakes and interconnecting wetlands. Sloughs, oxbow lakes, and escarpments along river channels are features associated with the flood plains, terraces, and basins. Isolated bedrock-controlled hills and low- to moderate-relief mountains are in scattered places throughout the area. Extended footslopes are common at the base of hills and mountains and along the boundaries with adjoining mountainous MLRAs. Elevation ranges from about 100 feet in the southwestern part of the area, along the lower Yukon River, to about 1,900 feet in the upper Tanana Valley.

Geology and Soils

Although never glaciated, this area is filled with a deep layer of Pleistocene glaciofluvial deposits. Additional fluvial sediments from the Alaska Range and the northern Aleutian Range accumulated along the Tanana and Kuskokwim Rivers during the Holocene Epoch. The Koyukuk and lower Yukon River drainages have undergone several periods of deposition followed by erosion. In some places old terraces are 33 to 250 feet above the flood plain. Quaternary glaciofluvial and fluvial sediments are estimated to be as much as 330 to 660 feet thick throughout the area. Much of the MLRA, particularly along the Tanana and Kuskokwim Rivers, is mantled with a layer of silty micaceous loess originating from the unvegetated flood plains and outwash plains along the Alaska Range. Thick eolian deposits, including loess dunes, sand dunes, and sand sheets, make up about 12 percent of the area. Inclusions of glacial moraines and drift are near the mountains. Unconsolidated sediments bury the bedrock geology, except for structural hills in some places.

This area is in the zone of discontinuous permafrost. Permafrost is close to the surface in lands with finer textured silty sediments on stream terraces, plains, and the more gently sloping footslopes and hills throughout the area. Isolated masses of ground ice occur on terraces and the lower side slopes of hills. Permafrost does not generally occur on floodplains, soils with sandy and gravelly parent material, and in areas near lakes and other water bodies.

The dominant soil orders in this area are Gelisols, Entisols, Inceptisols, and Spodosols. The Gelisols are shallow or moderately deep to permafrost, occur on finer textured sediments, and are poorly drained or very poorly drained. Common Gelisol suborders are Histels, Orthels, and Turbels. The Histels have thick accumulations of surface organic material and occur in depressions and peat plateau. The Orthels and Turbels have comparably thinner surface organic material and occur on drainageways, stream terraces, and outwash plains. The Inceptisols, Spodosols, and Entisols lack permafrost in the soil profile. Two important factors that prevent permafrost aggradation are groundwater connectivity and thick bands of sandy and/or gravelly soil horizons. Entisols most commonly occur on the floodplain with the most common suborder being Fluvents. Inceptisols and Spodosols occurs on streams terraces and slopes of hills and outwash plains. Dry soils on these landforms support soil suborders related to Cryods and Cryepts, while wet soils support Aquepts. Miscellaneous (nonsoil) areas make up about 19 percent of this MLRA. The most common are riverwash and water.

For Gelisols, wildfires disturb the insulating organic material at the soil surface and can change the presence and/or depth of permafrost in the soil profile. These fire related changes to permafrost can also change the depth and presence of perched water tables. Gelisols that burn in this area can change soil taxonomic classification. For instance, depending on fire-severity, Histels may change to Orthels and Orthels may change to Inceptisols. Depending on the frequency and intensity of fires, landform position, and soil texture, the soils may or may not revert back to their original taxonomic classification.

Climate

Short, warm summers and long, very cold winters characterize the continental subarctic climate of the area. The average annual precipitation for this area ranges from 11 to 17 inches. The maximum precipitation occurs in late summer, mainly during thunderstorms. The average annual snowfall ranges from 30 to 80 inches. The average annual temperature for this area ranges from about 23 to 30 degrees Fahrenheit. The freeze-free period averages about 90 to 110 days. The temperature usually remains above freezing from June through early-September.

Vegetation

Much of the soil in this area supports forested communities in some stage of post-fire recovery. Mesic to dry soils in the uplands support mixed forests of black spruce, white spruce, paper birch, and quaking aspen. White spruce and white spruce-balsam poplar forests occur on occasionally to rarely flooded portions of the floodplain-step. Black spruce woodlands occur on stream terraces and other places with wet soils and/or shallow permafrost. On permafrost-affected alluvial flats, tamarack occurs in association with black spruce. Lightning-caused wildfires are common. Many thousands of acres are often burned during a single fire. Following wildfires, willow, shrub birch, and ericaceous shrub scrub invade most previously forested ecological sites until they eventually are replaced by forest vegetation. After fire, resin birch is common on wet and mesic soils and quaking aspen on dry soils. On all forest and woodland ecological sites, post-fire succession leads to a relatively rapid accumulation of organic matter and mosses on the surface. This accumulation results in decreases in soil temperature, biologic activity, and nutrient availability and a gradual decrease in site productivity.

Frequently flooded and continuously ponded soils lack forested communities. Nonforested soils include shrub birch, ericaceous shrub scrub, and tussock tundra in peat areas and in drainageways. Wet sedge meadows, sedge-moss bog meadows, and sedge-grass meadows are along the margins of lakes and on continuously ponded sites such as fens. Low to tall willow and alder scrub are on low flood plains.

Classification relationships

Landfire BPS - 16220 - Western North American Boreal Black Spruce Wet-Mesic Slope Woodland

Ecological site concept

- Occurs on stream terraces and slopes of hills and plains.
- Soils commonly formed in silty loess over silty and sandy alluvium. Mineral soils are capped with 9 to 15 inches of peat.
- Soils do not flood or pond. Soils have a water table at 0 to 10 inches for much of the growing season and are considered poorly drained.

- Soils are considered very deep but have permafrost at moderate depth.
- The reference plant community is needleleaf woodland (Viereck et al. 1992) with black spruce the dominant tree. Commonly observed understory species include marsh Labrador tea, bog blueberry, Bigelow's sedge, Sphagnum, Schreber's big red stem moss, and reindeer lichen. Three plant communities have been identified within the reference state related to fire.

Associated sites

F229XY031AK	**Boreal Forest Loamy Flats and Slopes Moist** Occurs on the same terraces and slopes but in higher and drier positions. Soils are mesic and do not have permafrost. Associated with stands of black spruce.
F229XY032AK	**Boreal Woodland Sandy Slopes** Occurs on the same slopes but in higher positions with dry and gravelly soils. Associated with black spruce woodland that have abundant lichen understories.
F229XY033AK	**Boreal Forest Loamy Slopes** Occurs on the same slopes but in higher and drier positions. Soils are dry and do not have permafrost. Associated with productive stands of black spruce and white spruce.
R229XY010AK	**Boreal Scrub Loamy Frozen Drainageways** Occurs in adjacent drainageways with closed low scrub vegetation and abundant obligate wetland species.
F229XY021AK	**Boreal Peat Terraces and Slopes Complex** Occurs on the same terraces and slopes but in lower positions that pond more frequently and have thicker layers of peat. Associated with black spruce stunted woodlands.

Similar sites

F231XY171AK	**Boreal Woodland Loamy Frozen Terraces** Ecological site 171 is associated with stream terraces with similar soils but occurs to the North in the Interior Alaska Highlands MLRA.
XA232X01Y218	**Boreal Woodland Loamy Frozen Terraces** Ecological site 218 is associated with stream terraces with similar soils but occurs to the North in the Yukon Flats Lowlands MLRA.
F229XY021AK	**Boreal Peat Terraces and Slopes Complex** Both ecological sites 20 and 21 occur on stream terraces and slopes with wet soils underlain by permafrost. Ecological site 21 ponds more frequently, has thicker peat layers, and has less productive stands of black spruce.

Table 1. Dominant plant species

Tree	(1) *Picea mariana*

Shrub	(1) *Ledum palustre ssp. decumbens* (2) *Vaccinium uliginosum*
Herbaceous	(1) *Sphagnum* (2) *Cladina*

Physiographic features

- Occurs on stream terraces, channels on stream terraces, and the slopes of hills and plains. Hill slope profile is long, extended footslopes and toeslopes.
- Not associated with either flooding or ponding.
- Elevation occurs between 100 and 1900 feet.
- Slope is nearly level to gently sloping and occurs on all aspects
- A water table occurs in the soil profile at 0 and 10 inches during extended portions of the growing season.
- Associated with very low to low amounts of runoff to adjacent, downslope ecological sites.

Table 2. Representative physiographic features

Hillslope profile	(1) Footslope (2) Toeslope
Landforms	(1) Alluvial plain > Stream terrace (2) Alluvial plain > Stream terrace > Channel (3) Lowland > Plain (4) Lowland > Hill
Runoff class	Very low to low
Flooding frequency	None
Ponding frequency	None
Elevation	30–579 m
Slope	2–6%
Water table depth	0–25 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	1–10%

Water table depth	0–41 cm

Climatic features

Short, warm summers and long, very cold winters characterize the subarctic continental climate associated with this ecological site. The mean annual temperature for Interior Alaska Lowlands area ranges from 23 to 31 degrees Fahrenheit. The warmest months span May through August with mean temperatures ranging from 60 to 71 degrees Fahrenheit. The coldest months span December through February with mean temperatures ranging from -15 to -10 degrees Fahrenheit. The freeze-free period ranges between 96 and 115 days and typically lasts from late May through early-September.

The average annual precipitation across the Interior Alaska Lowlands area ranges between 11 and 17 inches. July through September are the wettest months with approximately 60 percent of the annual precipitation occurring, and thunderstorms are common. The average annual snowfall ranges from 30 to 80 inches (USDA 2022). The ground is consistently covered with snow from November through March.

Table 4. Representative climatic features

Frost-free period (characteristic range)	68-84 days
Freeze-free period (characteristic range)	96-115 days
Precipitation total (characteristic range)	305-356 mm
Frost-free period (actual range)	56-94 days
Freeze-free period (actual range)	88-120 days
Precipitation total (actual range)	279-432 mm
Frost-free period (average)	75 days
Freeze-free period (average)	105 days
Precipitation total (average)	330 mm

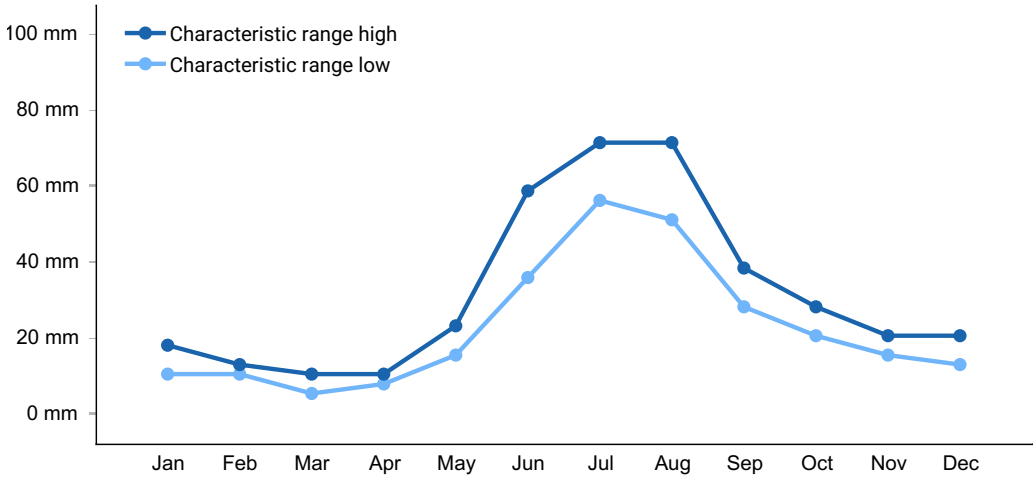


Figure 1. Monthly precipitation range

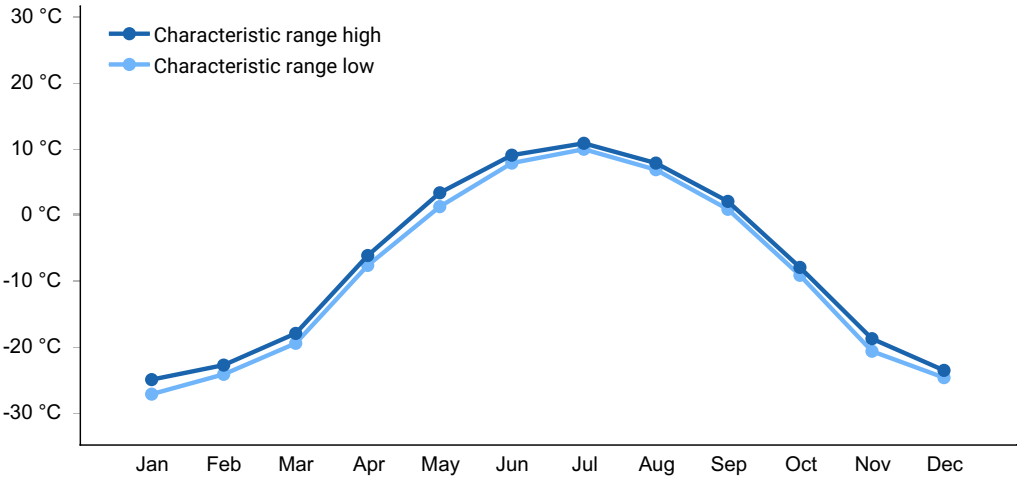


Figure 2. Monthly minimum temperature range

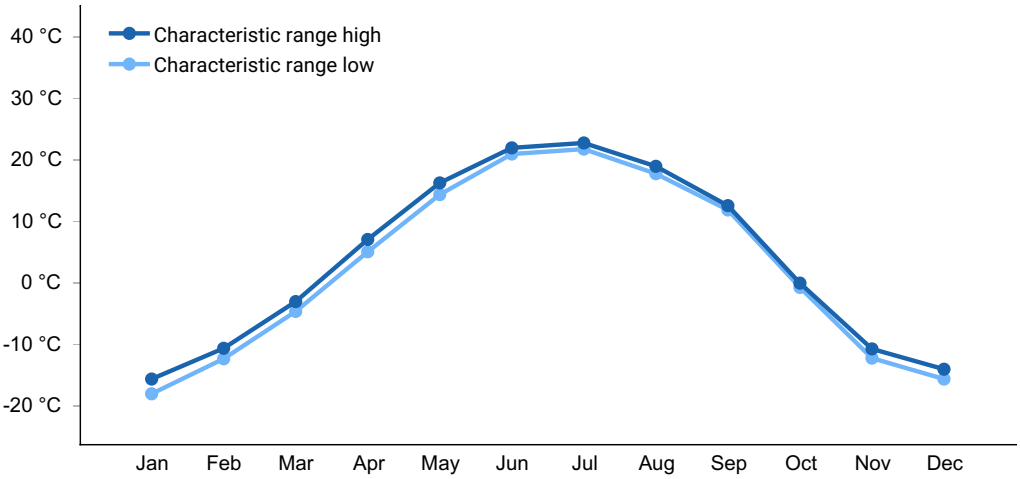


Figure 3. Monthly maximum temperature range

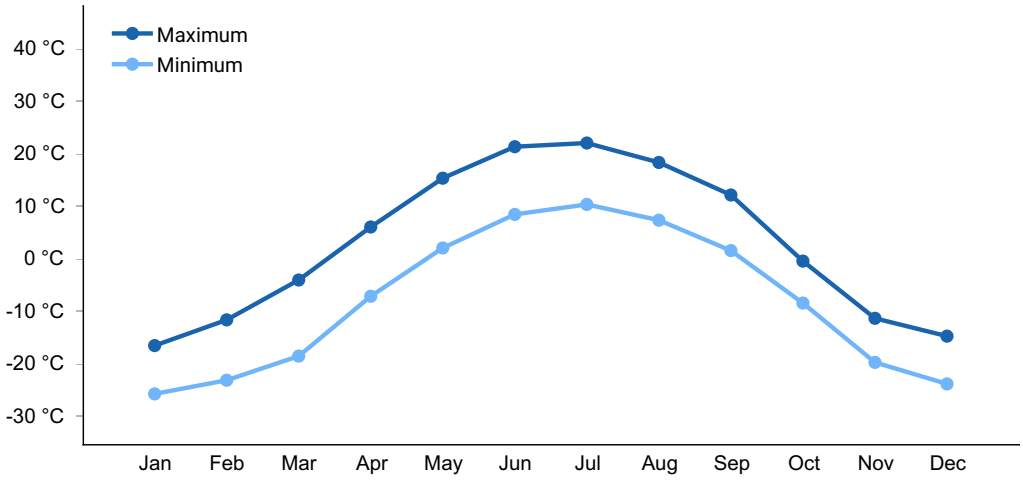


Figure 4. Monthly average minimum and maximum temperature

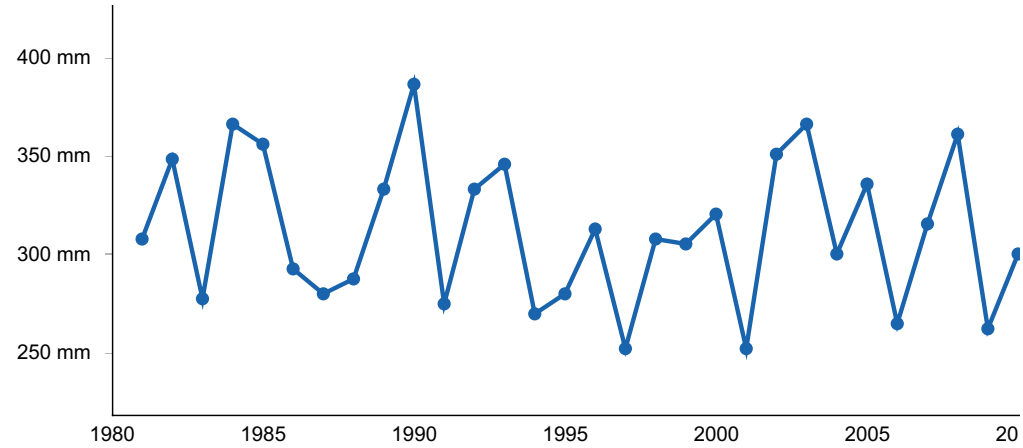


Figure 5. Annual precipitation pattern

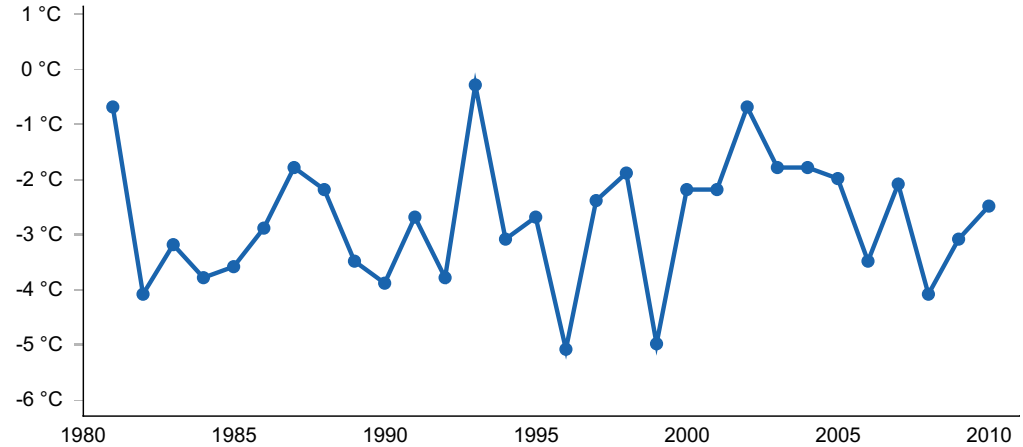


Figure 6. Annual average temperature pattern

Climate stations used

- (1) NENANA MUNI AP [USW00026435], Clear, AK
- (2) FAIRBANKS INTL AP [USW00026411], Fairbanks, AK
- (3) NORTH POLE [USC00506581], North Pole, AK
- (4) EIELSON FLD [USC00502707], Eielson AFB, AK

- (5) SALCHA [USC00508140], Salcha, AK
- (6) BIG DELTA AP [USW00026415], Delta Junction, AK
- (7) GALENA [USC00503212], Nulato, AK
- (8) TANANA CALHOUN MEM AP [USW00026529], Tanana, AK
- (9) MCGRATH AP [USW00026510], Mc Grath, AK
- (10) MINCHUMINA [USW00026512], Lake Minchumina, AK
- (11) KOBE HILL [USC00504971], Healy, AK

Influencing water features

Precipitation and ground water are the main sources of water (Smith et al. 1995).

Depth to the water table may decrease following summer storm events or spring snowmelt and increase during extended dry periods.

Wetland description

This site is classified as a slope wetland under the Hydrogeomorphic (HGM) classification system (Smith et al. 1995; USDA-NRCS 2008).

Soil features

- Soils commonly formed in silty loess over silty and sandy alluvium. On occasion, the soils are primarily alluvium, primarily loess, or the loess layer occurs over outwash.
- Rock fragments do not occur on the soil surface.
- Mineral soils are capped with 9 to 15 inches of peat.
- The surface mineral horizon is commonly a mucky silt loam or silt loam.
- Subsurface rock fragments range between 0 and 10 percent of the soil profile by volume. Gravelly horizons most commonly occur at depth and are associated with outwash or sandy and gravelly alluvium.
- Soils are considered very deep but have permafrost at moderate depths (26 to 35 inches).
- The pH of the soil profile ranges from very strongly acidic to slightly acidic.
- Soils are considered poorly drained.

Table 5. Representative soil features

Parent material	(1) Organic material (2) Loess (3) Alluvium (4) Outwash
Surface texture	(1) Peat

Family particle size	(1) Coarse-loamy (2) Coarse-loamy over sandy or sandy-skeletal (3) Coarse-silty (4) Coarse-silty over sandy or sandy-skeletal
Drainage class	Poorly drained
Permeability class	Moderately rapid
Depth to restrictive layer	66–89 cm
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	16–28.45 cm
Calcium carbonate equivalent (25.4-101.6cm)	0–1%
Clay content (0-50.8cm)	5–12%
Electrical conductivity (25.4-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (25.4-101.6cm)	0–1
Soil reaction (1:1 water) (25.4-101.6cm)	5–6.5
Subsurface fragment volume <=3" (0-152.4cm)	0–5%
Subsurface fragment volume >3" (0-152.4cm)	0–2%

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained to poorly drained
Permeability class	Not specified
Depth to restrictive layer	41–99 cm
Soil depth	Not specified
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	Not specified

Calcium carbonate equivalent (25.4-101.6cm)	Not specified
Clay content (0-50.8cm)	Not specified
Electrical conductivity (25.4-101.6cm)	Not specified
Sodium adsorption ratio (25.4-101.6cm)	0–3
Soil reaction (1:1 water) (25.4-101.6cm)	4–7.6
Subsurface fragment volume <=3" (0-152.4cm)	0–10%
Subsurface fragment volume >3" (0-152.4cm)	0–10%

Ecological dynamics

Fire

In the Interior Alaska Uplands MLRA (herein called area), fire is a common and natural event that has a significant control on the vegetation dynamics across the landscape. A typical fire event in the lands associated with this ecological site will reset plant succession and alter dynamic soil properties (e.g., soil organic matter and depth of permafrost). For this ecological site to progress from the earliest stages of post-fire succession to the oldest stages of succession, data suggest that 70-130 years or more must elapse without another fire event (Johnstone et al. 2010a).

Within this area, wildfire is considered a natural and common event that in many places goes unmanaged. Fire suppression is limited and occurs adjacent to the municipalities spread throughout the area or on allotments with known structures, all of which have a relatively limited acre footprint. Most fires are caused by lightning strikes. From 2000 to 2020, 513 known fire events occurred in this area and the burn perimeter of the fires totaled approximately 12.4 million acres (AICC 2022). Fire-related disturbances are highly patchy and can leave undisturbed areas within the burn perimeter. During this time frame, 73 percent of the fire events were smaller than 20,000 acres but 34 fire events were greater than 100,000 acres in size (AICC 2022). Over this period of 20 years, these burn perimeters cover approximately 50 percent of this area.

The fire regime within Interior Alaska follows two general scenarios—low-severity burns and high-severity burns. It should be noted, however, that the fire regime in Interior Alaska can be considered more complex (Johnstone et al. 2008). Burn severity refers to the proportion of the vegetative canopy and organic material consumed in a fire event (Chapin et al. 2006). Fires in cool and moist habitat tend to result in low-severity burns, while fires

in warm and dry habitat tend to result in high-severity burns. Because the soils have a thick organic cap and are poorly drained, the typical fire scenario for this ecological site is considered to result in a low-severity burn.

While a low-severity fire can consume the bulk of above ground vegetation, minimal proportions of the organic mat are removed. Organic matter continues to insulate these cold soils and permafrost remains in the soil profile. While field observations from similar ecological sites support that each plant community in the reference state is associated with permafrost, fire was thought to increase active layer depth causing the permafrost to occur deeper in the soil profile.

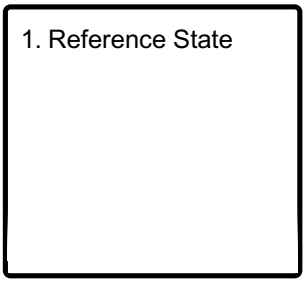
In areas prone to low-severity fire events, the pre-fire vegetative community generally reestablishes quickly and there is minimal long-term alteration to community composition (Johnstone et al. 2010; Bernhardt et al. 2011). When minimal proportions of the organic mat are consumed, many species regenerate asexually using below ground root systems and rhizomes. Species known to regenerate after low-severity fire events include various graminoids (e.g., Carex spp. and Eriophorum spp.), forbs (e.g., Equisetum sp.), and shrubs (e.g., *Ledum groenlandicum*, *Vaccinium uliginosum*, Salix sp.) (Johnstone et al. 2010). Black spruce is the Interior Alaska tree species best adapted to a low-severity fire regime. Black spruce have semi-serotenous cones and a low-severity fire often results in a flush of black spruce seedlings at the burned location.

The later stages of succession have an overstory that is a mix of broadleaf and immature needleleaf trees (community 1.2) or mature needleleaf trees (community 1.1). The recruitment of trees species during the early stages of post-fire succession largely controls the composition of the stand of trees in the later stages of post-fire succession (Johnstone et al. 2010a). During these later stages of succession, the slower growing black spruce seedlings mature and eventually replace the shade-intolerant broadleaf tree species. The typical fire return interval for black spruce stands in the boreal forest is 70-130 years (Johnstone et al. 2010a).

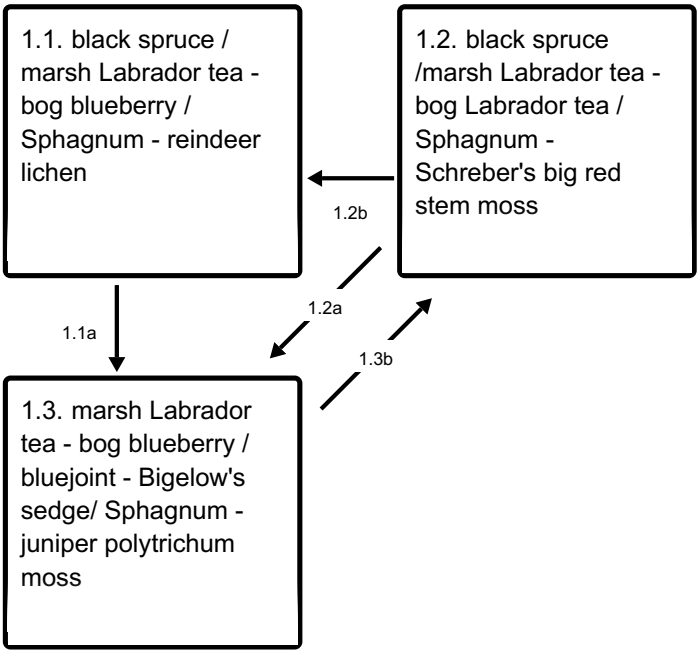
Lands in Interior Alaska are burning more frequently than in the past, which may result in alternative states of succession. The historic fire return interval for black spruce stands in Interior Alaska occurs approximately once per century. Due to global climate change, stands of spruce in certain portions of the Alaskan boreal forest are burning more frequently than these historic averages (Kelly et al. 2013). Increases to burn frequency favors forested stands dominated by quick growing deciduous trees. A major reason being that increased fire frequency decreases the presence and abundance of mature, cone-bearing trees. Less mature trees result in less spruce seedlings post-fire and an overall decreased abundance of spruce in the developing forest canopy. Increased burn frequency in the boreal forest may result in alternative pathways of post-fire succession with stands of deciduous trees persisting for longer than normal durations of time (Johnstone et al. 2010b).

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1a - A low-severity fire sweeps through and incinerates much of the above ground vegetation

1.2b - Occurs 40 to 70 years after wildfire

1.2a - A low-severity fire sweeps through and incinerates much of the above ground vegetation

1.3b - Occurs 10 to 20 years after wildfire

State 1
Reference State

The reference plant community is needleleaf woodland (Viereck et al. 1992) with the dominant tree being black spruce. There are three plant communities within the reference state related to fire. The vegetation modeled for this site has limited data and is considered provisional.

Dominant plant species

- black spruce (*Picea mariana*), tree
- bog blueberry (*Vaccinium uliginosum*), shrub
- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- Bigelow's sedge (*Carex bigelowii*), grass

- sphagnum (*Sphagnum*), other herbaceous
- reindeer lichen (*Cladina*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- cloudberry (*Rubus chamaemorus*), other herbaceous

Community 1.1
black spruce / marsh Labrador tea - bog blueberry / Sphagnum - reindeer lichen

Figure 7. Typical plant community associated with community 1.1. Photo is from Denali National Park and Preserve.

Figure 8. Typical plant community associated with community 1.1. Photo is from Denali National Park and Preserve.

The reference plant community is characterized as needleleaf woodland (Viereck et al. 1992) with black spruce as the dominant tree. Black spruce tree cover is split between the stunted tree (greater than 50 years of age and less than 15 feet) and medium tree strata (between 15 and 40 feet). Live deciduous trees, primarily resin birch, occasionally occur in the tree canopy but with limited cover. Common understory species include marsh Labrador tea, bog blueberry, scrub birch (B. glandulosa), lingonberry, Bigelow's sedge, cloudberry, Sphagnum, Schreber's big red stem moss, and various reindeer lichen. The soil surface is primarily covered with moss and lichen.

Dominant plant species

- black spruce (*Picea mariana*), tree
- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- resin birch (*Betula glandulosa*), shrub

- bog Labrador tea (*Ledum groenlandicum*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- Bigelow's sedge (*Carex bigelowii*), grass
- sphagnum (*Sphagnum*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- cloudberry (*Rubus chamaemorus*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- greygreen reindeer lichen (*Cladina rangiferina*), other herbaceous
- reindeer lichen (*Cladina mitis*), other herbaceous

Community 1.2
black spruce /marsh Labrador tea - bog Labrador tea / Sphagnum - Schreber's big red stem moss

Community 1.2. is in the late stage of fire-induced secondary succession for this ecological site. It is characterized as needleleaf woodland (Viereck et al. 1992). Black spruce saplings are abundant and tree cover primarily occurs in regenerative tree stratum. Deciduous tree seedlings and saplings, primarily resin birch, occasionally occur but with limited cover. Common understory species include marsh Labrador tea, bog blueberry, Bigelow's sedge, bluejoint, Sphagnum, and Schreber's big red stem moss. The soil surface is primarily covered with herbaceous litter and mosses.

Dominant plant species

- black spruce (*Picea mariana*), tree
- resin birch (*Betula neoalaskana*), tree
- resin birch (*Betula glandulosa*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- Bigelow's sedge (*Carex bigelowii*), grass
- sphagnum (*Sphagnum*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- juniper polytrichum moss (*Polytrichum juniperinum*), other herbaceous

Community 1.3
marsh Labrador tea - bog blueberry / bluejoint - Bigelow's sedge/ Sphagnum - juniper polytrichum moss

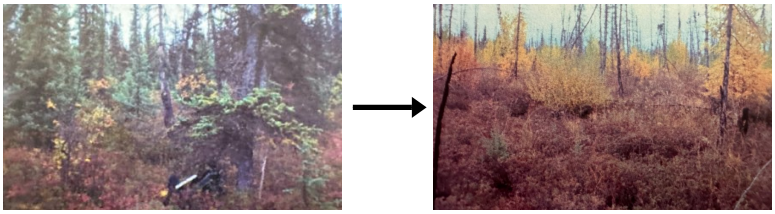
Figure 9. Typical plant community associated with community 1.3. Photo is from Denali National Park and Preserve.

Community 1.3 is in the early stage of fire-induced secondary succession for this ecological site. This community is characterized as closed low scrub (Viereck et al. 1992). Seedlings of black spruce and resin birch are commonly observed but have limited cover. Common species include marsh Labrador tea, bog blueberry, resin birch (B. glandulosa), bluejoint, Bigelow's sedge, fireweed, various Sphagnum, and juniper polytrichum moss.

Dominant plant species

- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- resin birch (*Betula glandulosa*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- Bigelow's sedge (*Carex bigelowii*), grass
- sphagnum (*Sphagnum*), other herbaceous
- juniper polytrichum moss (*Polytrichum juniperinum*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- ceratodon moss (*Ceratodon purpureus*), other herbaceous
- fireweed (*Chamerion angustifolium*), other herbaceous

Pathway 1.1a
Community 1.1 to 1.3



black spruce / marsh Labrador tea - bog blueberry / Sphagnum - reindeer lichen

marsh Labrador tea - bog blueberry / bluejoint - Bigelow's sedge/ Sphagnum - juniper polytrichum moss

A fire sweeps through and incinerates much of the above ground vegetation. Because of the associated cold and wet soils, this site commonly experiences low-severity fires. Minimal proportions of the organic mat are typically removed. The pre-fire vegetation generally reestablishes quickly from below ground root systems and rhizomes.

Pathway 1.2b
Community 1.2 to 1.1

Community pathway 1.2b is thought to occur 40 to 70 years after fire. Black spruce seedlings and saplings mature into a needleleaf woodland. Shrubs, moss, and lichen all recover to similar relative dominance before the fire.

Pathway 1.2a
Community 1.2 to 1.3

A fire sweeps through and incinerates much of the above ground vegetation. Because of the associated cold and wet soils, this site commonly experiences low-severity fires. Minimal proportions of the organic mat are typically removed. The pre-fire vegetation generally reestablishes quickly from below ground root systems and rhizomes.

Pathway 1.3b
Community 1.3 to 1.2

Community pathway 1.3b is thought to occur 10 to 20 years after fire (Landfire 2009). Black spruce seedlings and sapling start to become a characteristic component of the plant community. Plants that colonized or that had big increases in canopy cover after the disturbance like resin birch, fireweed, and bluejoint are largely replaced by pre-fire dominant plants.

Additional community tables

Animal community

not available

Hydrological functions

not available

Recreational uses

not available

Wood products

not available

Other products

not available

Other information

not available

Inventory data references

The vegetation modeled for this site has limited data and is considered provisional. The associated model was largely developed from NRCS staff with working knowledge of the area and literature review.

Plant species are largely based on the soil survey of Denali National Park Area, Alaska (Clark and Duffy 2006).

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Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be

known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	03/11/2025
Approved by	Blaine Spellman
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

3. **Number and height of erosional pedestals or terracettes:**

   _____

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

   _____

5. **Number of gullies and erosion associated with gullies:**

   _____

6. **Extent of wind scoured, blowouts and/or depositional areas:**

   _____

7. **Amount of litter movement (describe size and distance expected to travel):**

   _____

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species**

which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

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17. **Perennial plant reproductive capability:**
