USDA Natural Resources Conservation Service

Ecological site R242XY403AK
Arctic scrub frozen drainageways and mounds 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): 242X–Northern Seward Peninsula-Selawik Lowlands

The Northern Seward Peninsula-Selawik Lowlands (MLRA 242X) includes the mosaic of coastal lowlands, river deltas, gently sloping uplands, and isolated hills and low mountains along the northern Seward Peninsula and in the lower Selawik Basin at the head of Kotzebue Sound. To the east, the area extends to the lower slopes of the Purcell Mountains, Zane Hills, and Sheklukshuk Range. MLRA 242X makes up 8,445 square miles. Lakes, ponds, and saturated soils occur throughout most of this area. The MLRA is mostly undeveloped wildland and is sparsely populated. It is in the zone of continuous permafrost.

Land ownership:
MLRA 242X encompasses the northernmost portion of the Bering Land Bridge National Preserve, the westernmost portion of Cape Krusenstern National Monument, and the majority of the Selawik National Wildlife Refuge.

The Bering Land Bridge National Preserve is located on the Seward Peninsula. The preserve is one of the most remote protected areas in the United States. The preserve is used by native Alaskans for subsistence hunting and is home to several archaeological sites. The preserve is around 2.6 million acres.

The Cape Krusenstern National Monument is located in northwestern Alaska, bordering the Chukchi Sea. Beach ridges within the monument safeguard evidence of 5,000 years of occupation by the Inupiat people, and more than 9,000 years of human occupation (NPS 2025). The Inupiat people maintain subsistence camps within the monument to this day. The monument is around 650,000 acres in size.

The Selawik National Wildlife Refuge is locating in the Waring Mountains of northwestern Alaska, and comprises a transitional zone marking the opening of boreal forests into Arctic tundra (USFWS 2025). Selawik Refuge is an important migratory and wintering habitat for the Western Arctic Caribou Herd, one of four herds found across Arctic Alaska. The refuge is around 2.1 million acres, with 240,000 of that set aside as federally designated wilderness.

The majority of MLRA 242X is private lands or those managed by the USFWS, NPS, BLM, and State of Alaska. The USFWS manages 1,604,744 acres, around 36 percent of the MLRA. The National Park Service manages 1,350,544 acres, around 30 percent of the MLRA. The BLM manages 606,464 acres, around 14 percent of the MLRA. The State of Alaska has a patent on 55,675 acres of the MLRA, around 1 percent of the MLRA. Much of the MLRA is within Alaska Native allotments or patents around 832,328 acres, or 19 percent of the MLRA.

Climate:
The arctic climate of MLRA 242X is characterized by brief, cool summers and long, very cold winters. The average annual precipitation ranges from 11 to 12 inches. Average annual snowfall ranges from about 40 to 100 inches. The average annual temperature ranges from 18 to 25 degrees Fahrenheit. The average freeze-free period is between 98 to 104 days.

Geology:
The western part of this MLRA was unglaciated during the Pleistocene Epoch. Most of the eastern part was covered by glacial ice originating in the Waring Mountains and Brooks Range to the north. Sediments across the vast majority of the area consist of fine textured, Holocene and Pleistocene deltaic and fluvial deposits on coastal lowlands, Holocene fluvial deposits on flood plains and stream terraces, and mixed colluvium and slope alluvium on mountain footslopes. The underlying bedrock geology consists primarily of stratified sedimentary rocks and volcanic rocks of Cretaceous, Tertiary, and Quaternary age.

Soils:
The dominant soil orders in this MLRA are Gelisols, with Histosols and Entisols covering a comparatively minor extent in coastal or estuarine zones. These Gelisols are shallow or moderately deep to permafrost and are typically poorly to very poorly drained. Miscellaneous (nonsoil) areas make up about 25 percent of this MLRA. The most common are water and beaches.

Gelisols are soils that have permafrost within 100 cm of the soil surface and/or have gelic materials within 100 cm of the soil surface and have permafrost within 200 cm. Gelic materials are mineral or organic soil materials that have evidence of cryoturbation (frost churning) and/or ice segregation in the active layer (seasonal thaw layer) and/or the upper part of the permafrost (NRCS 2024). The common suborders of Gelisols within this MLRA are Turbels, Histels, and Orthels.

The Histels have thick accumulations of surface organic material and are associated with high-center polygons. The Orthels and Turbels have comparably thinner surface organic material and occur on high floodplains, stream terraces, low-center polygons, and the slopes of hills and plains. Turbels show signs of cryoturbation while Orthels do not.

Histosols have a high content of organic matter and no permafrost. Most are saturated year-round, but a few are freely drained. The most common suborder of Histosols in this MLRA are Fibrists. Fibrists are wet, slightly decomposed Histosols. Most of the soils support natural vegetation of widely spaced small trees, shrubs, forbs, and grasses and grass-like plants (NRCS 2025).

Entisols are soils that show little or no evidence of pedogenic horizon development and in this MLRA are associated with recently deposited sediments. The most common suborder of Entisols in this MLRA are Aquents, which are widely distributed throughout this MLRA. They are common in low lying estuarine areas bordering the Chukchi Sea and Kotzebue Sound.

Fire Dynamics and Succession:
Reported fire history in this MLRA spans 1957 to 2021. During this time period, there were 67 recorded fires. The mean fire size was approximately twelve thousand acres. The largest fire was the 1977 AUGUS fire, burning 235,584 acres (AICC 2025). The number of fires that burn in tundra systems are limited by ignitions, prevalence of atmospheric moisture, and fuel moisture content or fuel availability. Fires in the tundra happen less often than in boreal systems (NPS 2024). Fires can be sporadic and widely distributed. The fire return intervals vary widely in tundra systems, from 30 years to over 1,000 years. In the past, fires have burned more frequently on the Seward Peninsula and in the Noatak Valley than in other tundra regions. This is due to slightly warmer and drier conditions and higher amounts of plants and shrubs above ground such as tussock cottongrass (NPS 2024).

There are over 143 million acres of arctic and subarctic tundra in Alaska, most of which is designated in a limited fire management option. A limited fire management option is one of four fire management options outlined in the Alaska Interagency Wildland Fire Management Plan (AICC 2024). A ‘limited’ approach is the most hands-off management option, meaning the fire will be left to behave naturally and fill its natural ecological role (AICC 2024).
Arctic tundra areas are experiencing warmer temperatures and an increase in fire activity over the past twenty years. Climate model forecasts show more warming in the future, particularly in the high northern areas. This could affect the length of the growing season, how well plants and shrubs grow, and rain and snowfall. A longer and more robust growing season could likely impact trends regarding number and intensity of fires in the arctic tundra.

Vegetation dynamics:
Uplands are not common in this MLRA but where present they generally support dwarf scrub dominated by tussock tundra. On shallow, rocky soils and exposed sites, lichens and scattered herbs dominate the ground layer. Bare soil and bedrock generally are extensive. On mesic sites, halophytic sedges and grasses dominate. Depressions, drainageways, and other saturated areas support wet sedge meadows and wet sedge-moss meadows. The vegetation on flood plains consists of a mixture of wet sedge meadows and of tall scrub dominated by various willows and shrub birch.

Vascular and non-vascular plant succession dynamics vary in post-fire environments. Data collected in the footprint of the abnormally severe Anaktuvuk River fire shows that four years after the burn, above-ground net primary productivity of vascular plants was equal in burned and unburned areas, though total live biomass was less (Bret-Harte et al 2013). Graminoid biomass had recovered to unburned levels, but shrubs had not. Most of the vascular plant biomass had resprouted from surviving underground parts. Much greater changes were observed in the biomass and composition of the non-vascular plant community (Bret-Harte et al 2013). Lichen biomass appears to take decades to centuries to recover from the disturbances of fires, particularly under a warming climate (Racine et al 2004).

Tussock cottongrass is the primary tussock forming plant species in arctic tundra. Tussock cottongrass burns easily yet is very hardy. It grows quickly and is very productive, forming a tussock made of fine dead fuels from the previous year. These fine fuels burn quickly and easily. Tundra fires are usually wind driven and move rapidly, burning through years of accumulated tussock grass thatch. The tussock growth protects the cottongrass roots and plant tissues from fire. These plants and shrubs recover and grow vigorously after fire, benefitting from nutrients and warmer soils after a fire (NPS 2024).

Fire impacts soil composition and structure (Li et al 2021). Fires will often partially or completely consume the organic material layer, depending on the severity of the fire. Fire can also impact permafrost. On average, forest fires reduce the permafrost extent by up to 9 to 16 percent and accelerate permafrost thaw by five years. The effects of wildfire on permafrost are much larger in forested areas than in tundra, bogs, and fens (Li et al 2021).

Classification relationships

Landfire Biophysical Settings –
7216980 – Alaska Arctic Wet Sedge Meadow (Landfire, 2009)

Viereck Communities:
Wet sedge meadow tundra – III.A.3.a. (Viereck et al., 1992)
Shrub birch-ericaceous shrub bog – II.C.2.d. (Viereck et al., 1992)

Ecological site concept

- Arctic climate
- Associated landforms are peat mounds and drainageways on plains
- Soils are derived from organic material and silty eolian deposits
- Soils are considered well drained on mounds to poorly drained on surrounding tundra
- Soils have permafrost at moderate depths
- The reference plant community is described as a wet sedge meadow tundra (Viereck et al., 1992) with the dominant plants being water sedge, tussock cottongrass, Alaska bog willow, dwarf birch, lingonberry, and cloudberry.

Associated sites

R242XY404AK	**Arctic gravelly silty moist acidic tundra** Ecological site complex 404 occurs on plains as well as hills and slopes adjacent to ecological site 403 and supports tussock forming vegetation.

Similar sites

R242XY405AK	**Arctic scrub loamy floodplain** Ecological site 405 is found on low flood plains and produces similar kinds of vegetation to ecological site 403.
R242XY401AK	**Arctic silty polygon complex** Ecological site 401 is a polygonal ground complex that produces a mosaic of tussock tundra and wet sedge meadow tundra. Ecological site 403 produces vegetation that can be described as a wet sedge meadow tundra as well.
R242XY101AK	**Arctic silty shore complex** Ecological site 101 is a complex of tidally influenced ecological sites. One of the plant communities within ecological site 101 is a tidal marsh that produces vegetation characterized as a halophytic sedge meadow, similar to the sedge meadow found in ecological site 403.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix fuscescens* (2) *Salix pulchra*
Herbaceous	(1) *Carex aquatilis* (2) *Eriophorum angustifolium*

Physiographic features

This ecological site complex is associated with drainageways, swales, and peat mounds. Elevation ranges between 10 and 750 feet. This ecological site occurs on all aspects, showing no preference for north-facing or south-facing aspects.

Reference State
Please list the slope, ponding, flooding, water table here for the drainageways.
Associated swales and drainageways are nearly level. The reference state ponds frequently for long durations, and floods frequently for long durations. There is a water table present at the soil surface on associated drainageways, and from 10 to 20 inches below the soil surface on associated swales on plains.

Peat Mound State
Associated plains are nearly level to gently sloping. There is no ponding or flooding associated with peat mounds. There is a water table present 39 to 60 inches below the soil surface.

Table 2. Representative physiographic features

Landforms	(1) Plains > Plain (2) Drainageway (3) Plains > Plain > Mound (4) Plains > Plain > Swale
Runoff class	Medium
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	3–229 m
Slope	0–4%
Water table depth	0–152 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding duration	Not specified
Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	0–8%
Water table depth	Not specified

Climatic features

Sea ice strongly influences the climate of MLRA 242X. A protective barrier of sea ice has typically formed along the Chukchi coast and Kotzebue sound by early November and often lasting until April. The Kotzebue sound and Chukchi sea moderate diurnal and monthly temperatures resulting in a maritime climate. Summer temperatures (June through August) are relatively stable with mean maximum monthly temperatures ranging between 50 to 58 degrees Fahrenheit. As sea ice forms on the coastline, temperatures decrease significantly with the area shifting to a continental climate. The coldest months (January through March) have mean monthly temperatures ranging from 4 to 7 degrees Fahrenheit. The coverage and formation of sea ice has been decreasing due to rising atmospheric temperatures (USDA Climate Hub, 2025).

The Northern Seward Peninsula-Selawik Lowlands have summers that are short and cool and winters that are long and cold. Strong winds are common throughout the year. Mean annual air temperatures typically range from 18 to 25 degrees Fahrenheit. The warmest months are June, July, and August. During these summer months, the typical freeze free period for the area ranges from 103 to 99 days. The coldest months are January, February, and March.

This area is semi-arid with mean annual precipitation typically around 12 inches. The warmest months have overcast skies with frequent fog and precipitation while the coldest months have clear skies. The three wettest months are July, August, and September where the area may receive half of its total annual precipitation.

Table 4. Representative climatic features

Frost-free period (characteristic range)	59-75 days
Freeze-free period (characteristic range)	99-103 days
Precipitation total (characteristic range)	279-305 mm
Frost-free period (actual range)	54-80 days
Freeze-free period (actual range)	98-104 days
Precipitation total (actual range)	279-305 mm
Frost-free period (average)	67 days
Freeze-free period (average)	101 days
Precipitation total (average)	305 mm

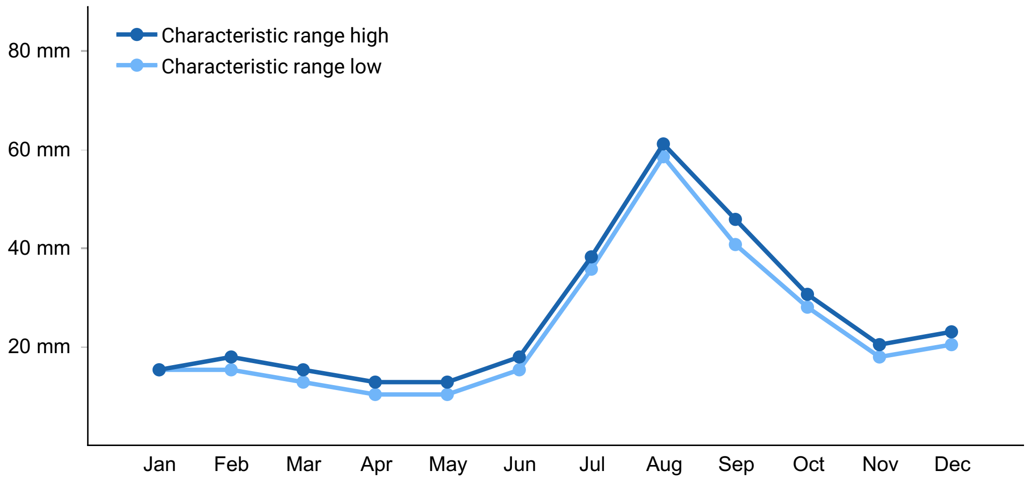


Figure 1. Monthly precipitation range

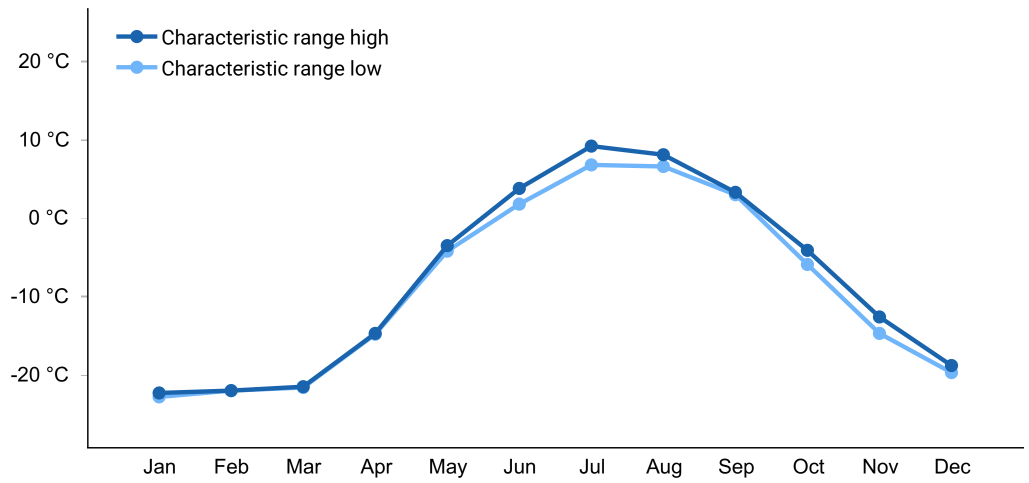


Figure 2. Monthly minimum temperature range

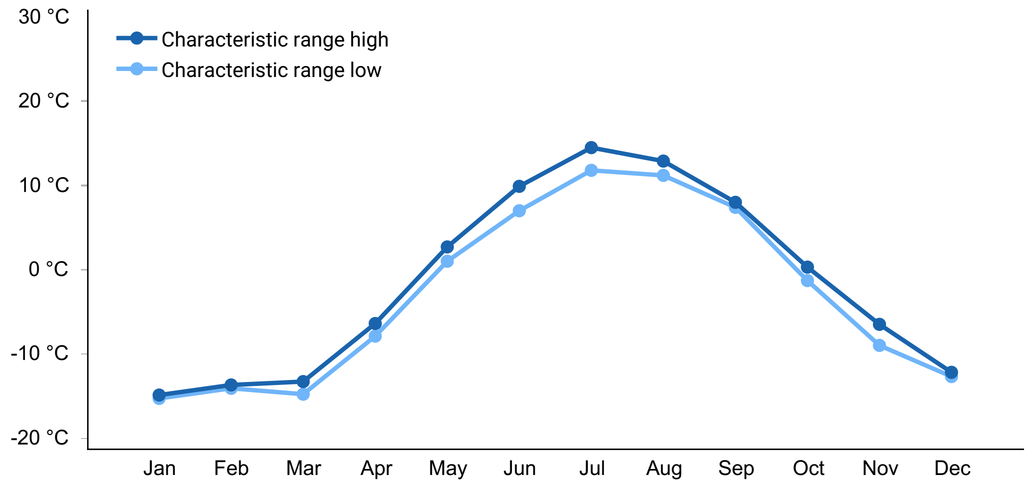


Figure 3. Monthly maximum temperature range

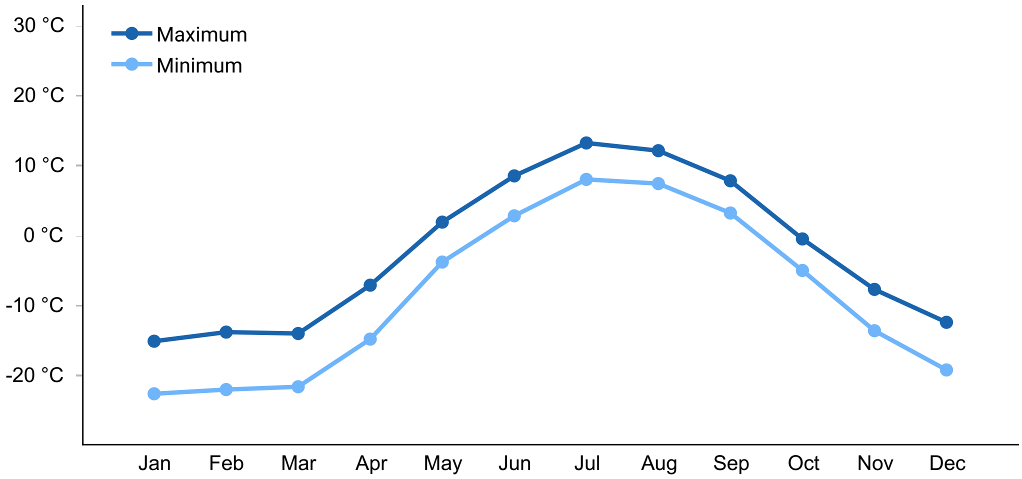


Figure 4. Monthly average minimum and maximum temperature

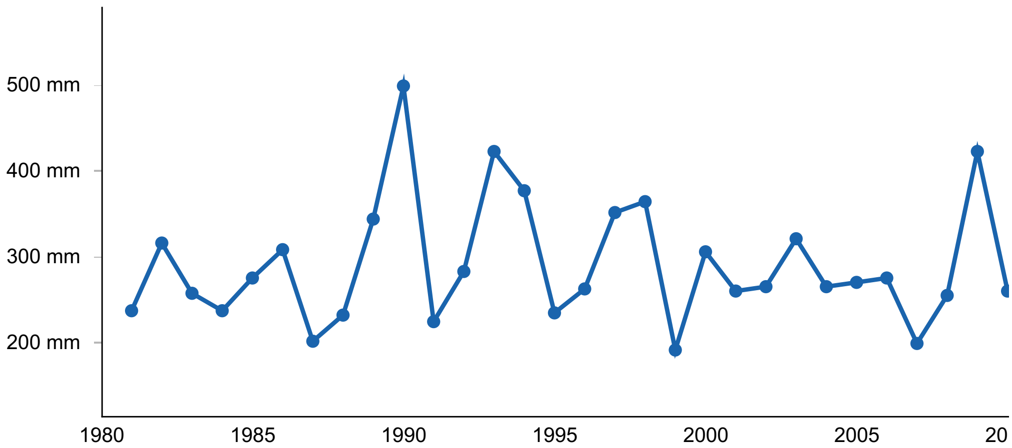


Figure 5. Annual precipitation pattern

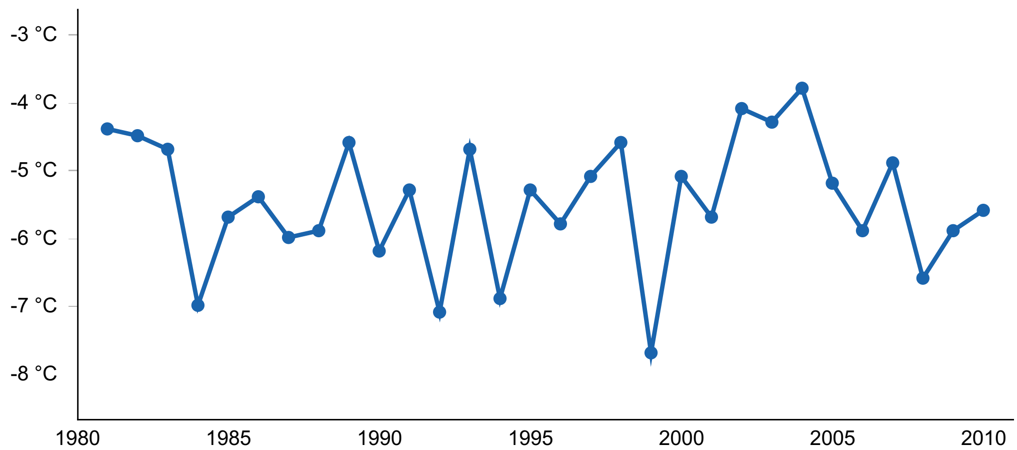


Figure 6. Annual average temperature pattern

Climate stations used

- (1) WALES [USW00026618], Wales, AK
- (2) KOTZEBUE RALPH WEIN AP [USW00026616], Kotzebue, AK

Influencing water features

The peat mounds within this ecological site complex are not considered a wetland, the troughs are considered a depressional wetland. Dominant water sources are precipitation, ground water discharge, and both interflow and overland flow from adjacent uplands.

Wetland description

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

Soil features

• Soils formed in organic material and loess
• Rock fragments do not occur on the soil surface.
• The pH of the soil profile ranges from strongly acidic to very strongly acidic.

Reference State
• The surface mineral horizon is frozen conglomeration of humified organic matter and weather rock and unconsolidated material. This horizon is 35 inches thick.
• The organic horizon is comprised of slightly decomposed materials and is 25 inches thick.
• These are wet soils that are considered very poorly drained.
• Permafrost is a restriction that occurs 33 to 47 inches below the soil surface.

Peat Mound State
• The surface mineral horizon is a frozen accumulation of humified organic matter closely mixed with mineral fractions. This horizon is 28 inches thick.
• Organic horizon is comprised of moderately decomposed organics and is 26 inches thick.
• These are wet soils that are considered well drained
• Permafrost is a restriction that occurs 17 to 31 inches below the soil surface.

Table 5. Representative soil features

Parent material	(1) Organic material (2) Loess
Surface texture	(1) Mucky (2) Peat
Family particle size	(1) Loamy
Drainage class	Very poorly drained to well drained
Permeability class	Moderately rapid
Depth to restrictive layer	84–119 cm

Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	24.38–49.28 cm
Calcium carbonate equivalent (0-25.4cm)	0–1%
Clay content (0-50.8cm)	0–15%
Electrical conductivity (25.4-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-25.4cm)	0
Subsurface fragment volume <=3" (0-152.4cm)	0%
Subsurface fragment volume >3" (0-152.4cm)	0%

Table 6. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Not specified
Depth to restrictive layer	43–119 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 (0-25.4cm)	Not specified
Clay content (0-50.8cm)	Not specified
Electrical conductivity (25.4-101.6cm)	Not specified
Sodium adsorption ratio (0-25.4cm)	Not specified
Subsurface fragment volume <=3" (0-152.4cm)	Not specified

Subsurface fragment volume >3" (0-152.4cm)	Not specified

Ecological dynamics

The Northern Seward Peninsula-Selawik Lowlands MLRA has a harsh climate and cold soils and occurs in the zone of continuous permafrost. This MLRA occurs in the arctic biome and has a growing season that is both short and cold. As a result, the vertical and horizontal structure of vegetation is severely limited. Vegetation within the arctic biome is typically restricted to dwarf shrubs, mosses, and lichens.

Ecological 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 peat mound state has 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.

Ungulate History and Use
Rangifera arcticus arcticus or barren ground caribou have been present in western Alaska for at least the past 11,000 years (ADFG 2014). Barren ground caribou are the most numerous large herbivore in Alaska, and represent North America’s longest-range migratory large mammal (Rickbeil et al., 2015). Barren ground caribou herds undergo rapid, large fluctuations in herd abundance. High herd densities can significantly impact vegetation production through continuous grazing and trampling (Rickbeil et al., 2015). Browsing on similar peat mounds in neighboring MLRA 239X, caused lichen pounds per acre to decrease from 5000 pounds per acre down to 500 pounds per acre or less. Continuous grazing of slow growing fruticose lichen can lead to changes in lichen species composition (Swanson and Barker, 1992) and can lead to increases in shrub and bryophyte cover (Kautz et al., 1992).

The northern and eastern sections of this MLRA comprise large portions of the Western Arctic Caribou Herd’s (WACH) migratory range, notably the Cape Krusenstern National Monument. Every spring and fall, the WACH passes through the monument on their trek between their summer and winter grounds (NPS 2025).

Peat Mounds State
Peat mound morphology and life history is complex and varied and can be read about in greater detail in the following journal articles Seppälä (1986) and Seppälä (2011).

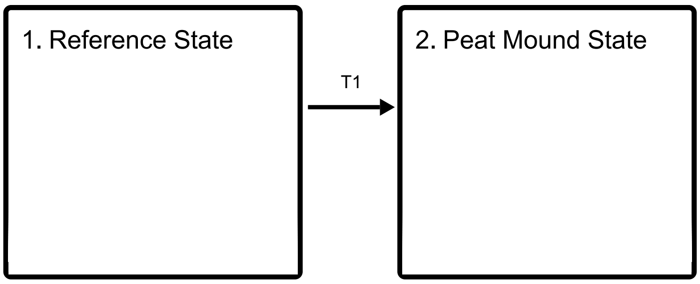
Mound formation in this MLRA relies upon thick accumulations of peat, cold temperatures, and free water from the surrounding tundra. Mound formation starts in areas of the tundra where there are significant differences in the thickness of peat, which may result from

Sphagnum moss colonization of sedge meadows (Pielou, 1995). In this MLRA, the associated drainageways have 10 inches of peat while the mounds have 30 inches or more peat. This thick layer of peat is saturated during the fall as soils start to freeze. Saturated peat has high thermal conductivity, which allows for the soils to freeze deeper than the surrounding tundra during the long, cold Arctic winters. The peat at the soil surface thaws and partially dries out during the short summer months. This dry peat layer has low thermal conductivity and insulates a frozen core of soil. Because of the differences in thermal conductivity, areas with thicker peat have permafrost closer to the soil surface. Much like a sponge, peat also has high capillarity that can readily draw water up the soil profile. During the fall as soils start to refreeze, the peat layer draws water from the surrounding saturated tundra and the soils form segregated ice lenses.

The mounds are slowly lifted out of the surrounding tundra due to the combination of frost heave, continued building of segregated ice lenses, and the inherent buoyancy of the icy, frozen peat core (Seppala, 1986). These peat mounds can reach significant heights. Peat mounds on Nunivak Island were commonly measured at 12 feet (Swanson et al., 1986). Soil drainage improves and the vegetation shifts from wet sedge meadow tundra to ericaceous shrub bog with abundant lichen. If these landforms raise high enough above the water table, soil temperature increases, ice-lens melt, and these landforms can collapse.

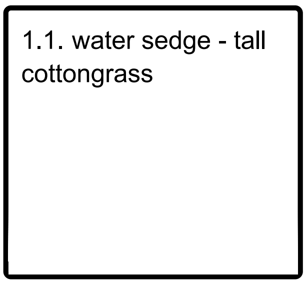
State and transition model

Ecosystem states

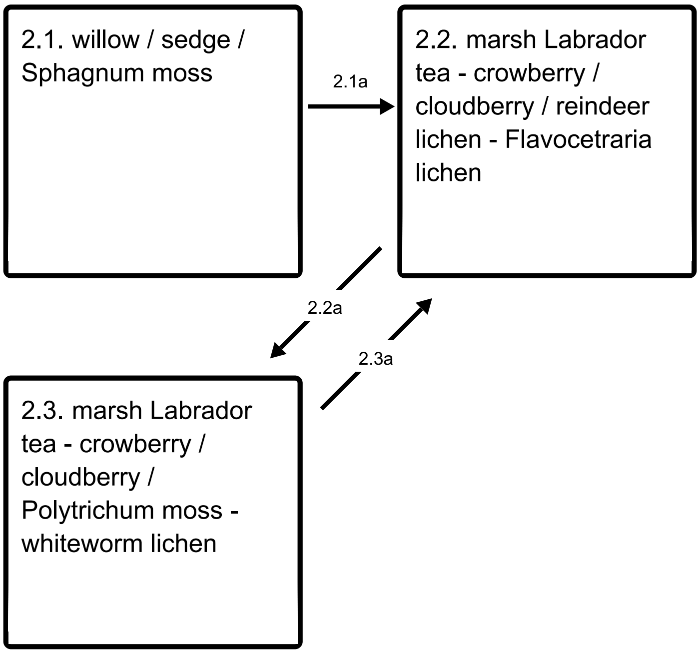


T1 - A peat mound or palsa raises up from the surrounding wet sedge meadow

State 1 submodel, plant communities



State 2 submodel, plant communities



2.1a - Peat mounds or palsa raise from the wet sedge meadow tundra

2.2a - Continuous grazing by reindeer and/or muskox

2.3a - Time without continuous grazing by reindeer and/or muskox

State 1
Reference State

There is one plant community within the reference state. Grazing is the main form of disturbance. The reference plant community supports vegetation that can be characterized as a wet sedge meadow (Viereck et al 1994). All plant communities associated with this ecological site have limited data, so the state-and-transition model is provisional.

Dominant plant species

- sedge (*Carex*), grass
- cottongrass (*Eriophorum*), grass

Community 1.1
water sedge - tall cottongrass

Community 1.1 is the natural vegetation for this state. It is characterized as wet sedge meadow (Viereck et al., 1992) with dominant species being water sedge (*Carex aquatilis*), tall cottongrass (*Eriophorum angustifolium*), and white cottongrass (*Eriophorum scheuchzeri*).

Dominant plant species

- water sedge (*Carex aquatilis*), other herbaceous
- tall cottongrass (*Eriophorum angustifolium*), other herbaceous

- white cottongrass (*Eriophorum scheuchzeri*), other herbaceous

State 2
Peat Mound State

Peat mounds develop from the surrounding wet sedge meadows associated with the reference state. A peat mound is an elliptical dome-like permafrost mound containing alternating layers of ice lenses and peat or mineral soil, which are typically less than 10 feet in height. The edges of these raised features are strongly sloping. Peat mounds can raise significantly above the water table and soil drainage can improve. If these landforms raise high enough above the water table, soil temperature increases, and eventually ice-lens melt. As soils thaw and ice melts, these peat mounds eventually collapse (Seppälä 1986; Pielou 1995). After collapse, the soils are thought to revert to thermokarst state conditions. Three plant communities occur within the peat mound state and the vegetation differs in large part due to the degree of ungulate use.

Dominant plant species

- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- reindeer lichen (*Cladina*), shrub
- cloudberry (*Rubus chamaemorus*), shrub

Community 2.1
willow / sedge / Sphagnum moss

Community 2.1 occurs directly adjacent to the peat mound. This community is characterized as wet sedge meadow tundra (Viereck et al. 1992) dominated by water sedge (*Carex aquatilis*). Additional common plants include Alaska bog willow (*Salix fuscescens*), cottongrass (Eriophorum spp.), and Sphagnum moss. The vegetative strata that characterize this community are low shrubs (between 8- and 36-inches), medium graminoids (between 4- and 24-inches height) and moss.

Dominant plant species

- Alaska bog willow (*Salix fuscescens*), shrub
- sedge (*Carex*), grass
- cottongrass (*Eriophorum*), grass
- sphagnum (*Sphagnum*), grass

Community 2.2
marsh Labrador tea - crowberry / cloudberry / reindeer lichen - Flavocetraria lichen

This is the potential natural vegetation on peat mounds and palsa for this state. This community is characterized as ericaceous shrub bog (Viereck et al. 1992). Common and abundant plants include marsh Labrador tea (*Ledum palustre* ssp. decumbens), crowberry (*Empetrum nigrum*), dwarf birch (*Betula nana*), Alaska bog willow (*Salix fuscescens*), bog blueberry (*Vaccinium uliginosum*), lingonberry (*Vaccinium vitis-idaea*), cloudberry (*Rubus chamaemorus*), Sphagnum moss, Flavocetraria lichen, various reindeer lichen (Cladina spp.), Cetraria lichen, and white worm lichen (Thamnolia spp.).

Dominant plant species

- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- dwarf birch (*Betula nana*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- reindeer lichen (*Cladina*), other herbaceous
- cup lichen (*Cladonia*), other herbaceous
- sphagnum (*Sphagnum*), other herbaceous

Community 2.3
marsh Labrador tea - crowberry / cloudberry / Polytrichum moss - whiteworm lichen

Community 2.3 has been continuously grazed. Cover of crowberry (Empetrium nigrums), marsh Labrador tea (*Ledum palustre* ssp. decumbens), dwarf birch (*Betula nana*), Polytrichum moss, and less preferred lichen species increase, while cover of willow and preferred lichen species decrease significantly. The less preferred lichen includes globe ball lichen (*Sphaerophorus globosus*), white worm lichen (Thamnolia spp.), cup lichen (Cladonia spp.), witch's hair lichen (*Alectoria sarmentosa*), and crustose lichens.

Dominant plant species

- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- dicranum moss (*Dicranum*), other herbaceous
- polytrichum moss (*Polytrichum*), other herbaceous
- reindeer lichen (*Cladina*), other herbaceous
- cloudberry (*Rubus chamaemorus*), other herbaceous
- whiteworm lichen (*Thamnolia*), other herbaceous

Pathway 2.1a
Community 2.1 to 2.2

Peat mounds or palsa raise from the wet sedge meadow tundra. Soil drainage improves and vegetation shifts to ericaceous shrub bog.

Pathway 2.2a

Community 2.2 to 2.3

Continuous grazing by reindeer and/or muskox. Continuous grazing reduces the cover and abundance of desirable forage lichen and increases the cover and abundance of dwarf shrubs, forbs, and less desirable forage lichen.

Pathway 2.3a
Community 2.3 to 2.2

Time without continuous grazing by reindeer and/or muskox. The cover and abundance of desirable forage lichen increases, competing and reducing the cover of dwarf shrubs, forbs, and less desirable forage lichen.

Transition T1
State 1 to 2

A peat mound or palsa raises up from the surrounding wet sedge meadow. This raised feature is large enough to result in a mosaic of vegetation.

Additional community tables

Animal community

Mammals common to the area include brown bear, caribou, moose, musk ox, black bear, wolf, red fox, a variety of other furbearers, and rodents. Many species of migratory waterfowl and shore birds' nest in the ponds and wetlands. Raptors include gyrfalcon, peregrine falcon, golden eagle, hawks, and owls. Arctic char and Arctic grayling are in most of the rivers. Lake trout and northern pike are common in many lakes.

Hydrological functions

n/a

Recreational uses

Local residents use this remote area primarily for subsistence hunting, fishing, and gathering. Hunting and other kinds of wildland recreation are increasingly important. Most visitors are served by air taxi, guiding, and outfitting companies operating out of the major Alaska communities. Most of the communities are along the major rivers or lakes or on the coast.

Wood products

n/a

Other products

n/a

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.

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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	01/22/2026
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):**

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

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

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

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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:

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

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

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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:**