USDA Natural Resources Conservation Service

Ecological site R230XY633AK
Subalpine Scrub Loamy Slopes

Last updated: 6/11/2025
Accessed: 12/19/2025

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): 230X–Yukon-Kuskokwim Highlands

The Yukon-Kuskokwim Highlands (MLRA 230X) include the most western parts of Interior Alaska (Land Resource Region X2) and have a continental climate. MLRA 230X is approximately 42,300 square miles spread across mountain, hills, and valleys. Flood plain systems are common. The watershed drains into the Bering Sea to the west and Bristol Bay to the southwest. Major rivers include the Yukon, Innoko, Kuskokwim, Mulchatna, and Nushagak Rivers. This sparsely populated area is mostly undeveloped wildland. Residents use this remote area primarily for subsistence hunting, fishing, and gathering. Villages are primarily located along rivers along the MLRA 230X boundary and include Greyling, Nulato, and Koyukuk. Federally managed lands in the MLRA include parts of Innoko, Nowitna, and Koyukuk National Wildlife Refuges.

Geology and Soils

The Yukon-Kuskokwim Highlands MLRA was mostly unglaciated during the Pleistocene. Glaciers were limited to the Lime Hills in the southeast. Glacial moraines and drift are evident in areas of past glacial activity. Unglaciated upland areas are covered with colluvium and slope alluvium originating from bedrock. Loess deposits cover gentle sloping hills and footslopes of mountains near major rivers. Bedrock material is primarily sedimentary rocks with intrusive volcanic rock (USDA, 2022).

This MLRA is in the zone of discontinuous permafrost. Permafrost is most common in finely textured soils on terraces, gently sloping hills, and cold mountain footslopes. It is typically absent from flood plains and mountain backslopes. Across the MLRA, permafrost presence decreases as proximity to the Yukon-Kuskokwim delta increases.

The dominant soil orders are Gelisols, Entisols, Inceptisols, and Spodosols. Gelisols support shallow to deep permafrost and often have a perched water table for at least part of the growing season. Inceptisols, Spodosols, and Entisols lack permafrost. Two important factors that prevent permafrost aggradation are groundwater connectivity and thick bands of sandy and/or gravelly soil horizons. Inceptisols have minimal development and are common on alpine scrublands and high flood plains. Entisols are common on mountain backslopes and scoured flood plains. Spodosols support a spodic soil horizon and are common in the acidic soils underlying spruce forests and ericaceous shrublands. Non-soil areas such as rock outcrops, rubble lands and beaches make up approximately ten percent of the MLRA surface.

Climate

The Yukon-Kuskokwim Highlands MLRA has short, warm summers and cold, long winters. Mean annual precipitation is 10 to 15 inches at low elevations and increases to 20 to 40 inches at higher elevations (USDA, 2022). Annual snowfall is between 80 and 100 inches. Mean annual temperatures ranges from 25 to 32 degrees F (SNAP, 2014a; SNAP, 2014b).

Vegetation

Vegetation is mainly influenced by site and soil characteristics such as temperature-degree days, exposure, soil depth, and soil hydrology. Dwarf scrublands are prevalent on shallow soils on convex slopes and in the alpine. Mesic, lowland slopes are a mix of forests and shrublands of alder, willow, and ericaceous shrubs. Cold slopes generally support black spruce, while warm slopes support white spruce. Valley bottoms and steep slopes support a deciduous forest. Tussock tundra is associated with wet soils underlain by shallow permafrost and is ubiquitous across the lower footslopes of mountains and the coastal plain (USDA, 2022).

Fire

Fire is a major disturbance across the Yukon-Kuskokwim Highlands. Low severity fires destroy the canopy but leave the organic mat and rootstock mostly undisturbed. The vegetative community progresses directly back to a forest. Severe forest fires are stand replacement events. Post-first communities typically pass through an herbaceous meadow community before ericaceous shrubs, birch, and willows colonize. Drier soils may support a deciduous aspen or birch forest, while moist soils support cottonwoods and spruce. 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.

LRU notes

MLRA 230X contains three life zones defined by the physiological limits of plant communities along an elevational gradient. The boreal life zone is the elevational band where forest communities dominate. Non-forested areas in the boreal life zone are often hydrologically driven, and are either too wet (i.e., bogs) or too dry (i.e., river bluffs) to support forest communities. Subalpine and alpine vegetation dominates at higher elevations. The subalpine zone is a transitional band between the boreal and the alpine life zones, and is characterized by sparse, stunted trees. Shrub height can be over four feet. Trees are absent from the alpine, and all shrubs are dwarf or prostrate. In general, the boreal life zone occurs below 1,200 feet; the subalpine life zone occurs between 1,200 and 1,600 feet; and the alpine life zone occurs above 1,600 feet.

Within each life zone, there are plant assemblages associated with cold and warm slopes. Slope temperature is a factor of slope steepness, aspect, and shading from surrounding ridges and mountains. Warm slopes occur on southeast to west aspects that are moderate to very steep and are not shaded by the surrounding landscape. Cold slopes occur on northwest to east facing slopes, occur in shaded slope positions, or occur in low-lying areas that are cold air sinks. Examples of shaded positions include head slopes, low relief backslopes of hills, and the base of hills and mountains shaded by adjacent mountain peaks. Warm boreal slopes have a cryic soil temperature regime and lack permafrost. White spruce forests are an indicator of warm boreal slopes. Cold boreal slope soils have a gelic soil temperature regime and commonly have permafrost. In this area, black spruce forests and woodlands are an indicator of cold boreal slopes.

Classification relationships

Alaska Vegetation Classification:
Open low shrub (II.C.2 - level III) / Open low mesic shrub birch-ericaceous shrub (II.C.2.c - level IV)
(Viereck et al., 1992)

Circumboreal Vegetation Map – Alaska-Yukon Region:
Yukon Subalpine Spruce Woodlands and Scrub
(Jorgensen and Meidinger, 2015)

BioPhysical Settings:
7316101 - Boreal mesic scrub birch-willow
(Landfire, 2009)

Ecological site concept

Ecological Site characteristics:
• Occurs in the subalpine on strongly sloping to very steep hill and mountain slopes
• Soils are typically very deep without restrictions. On occasions, soils contact bedrock at

moderately deep to deep depths.
• Soils do not pond or flood. These well drained soils do not have a growing season water table
• Slope shape is linear to convex, shedding precipitation to concave positions
• The reference plant community is a birch-ericaceous shrubland with abundant graminoid cover. Krummholz white spruce and black spruce may be present. Fire is the major disturbance and is responsible for one post-disturbance community.

Associated sites

F230XY612AK	**Boreal Forest Loamy Slopes** F230XY612AK describes the boreal white spruce forest on well drained soils. They are downslope of the subalpine. The boreal forest becomes patchy in the subalpine.
R230XY630AK	**Alpine Dwarf Scrub Gravelly Slopes** R230XY630AK describes the alpine Dryas dwarf scrub community. It is upslope of the subalpine and supports a shorter, much less productive shrubland.
R230XY632AK	**Subalpine Tall Scrub Gravelly Moist Slopes** R230XY632AK describes moderately well drained soils with a willow and alder shrubland in the subalpine. Differences in soil moisture drive vegetative differences.

Similar sites

R230XY630AK	**Alpine Dwarf Scrub Gravelly Slopes** R230XY630AK describes the Dryas dwarf scrubland in the alpine. There is overlap in community composition between these ecological sites. However, the subalpine community supports a taller, more productive shrubland.
R230XY632AK	**Subalpine Tall Scrub Gravelly Moist Slopes** Both ecological sites describe subalpine scrublands. The depth and presence of a water table drive vegetative differences.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Vaccinium uliginosum* (2) *Ledum palustre ssp. decumbens*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Carex*

Physiographic features

• Occurs on mountain and hill slopes in the subalpine life zone.
• Elevation typically ranges from 1,200 to 1,600 feet above sea level but can be found

outside this range as temperature and soil conditions allow.
• Slopes are generally convex to linear across, and water run-in is lower than on concave slopes.
• Slope gradients are strongly sloped to very steep (5 to 60 percent), and this ecological site occurs on all aspects.
• Flooding and ponding do not occur and there is no water table present in the soil profile.

Table 2. Representative physiographic features

Slope shape across	(1) Linear (2) Convex
Slope shape up-down	(1) Linear (2) Convex
Hillslope profile	(1) Backslope (2) Shoulder
Landforms	(1) Mountains > Mountain (2) Hills > Hill
Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None
Elevation	1,200–1,600 ft
Slope	5–60%
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	500–2,000 ft
Slope	Not specified

Climatic features

The Yukon-Kuskokwim Highlands MLRA has short, warm summers and long, cold winters. Mean annual temperature ranges from 25 to 32 degrees Fahrenheit, with temperatures typically below freezing from October through April. June through August are the warmest months of the year and constitute the heart of the growing season. Approximately 60 percent of total annual precipitation occurs from June through September (PRISM, 2018; SNAP, 2014a). Across the MLRA, snowfall ranges from 80 to 100 inches (USDA, 2022).

Table 4. Representative climatic features

Frost-free period (characteristic range)	60-76 days
Freeze-free period (characteristic range)	52-68 days
Precipitation total (characteristic range)	13-20 in
Frost-free period (actual range)	48-88 days
Freeze-free period (actual range)	40-80 days
Precipitation total (actual range)	10-40 in
Frost-free period (average)	64 days
Freeze-free period (average)	56 days
Precipitation total (average)	15 in

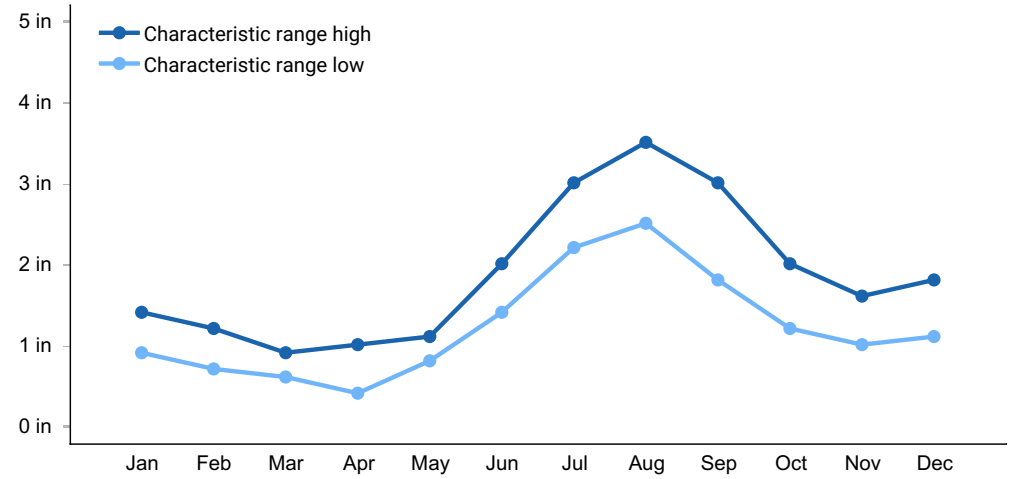


Figure 1. Monthly precipitation range

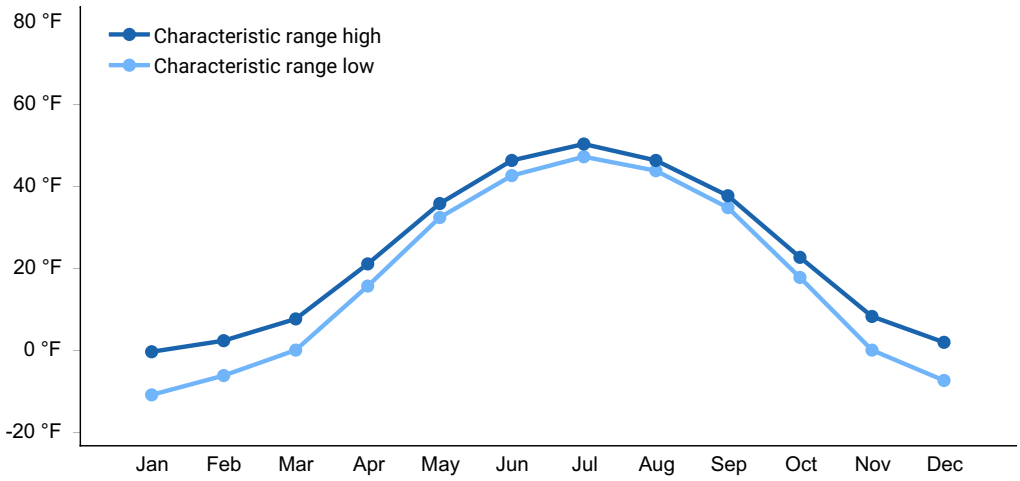


Figure 2. Monthly minimum temperature range

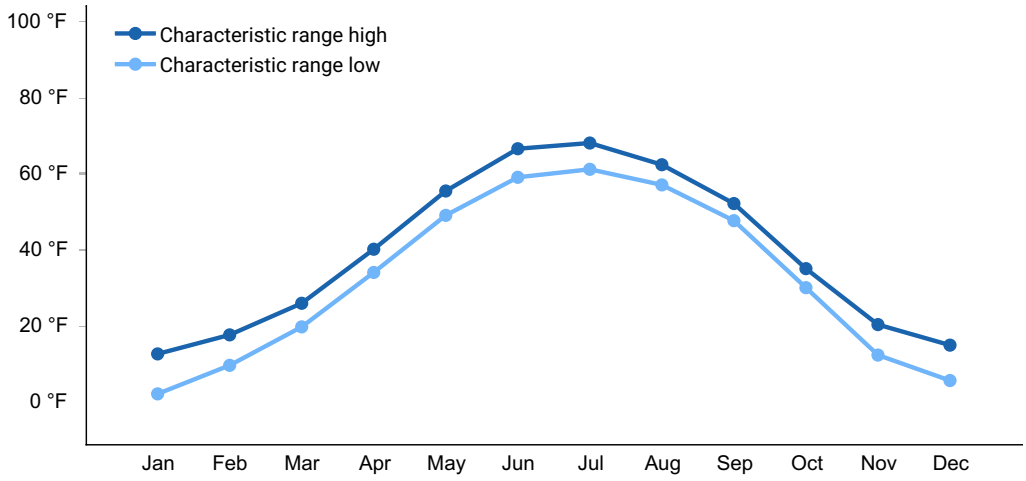


Figure 3. Monthly maximum temperature range

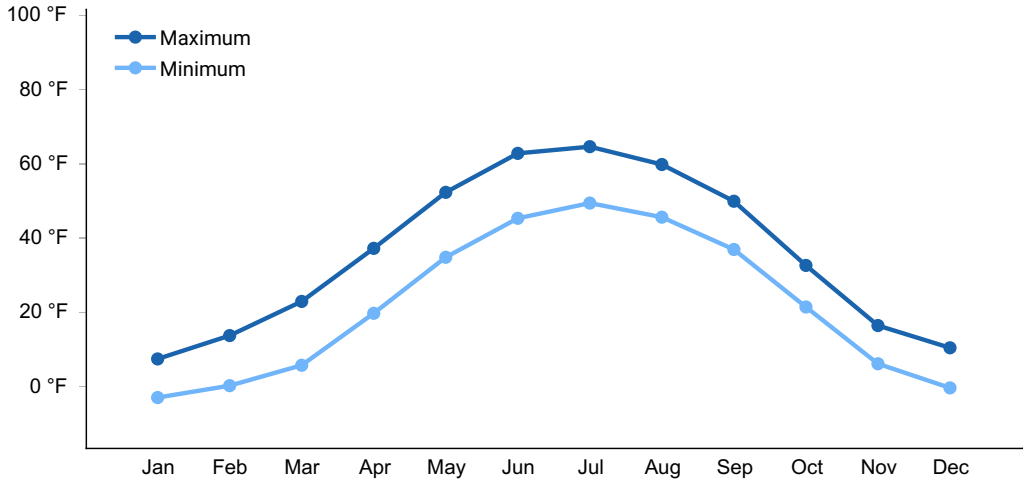


Figure 4. Monthly average minimum and maximum temperature

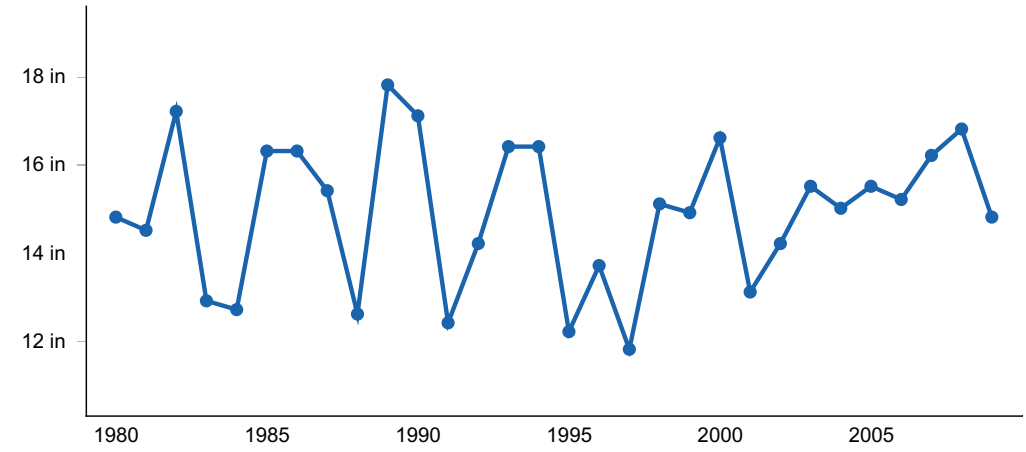


Figure 5. Annual precipitation pattern

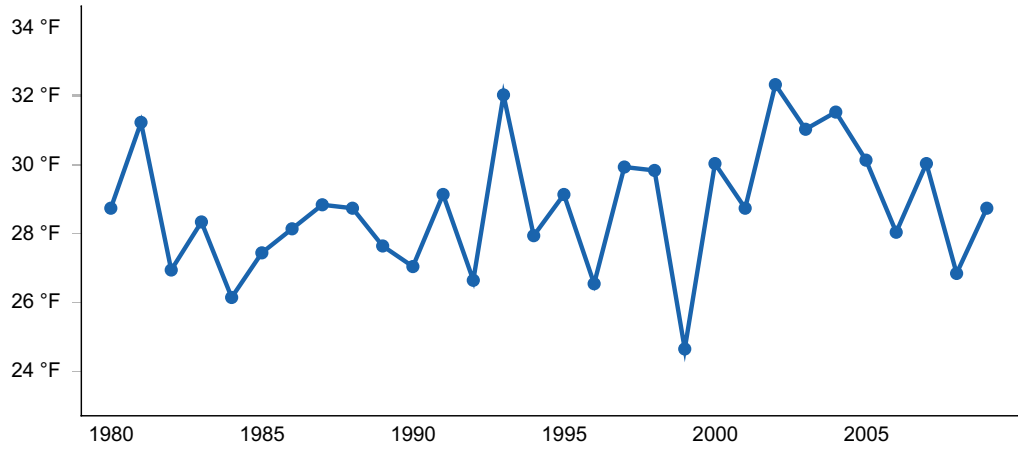


Figure 6. Annual average temperature pattern

Influencing water features

This site is not associated with or influenced by streams or wetlands. Precipitation and throughflow are the main source of water for this ecological site. Surface runoff and throughflow contribute water to downslope ecological sites.

Wetland description

This ecological site is not a wetland.

Soil features

FEATURES NARRATIVE
• Common soils include the Inceptisol great groups Humigelepts and Dystrocryepts, and the Spodosol great group Haplocryods (Soil Survey Staff, 2013)
• Soils developed in silty and gravelly colluvium
• Rock fragments are absent from the soil surface
• There is a two-to-six-inch organic cap.
• Subsurface rock fragment volume ranges from 0 to 60 percent.
• Soils are typically very deep without restrictions. On occasions, soils contact bedrock at moderately deep to deep depths.
• Soil pH is extremely to moderately acidic.
• Soils are considered well drained and do not have a growing season water table

Table 5. Representative soil features

Parent material	(1) Loess (2) Colluvium
Surface texture	(1) Silt loam (2) Gravelly very fine sandy loam (3) Silt

Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	Not specified
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2.4–7.3 in
Soil reaction (1:1 water) (0-10in)	4–6
Subsurface fragment volume <=3" (0-60in)	0–56%
Subsurface fragment volume >3" (0-60in)	0–11%

Table 6. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Not specified
Depth to restrictive layer	20–60 in
Soil depth	20–60 in
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-40in)	Not specified
Soil reaction (1:1 water) (0-10in)	Not specified
Subsurface fragment volume <=3" (0-60in)	Not specified
Subsurface fragment volume >3" (0-60in)	Not specified

Ecological dynamics

The low scrub reference plant community is shaped by factors including low annual temperatures and soil hydrology. Snowpack protects vegetation from scouring winter winds but shortens the growing season. Cool temperatures and a shortened growing season support slow growing, often evergreen ericaceous shrubs. Average shrub height is taller here than in the alpine. Community vegetation occurs on a moisture gradient. The

typical community is an ericaceous shrubland; wetter soils support more willow, while drier areas support more birch.

Fire

Fire has a major influence on vegetation across the Yukon-Kuskokwim Highlands MLRA. Wildland fire is a common and natural event that is unmanaged except near towns and villages. Fires are patchy and different locations within a single burn experience different levels of fire intensity, or no fire at all. In general, cooler and wetter areas experience low-severity fires, while warmer and drier areas experience high-severity fires. Other factors such as fire load and recent weather also affect fire characteristics. A typical fire event considerably alters vegetation, above ground biomass, and the organic soil cap.

Fire is the major disturbance on this ecological site. It is a cyclical disturbance with a long return interval of over 100 years (Landfire, 2009). It is responsible for a unique post-disturbance community. Post-fire community composition depends on factors such as fire frequency and severity. A more intense fire will alter a community to a higher degree than a less intense fire. Low-severity fires may only burn surface vegetation, leaving extant species to resprout immediately from seed source and surviving root stock. A severe fire burns the organic layer and destroys part or all of the root stock. In this instance, the post-fire community is comprised of colonizing, fast-growing herbaceous species (Landfire, 2009). Patchy krummholz spruce outcroppings typically revert to a low scrubland after a fire but may come to support spruce again over time.

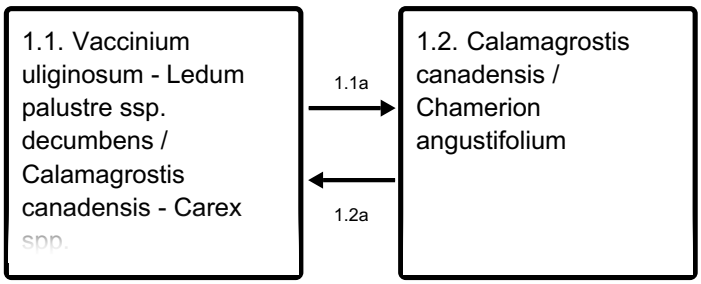
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

State and transition model

Ecosystem states

1. Reference State

State 1 submodel, plant communities



1.1a - Fire; occurs 0 to 4 years post-fire

1.2a - Fire recovery; develops 5 or more years post-fire

State 1
Reference State

The reference state describes two distinct vegetative communities grouped by the structure and dominance of the vegetation (e.g., shrubs, forbs, and graminoids) and their ecological function and stability. Fire is the major disturbance on this ecological site. Soil and site factors including drainage class and mean annual air temperature influence the vegetation in the reference state. The reference state is developed and characterized using available vegetation models, including Landfire BpS and the Alaska vegetation classification system (Landfire, 2009; Viereck et al., 1992).

Dominant plant species

- tealeaf willow (*Salix pulchra*), shrub
- resin birch (*Betula glandulosa*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- Bigelow's sedge (*Carex bigelowii*), grass

Community 1.1
Vaccinium uliginosum - Ledum palustre ssp. decumbens / Calamagrostis canadensis - Carex spp.

This community is a closed low shrub scrubland (Viereck et al., 1992). The dominant strata are low shrubs, medium shrubs, tall graminoids, and tall forbs. Community vegetation occurs on a moisture gradient. The typical community is an ericaceous shrubland; wetter soils support more willow, while drier areas support more birch. Alder may be present, particularly along ecotonal gradients. Krummholz black and white spruce may be present in the subalpine. The shaded understory is comprised of graminoids, ferns, and forbs. Ground cover is predominantly herbaceous litter but also contains mosses and lichens. The binomial and vernacular name of common plants are listed in the

dominant plant species table.

Dominant plant species

- bog blueberry (*Vaccinium uliginosum*), shrub
- marsh Labrador tea (*Ledum palustre ssp. decumbens*), shrub
- tealeaf willow (*Salix pulchra*), shrub
- resin birch (*Betula glandulosa*), shrub
- dwarf birch (*Betula nana*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- sedge (*Carex*), grass
- Altai fescue (*Festuca altaica*), grass
- reindeer lichen (*Cladina*), other herbaceous
- cup lichen (*Cladonia*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- twoflower cinquefoil (*Potentilla biflora*), other herbaceous
- arctic sweet coltsfoot (*Petasites frigidus*), other herbaceous

Community 1.2
Calamagrostis canadensis / Chamerion angustifolium

This community is a mesic graminoid herbaceous meadow (Viereck et al., 1992). The dominant strata are tall graminoids, medium graminoids and medium forbs. Community composition depends on fire disturbance characteristics. A more intense fire will alter a community to a higher degree than a less intense fire. Fast-growing herbaceous species with wind-dispersed seeds are the most common species after a severe fire. Extant species from the pre-fire community may be present, particularly after a low-severity fire. Ground cover is mostly herbaceous litter. The binomial and vernacular name of common plants are listed in the dominant plant species table.

Dominant plant species

- bluejoint (*Calamagrostis canadensis*), grass
- sedge (*Carex*), grass
- fireweed (*Chamerion angustifolium*), other herbaceous

Pathway 1.1a
Community 1.1 to 1.2

Fire is the major disturbance on this site. Drier areas may ignite directly from lightning strikes, while wetter areas are more likely to catch fire from neighboring vegetation. The fire return interval is hypothesized to be very long (Landfire, 2009b). A severe fire is required to transform community 1.1a into an herbaceous meadow. Fire burns the organic

layer and can destroy rootstocks and the seed bank. Post-fire vegetation is comprised primarily of disturbance-loving, fast-growing, seed-dispersing herbaceous species. Absent fire, the vegetative composition of this community is stable and unlikely to change over time (Viereck et al., 1992; Landfire, 2009b).

Pathway 1.2a
Community 1.2 to 1.1

Fire recovery occurs regularly quickly following low intensity fires. Recovery after high-intensity fires takes longer. Several shrubs, such as tealeaf willow, are fire-adapted and will quickly grow back if the below ground rootstock is not destroyed (Uchytil, 1991). Other shrub species may take longer to colonize and support a reproducing population.

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

Vegetative communities and transitions are described using existing models and expert knowledge. There are no vegetation inventory data points in NASIS associated with this ecological site.

External model data sources:

The Alaska-Yukon Region of the Circumboreal Vegetation Map (CBVM) (Jorgensen and Meidinger, 2015)

LANDFIRE Biophysical Settings Models (Landfire, 2009)

Viereck, L.A., C.T. Dyrness, A.R. Batten, and K.J. Wenzlick. 1992. The Alaska vegetation classification. Gen. Tech. Rep. PNW-GTR-286. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 278 p. (Viereck et al., 1992)

References

Viereck, L.A., C. T. Dyrness, A. R. Batten, and K. J. Wenzlick. 1992. The Alaska vegetation classification. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station General Technical Report PNW-GTR-286..

Other references

Jorgensen, T., and D. Meidinger. 2015. The Alaska Yukon Region of the Circumboreal Vegetation Map (CBVM). CAFF Strategies Series Report. Conservation of Arctic Flora and Fauna, Akureyri, Iceland. ISBN: 978-9935-431-48-6.

Landfire. 2009. Biophysical Setting 7316101 - Boreal mesic scrub birch-willow. In: LANDFIRE Biophysical Setting Model: Map zone 73, [Online]. In: Vegetation Dynamics Models. In: LANDFIRE. Washington, DC: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory; U.S. Geological Survey; Arlington, VA: The Nature Conservancy (Producers). Available: https://www.landfire.gov/vegetation/bps. Accessed March 18, 2025

PRISM Climate Group (PRISM). 2018. “Alaska – average monthly and annual precipitation and minimum, maximum, and mean temperature for the period 1981-2010.” Oregon State University, Corvallis, Oregon. https://prism.oregonstate.edu/projects/alaska.php. Accessed Sept 17, 2024.

Scenarios network for Alaska and arctic planning (SNAP). 2014. “Historical Monthly Temperature – 1km, 1901-2009”. http://ckan.snap.uaf.edu/dataset/. Accessed Sept 17, 2024.

Scenarios network for Alaska and arctic planning (SNAP). 2014. “Historical monthly and derived precipitation products downscaled from CRU TS data via the delta methods – 2km, 1901-2009”. http://ckan.snap.uaf.edu/dataset/. Accessed Sept 17, 2024.

Soil Survey Staff. 2013. Simplified Guide to Soil Taxonomy. USDA-Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

United States Department of Agriculture, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Western Regional Climate Center (WRCC). 2021. Climate of Alaska. Retrieved from https://wrcc.dri.edu/Climate/narrative_ak.php. Accessed November 15, 2024.

Western Regional Climate Center (WRCC). 2025. “McGrath WB Airport, Alaska ‘Freeze Free’ Season Probabilities.” https://wrcc.dri.edu/cgi-bin/cliTFrezD.pl?akmcgr. Accessed Mar 6, 2025.

Contributors

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Blaine Spellman
Marji Patz

Acknowledgments

This ecological site description (ESD) fulfills the requirements of the Provisional Ecological Site (PES) national initiative. This ESD is published to fit current site-soil correlations as they are currently mapped and understood. Further data collection may provide the information to update this ESD from the provisional level to the approved level.

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	12/19/2025
Approved by	Blaine Spellman
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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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:**

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:**