USDA Natural Resources
Conservation Service

Ecological site R230XY601AK
Boreal Forest Flood Plain Complex

Last updated: 6/11/2025
Accessed: 04/14/2026

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 needleleaf forest (I.A.2 - level III) / Open white spruce forest (I.A.2.e - level IV)
(Viereck et al., 1992)

Circumboreal Vegetation Map:
Yukon Flood Plain Spruce-Poplar Forests and Scrub
(Jorgensen and Meidinger, 2015)

BioPhysical Settings:
7316141 – Western North American Boreal Montane Flood Plain Forest and Shrubland - Boreal
(Landfire, 2009)

Ecological site concept

Ecological Site characteristics:
• Occurs in the boreal life zone on flood plains
• Soils are very deep

• Soils range from poorly drained to well drained, and is often a reflection of slope shape and elevation above the flood source
• Flooding is the major disturbance on this ecological site. Average flood energy for a specific area generally determines the associated vegetation of that area.
• The reference plant community is an open white spruce forest with medium shrubs, graminoids and mosses dominating the understory
• Fire is a minor disturbance in this ecological site and is responsible for one post-fire community.

Associated sites

F230XY611AK	**Boreal Forest Loamy Frozen Slopes** Ecological site F230XY611AK occurs on cold mountain slopes. The black spruce forest of this ecological site abuts the flood plain described by F230XY601AK.
F230XY612AK	**Boreal Forest Loamy Slopes** Ecological site F230XY612AK occurs on warm, well drained mountain slopes. The white spruce forest of this ecological site abuts the flood plain described by F230XY601AK.
F230XY614AK	**Boreal Black Spruce Unfrozen Well Drained Slopes** Ecological site F230XY614AK occurs on cool, well drained mountain slopes. The black spruce forest of this ecological site abuts the flood plain described by F230XY601AK.

Similar sites

F230XY612AK	**Boreal Forest Loamy Slopes** Both ecological sites support white spruce in the reference plant community. Ecological site F230XY612AK occurs on warm, well drained mountain slopes that do not undergo flooding. This ecological site does not support a willow scrubland in the reference state.
R230XY610AK	**Boreal Scrub Silty Frozen Drainages** Both ecological sites support willow in the reference state. Ecological site R230XY610AK occurs on frozen, organic soils in drainages. White spruce are not supported on these landforms.

Table 1. Dominant plant species

Tree	(1) *Picea glauca* (2) *Populus balsamifera*
Shrub	(1) *Rosa acicularis* (2) *Viburnum edule*
Herbaceous	(1) *Calamagrostis canadensis*

Physiographic features

• This boreal ecological site occurs on flood plains with flood frequency ranging from frequent to rare
• Elevation ranges from 200 to 1,200 feet
• Slope gradients are nearly level to gently sloping (0 to 2 percent).
• This ecological site includes low, medium, and high flood plain levels, as well as terraces that flood and alluvial fans
• Flooding is the major disturbance on this ecological site. Flood frequency and period depend on factors such as proximity to and elevation above the flood source
• A water table occurs at shallow to very deep depths

Table 2. Representative physiographic features

Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Hillslope profile	(1) Toeslope
Geomorphic position, flats	(1) Talf
Geomorphic position, terraces	(1) Tread
Landforms	(1) Valley > Flood plain (2) Valley > Flood plain (3) Mountains > Flood plain (4) Valley > Alluvial fan
Runoff class	Negligible to very low
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	61–366 m
Slope	0–2%
Water table depth	25–150 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding duration	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	61–488 m

Slope	Not specified
Water table depth	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)	75-95 days
Freeze-free period (characteristic range)	65-85 days
Precipitation total (characteristic range)	330-508 mm
Frost-free period (actual range)	60-110 days
Freeze-free period (actual range)	50-100 days
Precipitation total (actual range)	254-1,016 mm
Frost-free period (average)	80 days
Freeze-free period (average)	70 days
Precipitation total (average)	381 mm

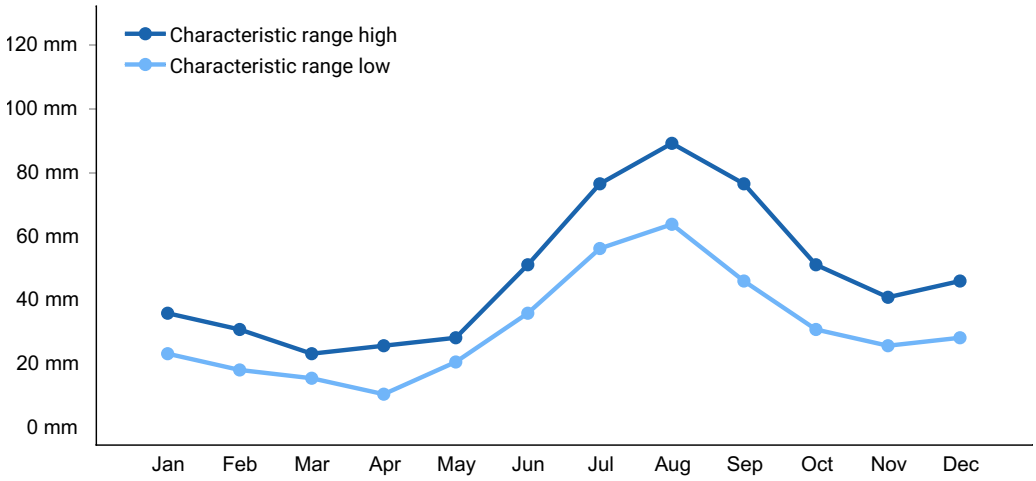


Figure 1. Monthly precipitation range

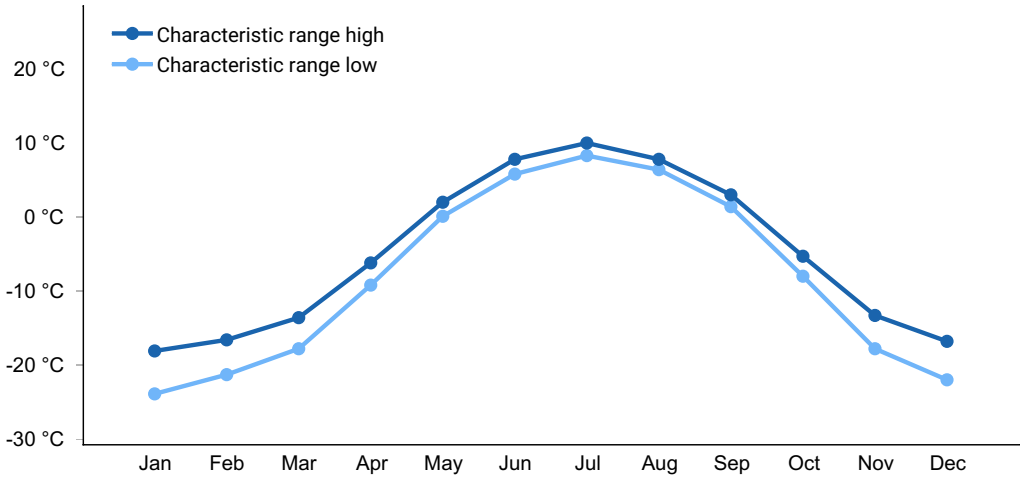


Figure 2. Monthly minimum temperature range

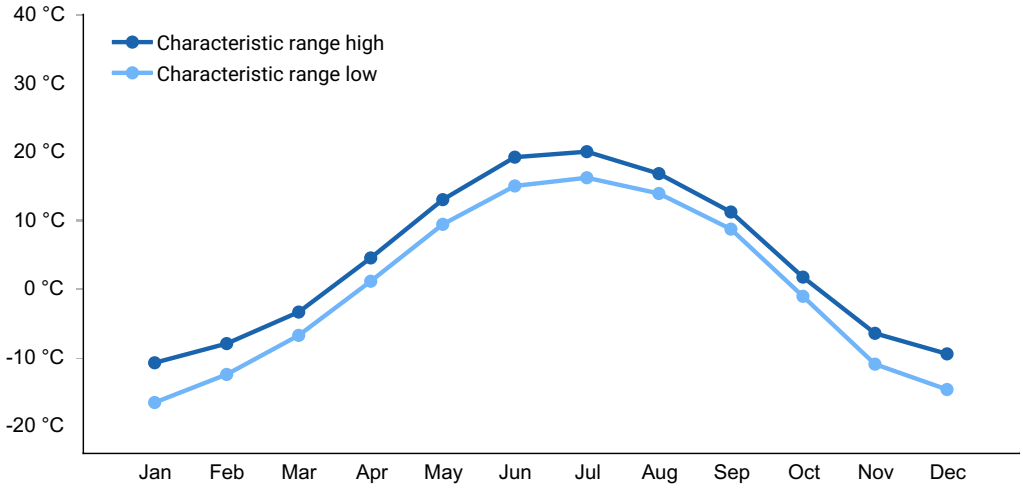


Figure 3. Monthly maximum temperature range

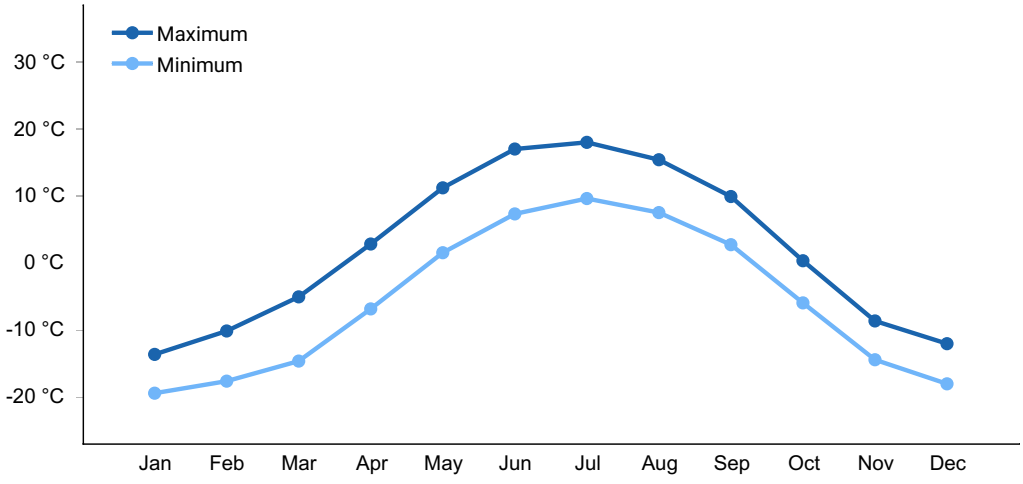


Figure 4. Monthly average minimum and maximum temperature

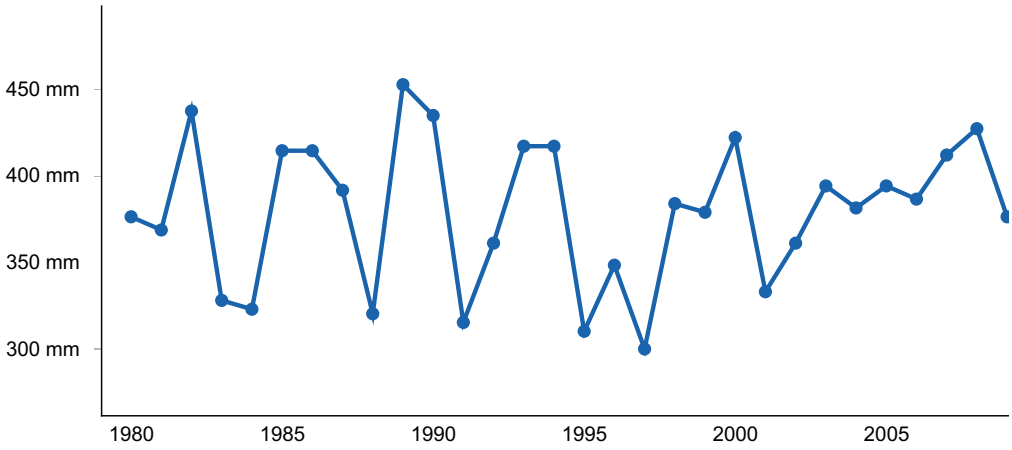


Figure 5. Annual precipitation pattern

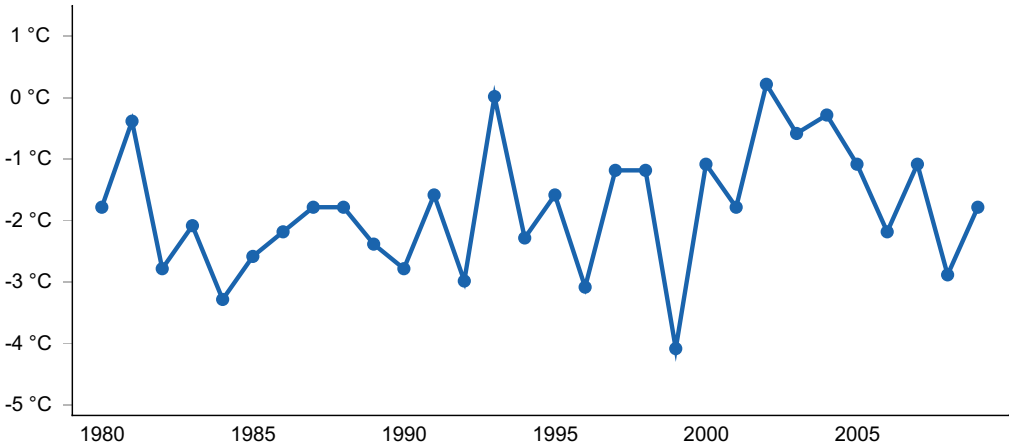


Figure 6. Annual average temperature pattern

Influencing water features

This ecological site is influenced by riparian water features. Overbank and subsurface flow occur during a flood event. Precipitation and seasonal snow melt are the main sources of water from upstream areas. Flood plains are usually unbraided but may braid in high energy locations. Riverine wetlands are often replaced by slope and depressional wetlands at upstream locations where the defined channel disappears.

Wetland description

This ecological site is a riverine wetland under the Hydrogeomorphic (HGM) classification system (Brinson, 1993; USDA-NRCS, 2008). In the associated flood plains, overbank flow from the channel and subsurface hydraulic connections between the stream and adjacent wetlands are the main sources of water (USDA-NRCS, 2008).

Soil features

• Common Inceptisol great groups are Dystrocryepts or Haplocryepts, while common

Entisol great groups are Cryorthents or Cryofluvents (Soil Survey Staff, 2013)
• Soils formed in alluvium
• Surface texture is stratified fine sand over silt, stratified sand over silt, or silt loam
• Rock fragments are generally absent from the surface, except on areas of high energy flooding such as gravel bars
• Soils have a thin, 1- to 2-inch-thick organic cap
• Soils are very deep but strongly contrasting textural stratification can be present between 9 and 60 inches
• Subsurface rock fragments vary from zero to approximately forty percent volume
• Soil pH is strongly acidic to slight alkaline
• Soils range from poorly to well drained. This classification often depends on location on the flood plain and slope shape

Table 5. Representative soil features

Parent material	(1) Alluvium (2) Loess (3) Eolian deposits
Surface texture	(1) Fine sand (2) Silt (3) Sand (4) Silt (5) Silt loam
Drainage class	Poorly drained to well drained
Permeability class	Moderate to rapid
Depth to restrictive layer	23–152 cm
Soil depth	152 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.29–18.03 cm
Soil reaction (1:1 water) (0-25.4cm)	5–7.6
Subsurface fragment volume <=3" (0-152.4cm)	0–33%
Subsurface fragment volume >3" (0-152.4cm)	0–7%

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained to well drained
Permeability class	Not specified

Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	0–37%
Surface fragment cover >3"	0–38%
Available water capacity (0-101.6cm)	Not specified
Soil reaction (1:1 water) (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

This ecological site complex combines the soils and vegetation on the low, middle, and high levels of flood plain in the Yukon-Kuskokwim Highlands MLRA. These three flood plain levels have distinctive flood regimes that result in different vegetation and each level should be viewed as being a unique ecological site. Due to similarities in soils and a shared disturbance regime, these ecological sites were combined into a complex.

Flood disturbances most commonly occur during spring snow melt and river breakup. Depending on position, floods can scour surfaces or deposit alluvium with either process resulting in exposed parent material. Flood dynamics are site-specific, but large flood events can remove all vegetation and create areas that go through the earliest stages of primary succession.

Differences in flood frequency and duration result in different plant communities within this ecological site. Areas proximal to the flood source are most likely to experience disruptive flooding. These areas support community 1.4. Bare gravels are common directly adjacent to the active flood plain channel. Colonizing these bare gravels is a pioneering plant community largely composed of grasses and forbs. This plant community has the most frequent and longest duration flood events for this ecological site. Successive communities, as outlined on the state and transition model, typically develop as move away from the flood source.

Flood plain development coincides with river channel movement. This succession is generally slow. Channel movement occurs when riverbanks are eroded, and sediments are deposited on new bars. Channel movement is accompanied by a shift of vegetative type from herbaceous meadow to forest represents riparian primary succession along major streams and rivers in the Yukon-Kuskokwim Highlands. It takes about 150 years for white spruce to become the dominant canopy species (Landfire, 2009).

Fire

Fire has a major influence on vegetation across the Yukon-Kuskokwim Highlands MLRA. It is a common and natural event that is generally unmanaged except near towns and villages. Fires are patchy and different locations within a single burn area may experience different levels of fire intensity, or no fire at all. Fires may present as low-severity or high-severity, and the vegetative response may differ based on fire type. In general, cooler and wetter areas experience low severity fires, while dry, warm landforms experience higher severity fires.

Flood plains routinely serve as fire breaks in the Yukon-Kuskokwim Highlands. When they do occur, fires are typically small, patchy, and of mixed severity. White spruce flood plains are less susceptible to fire than other white spruce communities (Abrahamson, 2015). The oldest white spruce stands in Interior Alaska are on flood plains. The expected fire cycle is about 300 years, which is much longer than the flooding regime on flood plains.

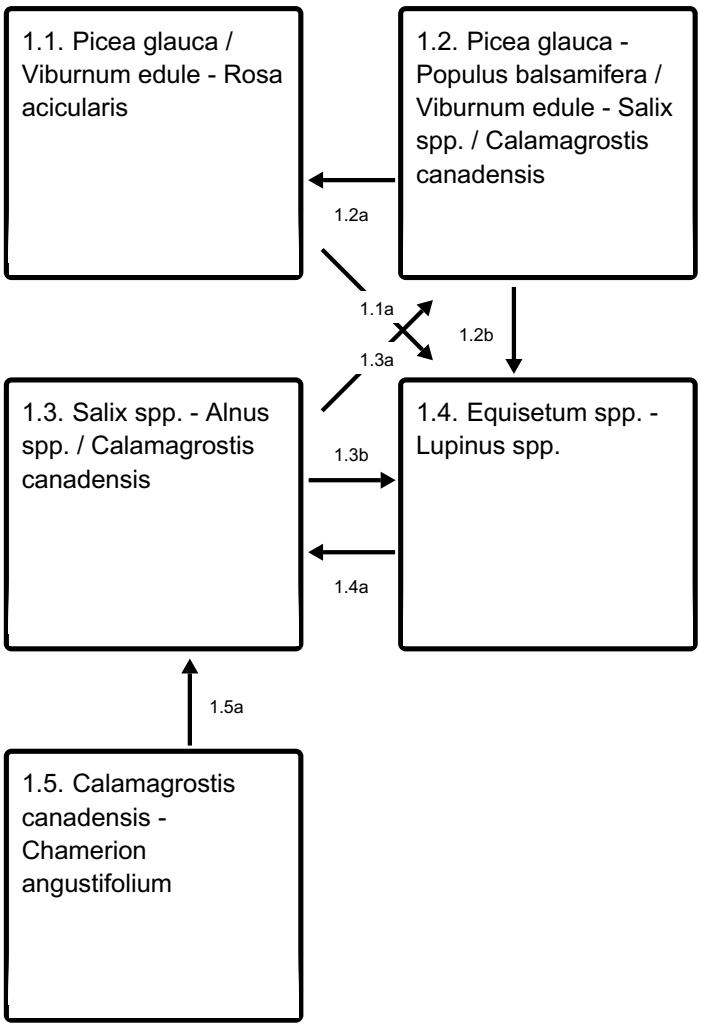
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant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

State and transition model

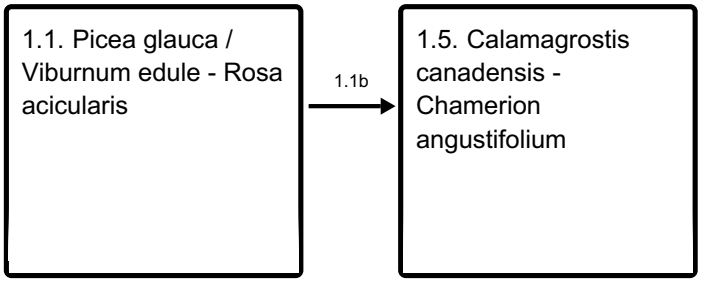
Ecosystem states

1. Reference State

State 1 submodel, plant communities



Communities 1 and 5 (additional pathways)



1.1a - Increased flooding disturbance

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

1.2a - Decreased flooding

1.2b - Increased flooding

1.3a - Decreased flooding

1.3b - Increased flooding

1.4a - Decreased flooding

1.5a - Fire recovery; develops 5 to 30 years post-fire

State 1
Reference State

The reference state describes five vegetative communities across the flood plain catena. Flooding is the major disturbance. Site factors such as disturbance and soil drainage contribute to the community composition and dynamics on this ecological site. 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

- white spruce (*Picea glauca*), tree
- prickly rose (*Rosa acicularis*), shrub
- squashberry (*Viburnum edule*), shrub
- bluejoint (*Calamagrostis canadensis*), grass

Community 1.1
Picea glauca / Viburnum edule - Rosa acicularis

The reference plant community is a closed white spruce forest (Viereck et al. 1992). Tree cover is primarily in the tall tree stratum (greater than 40 feet in height). Windthrow maintains gaps in the canopy, allowing light to reach the subcanopy comprised of shrubs and graminoids. The dominant vegetative strata are tall trees, tall and medium shrubs, and tall graminoids. The soil surface is primarily covered with herbaceous litter and mosses. The binomial and vernacular name of common plants are listed in the dominant plant species table.

Dominant plant species

- white spruce (*Picea glauca*), tree
- squashberry (*Viburnum edule*), shrub
- prickly rose (*Rosa acicularis*), shrub
- alder (*Alnus*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- northern bedstraw (*Galium boreale*), other herbaceous
- horsetail (*Equisetum*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous

Community 1.2
Picea glauca - Populus balsamifera / Viburnum edule - Salix spp. / Calamagrostis canadensis

The reference plant community is a closed mixed forest (Viereck et al. 1992). White spruce and balsam poplar are the most common tree species. Tree cover is primarily in the tall tree stratum (greater than 40 feet in height). Gaps occur in the tree canopy, but they are limited in size and extent and are likely the result of occasional windthrow. The

dominant vegetative strata are tall trees, tall and medium shrubs, and tall graminoids. The soil surface is primarily covered with herbaceous litter and mosses. The binomial and vernacular name of common plants are listed in the dominant plant species table.

Dominant plant species

- white spruce (*Picea glauca*), tree
- balsam poplar (*Populus balsamifera*), tree
- squashberry (*Viburnum edule*), shrub
- willow (*Salix*), shrub
- prickly rose (*Rosa acicularis*), shrub
- alder (*Alnus*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- northern bedstraw (*Galium boreale*), other herbaceous
- horsetail (*Equisetum*), other herbaceous
- Tilesius' wormwood (*Artemisia tilesii*), other herbaceous

Community 1.3
Salix spp. - Alnus spp. / Calamagrostis canadensis

This community is a closed tall scrubland (Viereck et al. 1992). The dominant vegetative strata are tall and medium shrubs and tall graminoids. The scrubland is usually a mix of willow and alder in the overstory, with shade tolerant graminoids and forbs in the understory. White spruce and balsam poplar may be present. The soil surface is primarily covered with herbaceous litter, woody litter, and mosses. The binomial and vernacular name of common plants are listed in the dominant plant species table.

Dominant plant species

- willow (*Salix*), shrub
- alder (*Alnus*), shrub
- prickly rose (*Rosa acicularis*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- horsetail (*Equisetum*), other herbaceous

Community 1.4
Equisetum spp. - Lupinus spp.

This community is an herbaceous meadow (Viereck et al. 1992). The dominant vegetative strata are tall and medium graminoids and forbs. This meadow supports a variety of fast-growing, often seed-dispersed species capable of reproducing on the scoured, rocky substrate. Willow and alder may be present. Balsam poplar seedlings are common. The soil surface is primarily covered with herbaceous litter, woody litter, and rock fragments The binomial and vernacular name of common plants are listed in the dominant plant species table.

Dominant plant species

- willow (*Salix*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- horsetail (*Equisetum*), other herbaceous
- lupine (*Lupinus*), other herbaceous
- fireweed (*Chamerion angustifolium*), other herbaceous
- dwarf fireweed (*Chamerion latifolium*), other herbaceous

Community 1.5
Calamagrostis canadensis - Chamerion angustifolium

This community is an herbaceous meadow (Viereck et al. 1992). The dominant vegetative strata are tall and medium graminoids and forbs. This meadow supports a variety of fast-growing, often seed-dispersed species capable of reproducing on the burned substrate. Unburned specimens are common. The soil surface is primarily covered with herbaceous litter, woody litter, and rock fragments. The binomial and vernacular name of common plants are listed in the dominant plant species table.

Dominant plant species

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

Pathway 1.1a
Community 1.1 to 1.4

Increased flooding frequency and energy scours vegetation and soil. Slow growing species are killed by force or by post-flood ponding. Herbaceous litter and organic soil are removed, leaving exposed mineral soil and gravel.

Pathway 1.1b
Community 1.1 to 1.5

Fire is a small, patchy, and often low-severity disturbance on flood plains. The high are humidity and soil moisture generally prevent severe fires from occurring.

Pathway 1.2a
Community 1.2 to 1.1

Decreased flooding frequency and energy allow trees to colonize and create a canopy. Shade-tolerant species are partially removed from the understory. Organic material in the soil increases.

Pathway 1.2b
Community 1.2 to 1.4

Increased flooding frequency and energy scours vegetation and soil. Slow growing species are killed by force or by post-flood ponding. Herbaceous litter and organic soil are removed, leaving exposed mineral soil and gravel.

Pathway 1.3a
Community 1.3 to 1.2

Decreased flooding frequency and energy allow trees to colonize, grow, and establish a canopy. Shade-intolerant species are partially removed from the understory. Organic material in the soil increases.

Pathway 1.3b
Community 1.3 to 1.4

Increased flooding frequency and energy scours vegetation and soil. Slow growing species are killed by force or by post-flood ponding. Herbaceous litter and organic soil are removed, leaving exposed mineral soil and gravel.

Pathway 1.4a
Community 1.4 to 1.3

Decreased flooding frequency and energy allow shrubs to colonize and create a canopy. Shade-intolerant species are partially removed from the understory. Organic material in the soil increases.

Pathway 1.5a
Community 1.5 to 1.3

Shrubs colonize and form an overstory, shading out much of the dense herbaceous cover in the immediate post-fire community. Tree seedlings establish and saplings develop. Organic material accumulates on the soil surface.

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)

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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	04/14/2026
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:**

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:

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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):**

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

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17. **Perennial plant reproductive capability:**
