

Ecological site F229XY021AK

Boreal Peat Terraces and Slopes Complex

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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 – 16211 - Western North American Boreal Black Spruce Dwarf-tree Peatland – Boreal Complex (Landfire 2009)

Ecological site concept

- Occurs on stream terraces, nearly level to gentle slopes of hills and plains, thermokarst depressions, and peat plateau. Thermokarst depressions and peat plateau represent alternate states within this ecological site complex. - Soils formed in organic material over silty loess and/or silty alluvium. Soils are commonly cryoturbated. Reference state soils are capped with 9 to 20 inches of peat and mucky peat. - Reference state soils pond frequently for long durations of time and have a water table at 0 to 10 inches for much of the growing season. These soils are considered very poorly drained. - Reference state soils are considered very deep but have permafrost at moderate depth. - The reference plant community is dwarf tree scrub woodland (Viereck et al. 1992) with black spruce the dominant tree. Commonly observed understory species include marsh Labrador tea, northland cottongrass, and Sphagnum. Three plant communities have been identified within the reference state related to fire. The thermokarst depressions support wet sedge meadows while the peat plateau support dwarf tree scrub woodlands with significantly less sedge cover and more lichen cover.

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.
F229XY020AK	Boreal Woodland Loamy Frozen Slopes Occurs on the same terraces and slopes but in higher positions that pond less frequently and have thinner layers of peat. Associated with black spruce woodlands.
R229XY010AK	Boreal Scrub Loamy Frozen Drainageways Occurs in adjacent drainageways with closed low scrub vegetation and abundant obligate wetland species.

Similar sites

XA232X01Y201	Boreal Woodland Peat Frozen Terraces Ecological site 201 is associated with stream terraces with similar soils, disturbance regimes, and vegetation. This ecological site occurs to the North in the Yukon Flats Lowlands MLRA.
F229XY020AK	Boreal Woodland Loamy Frozen Slopes Both ecological sites 20 and 21 occur on stream terraces and slopes with wet soils underlain by permafrost. Ecological site 20 ponds less frequently, has thinner peat layers, and has more productive stands of black spruce.
F231XY169AK	Boreal Woodland Peat Frozen Flats Ecological site 169 is associated with stream terraces with similar soils, disturbance regimes, and vegetation. This ecological site occurs to the North in the Interior Alaska Highlands MLRA.

Table 1. Dominant plant species

Tree	(1) <i>Picea mariana</i>
Shrub	(1) <i>Ledum palustre ssp. decumbens</i> (2) <i>Betula nana</i>
Herbaceous	(1) <i>Eriophorum brachyantherum</i> (2) <i>Sphagnum</i>

Physiographic features

- Occurs on stream terraces, slopes of hills and plains, and peat plateau on plains. This site is occasionally associated with thermokarst depressions on both stream terraces and plains and palsa on plains. Turf hummocks are common periglacial microfeatures that are small mounds consisting of vegetation and organic matter.
- The reference state and alternate states do not flood.
- Elevation occurs between 100 and 1900 feet.

Reference State

- Slope is nearly level to gently sloping and occurs on all aspects.
- Ponding occurs frequently for long durations of time. Ponding depth is two to eight inches above the soil surface. A water occurs in the soil profile at 0 to 10 inches during extended portions of the growing season.
- Associated with negligible to very low amounts of runoff to adjacent, downslope ecological sites.

Thermokarst State

- This state covers the soils and vegetation associated with thermokarst depressions.
- Slope is nearly level and occurs on all aspects.
- Ponding occurs frequently for very long durations of time. Ponding depth is two to eight inches above the soil surface. A water occurs at the soil surface throughout the growing season.
- Associated with negligible amounts of runoff to adjacent, downslope ecological sites.

Peat Plateau State

- This state covers the soils and vegetation associated with both palsa and peat plateau.
- The tops of peat plateau are nearly level but the edges range between gently sloping to moderately steep (0 to 20 percent slope). Associated with all slope aspects.
- These landform features are significantly raised above the surround landscape and soils do not pond. A water table occurs in the soil profile at 20 to 60 inches during extended portions of the growing season.
- Associated with negligible to very low amounts of runoff to adjacent, downslope ecological sites.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Stream terrace (2) Alluvial plain > Stream terrace > Turf hummock (3) Alluvial plain > Thermokarst depression (4) Lowland > Plain (5) Lowland > Plain > Palsa (6) Lowland > Plain > Turf hummock (7) Lowland > Peat plateau (8) Lowland > Hill (9) Lowland > Thermokarst depression
Runoff class	Negligible to very low
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	30 – 580 m
Slope	0 %
Ponding depth	10 – 20 cm
Water table depth	0 – 30 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	None to rare
Ponding duration	Very long (more than 30 days)

Ponding frequency	None to frequent
Elevation	Not specified
Slope	0 – 20 %
Ponding depth	Not specified
Water table depth	0 – 150 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)	70-80 days
Freeze-free period (characteristic range)	100-120 days
Precipitation total (characteristic range)	310-360 mm
Frost-free period (actual range)	60-90 days
Freeze-free period (actual range)	90-120 days
Precipitation total (actual range)	280-430 mm
Frost-free period (average)	80 days
Freeze-free period (average)	110 days
Precipitation total (average)	330 mm

- (1) GALENA [USC00503212], Nulato, AK
- (2) TANANA CALHOUN MEM AP [USW00026529], Tanana, AK
- (3) MCGRATH AP [USW00026510], Mc Grath, AK
- (4) MINCHUMINA [USW00026512], Lake Minchumina, AK
- (5) KOBE HILL [USC00504971], Healy, AK
- (6) NENANA MUNI AP [USW00026435], Clear, AK
- (7) FAIRBANKS INTL AP [USW00026411], Fairbanks, AK
- (8) NORTH POLE [USC00506581], North Pole, AK
- (9) EIELSON FLD [USC00502707], Eielson AFB, AK
- (10) SALCHA [USC00508140], Salcha, AK
- (11) BIG DELTA AP [USW00026415], Delta Junction, AK

Influencing water features

Precipitation is the main sources of water. Water loss is by saturation, overland flow, and seepage to underlying ground 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 ecological site is classified as an organic soil flats wetland under the hydrogeomorphic (HGM) classification system (Smith et al. 1995; USDA-NRCS 2008).

Soil features

- Soils formed in organic material over silty loess and/or silty alluvium. Soils are commonly cryoturbated.
- Rock fragments do not occur on the soil surface.
- Subsurface rock fragments do not typically occur in the soil profile.
- The pH of the soil profile ranges from extremely acidic to moderately acidic.

Reference State

- Soils are capped with 9 to 20 inches of peat and mucky peat.
- Soils are considered very deep but have permafrost at moderate depth (20 to 36 inches).
- Soils are considered very poorly drained.
- Soil taxonomic order is Gelisols with the most common suborders being Turbels and Histels.

Thermokarst State

- Soils are capped with 25 to 60 inches or more peat.
- Soils are considered very deep without restrictions like permafrost.
- Soils are considered very poorly drained.
- Soil taxonomic order is Histosols with the most common suborders being Fibrists and Saprists.

Peat Plateau State

- Soils are commonly capped with 60 or more inches of peat and mucky peat.
- Soils are considered very deep but have permafrost at shallow to moderate depths (15 to 24 inches).
- Soils range from poorly to well drained.
- Soil taxonomic order is Gelisols with the most common suborders being Histels that have glacic horizons.

Table 5. Representative soil features

Parent material	(1) Organic material (2) Loess (3) Alluvium (4) Cryoturbate
Surface texture	(1) Mucky peat (2) Peat

Family particle size	(1) Coarse-silty (2) Coarse-loamy
Drainage class	Very poorly drained
Permeability class	Moderately rapid
Depth to restrictive layer	50 – 90 cm
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	18.29 – 28.96 cm
Calcium carbonate equivalent (25.4-101.6cm)	Not specified
Clay content (0-50.8cm)	0 – 10 %
Electrical conductivity (25.4-101.6cm)	Not specified
Sodium adsorption ratio (25.4-101.6cm)	Not specified
Soil reaction (1:1 water) (25.4-101.6cm)	4.2 – 5.6
Subsurface fragment volume <=3" (0-152.4cm)	Not specified

Subsurface fragment volume >3" (0-152.4cm)	Not specified
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Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained to well drained
Permeability class	Moderately rapid to rapid
Depth to restrictive layer	40 – 90 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
Soil reaction (1:1 water) (25.4-101.6cm)	Not specified

Subsurface fragment volume <=3" (0-152.4cm)	0 – 20 %
Subsurface fragment volume >3" (0-152.4cm)	0 – 10 %

Ecological dynamics

Ecological Site Complex

Each state in the state-and-transition model represents a unique ecological site that was combined into a complex. When compared to the reference state, the thermokarst and peat plateau states have unique and wide-ranging differences in soil and site properties that result in different kinds and amounts of vegetation. Soils and vegetation interaction with the formation and deterioration of ice-rich permafrost, creates vegetation shifts across a landform. The significant shifts in vegetation occur in a patchwork and is best illustrated by an ecological site complex.

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 to 100 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 is generally thought to be much 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 very poorly to poorly drained, the typical fire scenario for this ecological site is considered to result in a low severity burn.

Reference State Soil and Vegetation Dynamics

The low-severity fire regime associated with this ecological site has modest impacts to soil organic matter thickness, depth of permafrost, and soil drainage. While a low-severity fire can consume the bulk of above ground vegetation, minimal proportions of the organic mat are typically removed. Organic matter continues to insulate these cold soils. Field data from similar ecological sites support that each plant community has permafrost and that the associated low-severity fire event had a negligible impact on the depth of permafrost. If permafrost remains at similar depths after a fire event, then soil drainage is unlikely to improve post-fire.

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-serotinous cones and a low-severity fire often results in a flush of black spruce seedlings at the burned location.

The latter 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 associated with this site may be burning more frequently than in the past, which may result in alternative pathways 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).

Thermokarst State

Thermokarst occurs due to the thaw of ice-rich permafrost in soil after disturbances such as fire events or land clearing. Thermokarst depressions are common landforms associated with this ecological site. When compared to reference state soils, thermokarst depressions have comparatively wetter soils that pond for longer durations of time and typically lack permafrost in the soil profile.

Peat Plateau State

Palsa and peat plateau develop from the soils associated with the reference state (personnel observations of NRCS staff). A palsa is a much smaller landform feature compared to a peat plateau. A palsa is an elliptical dome-like permafrost mound containing alternating layers of ice lenses and peat or mineral soil, commonly 10 to 30 feet in height and 6 to 80 feet long (Schoeneberger and Wysocki 2017). A peat plateau is a generally flat-topped expanse of peat, elevated above the general surface of a peatland, and containing segregated ice that may or may not extend downward into the underlying mineral soil (Schoeneberger and Wysocki 2017). These landforms can raise significantly above the water table and their peaty soils can become well drained. If these landforms raise high enough above the water table, soil temperature increases, ice-lens melt, and these landforms eventually collapse.

State and transition model

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 1.2 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height M	Canopy Cover (%)	Diameter Cm	Basal Area (square M/hectare)
Tree							
black spruce	PIMA	<i>Picea mariana</i>	Native	–	15-35	–	–

Table 10. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 2.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height M	Canopy Cover (%)	Diameter Cm	Basal Area (square M/hectare)
Tree							
black spruce	PIMA	<i>Picea mariana</i>	Native	–	0-4	–	–
white spruce	PIGL	<i>Picea glauca</i>	Native	–	0-2	–	–

Table 13. Community 2.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (m)	Canopy Cover (%)
Grass/grass-like (Graminoids)					

water sedge	CAAQ	<i>Carex aquatilis</i>	Native	0.6-1.2	8-65
Forb/Herb					
purple marshlocks	COPA28	<i>Comarum palustre</i>	Native	0.1-0.6	0-15
Shrub/Subshrub					
sweetgale	MYGA	<i>Myrica gale</i>	Native	0.2-0.9	0-60
marsh Labrador tea	LEPAD	<i>Ledum palustre ssp. decumbens</i>	Native	0.2-0.9	0-50
leatherleaf	CHCA2	<i>Chamaedaphne calyculata</i>	Native	0.2-0.9	0.1-25
bog rosemary	ANPO	<i>Andromeda polifolia</i>	Native	0-0.1	0-8
tealeaf willow	SAPU15	<i>Salix pulchra</i>	Native	0.9-1.5	0-8
small cranberry	VAOX	<i>Vaccinium oxycoccos</i>	Native	0-0.1	0-8
bog blueberry	VAUL	<i>Vaccinium uliginosum</i>	Native	0.2-0.9	0-6
dwarf birch	BENA	<i>Betula nana</i>	Native	0.2-0.9	0-3
Nonvascular					
sphagnum	SPHAG2	<i>Sphagnum</i>	Native	0-0.1	0-85

Table 14. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 15. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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 similar ecological sites in northern MLRA and a soil survey of Denali National Park Area, Alaska (Clark and Duffy 2006).

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Approval

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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	09/13/2026
Approved by	
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:

17. Perennial plant reproductive capability:
