

Ecological site F236XY171AK

Subarctic Woodland Loamy Slopes

Last updated: 2/13/2024

Accessed: 10/14/2026

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): 236X–Bristol Bay-Northern Alaska Peninsula Lowlands

The Bristol Bay-Northern Alaska Peninsula Lowland Major Land Resource Area (MLRA 236) is located in Western Alaska. This MLRA covers approximately 19,500 square miles and is defined by an expanse of nearly level to rolling lowlands, uplands and low to moderate hills bordered by long, mountain footslopes. Major rivers include the Egegik, Mulchatna, Naknek, Nushagak, and Wood River. MLRA 236 is in the zone of discontinuous permafrost. It is primarily in areas with finer textured soils on terraces, rolling uplands and footslopes. This MLRA was glaciated during the early to middle Pleistocene. Moraine and glaciofluvial deposits cover around sixty percent of the MLRA. Alluvium and coastal deposits make up a large portion of the remaining area (Kautz et al., 2012; USDA, 2006). Climate patterns across this MLRA shift as one moves away from the coast. A maritime climate is prominent along the coast, while continental weather, commonly associated with Interior Alaska, is more influential inland. Across the MLRA, summers are general short and warm while winters are long and cold. Mean annual precipitation is 13 to 50 inches, with increased precipitation at higher elevations and areas away from the coast. Mean annual temperatures is between 30 and 36 degrees F (USDA, 2006). The Bristol Bay-Northern Alaska Peninsula MLRA is principally undeveloped wilderness. Federally managed land includes parts of the Katmai and Aniakchak National Parks, and the Alaska Peninsula, Becharof, Togiak and Alaska Maritime National Wildlife Refuges. The MLRA is sparsely populated. Principal communities include Dillingham, Naknek, and King Salmon. Commercial fishing in Bristol Bay and the Bering Sea comprises a major part of economic activity in the MLRA. Other land uses include subsistence activities (fishing, hunting, and gathering) and sport hunting and fishing (USDA, 2006).

Ecological site concept

This boreal ecological site is on sloped plain talfs. Site elevation ranges from 10 to 190 feet above sea level. Slopes are nearly level to gentle (0 – 8 percent). Soil hydrology and local slope gradient shape the vegetation on this landform. Soils are typically poorly drained with a histic epipedon and aquic conditions throughout. These conditions limit where a forest may develop in this site. A woodland typically only develops in the drier areas of this landform, commonly where slope gradient is highest. The effects of soil wetness are decreased here due to increased run off and drainage. Level slopes generally support wetter soil, which exclude trees and support hydrophytic shrubs and graminoids. The reference state supports three communities. The reference plant community is characterized as a mixed woodland (Viereck et al., 1992). It is composed of a white spruce and birch overstory with ericaceous shrubs and moss in the understory. Other communities on this site are limited by wetter soils. Communities on this site are relatively stable, as a marked change in site hydrology is typically required to elicit a vegetative response or community shift.

Associated sites

R236XY124AK	Subarctic Tall Scrub Loamy Convex Hillslopes R236XY124 describes a scrubland on convex plain slopes. It is associated with well drained soils with no water table.
F236XY115AK	Boreal Forest Loamy Moist Slopes F236XY115AK describes a forested plain on well drained soils. It is found on similar landforms as this site, but differences in soil, and particularly soil wetness, prevent a forest from developing on areas described by F236XY171AK.

R236XY127AK	Subarctic Sedge Peat Plain Depressions R236XY127AK is found in concave dips in plains. Soil is organic and very poorly drained and does not support the trees found in R236XY171AK.
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Similar sites

R236XY140AK	Subarctic Tussock Tundra Wet Loamy Plains R236XY140AK is associated with a soil similar to that of F236XY171AK. R236XY140AK is found in upstream areas of the Nushagak River, where local climate excludes the presence of trees.
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Table 1. Dominant plant species

Tree	(1) <i>Picea glauca</i> (2) <i>Betula papyrifera</i>
Shrub	(1) <i>Empetrum nigrum</i> (2) <i>Betula nana</i>
Herbaceous	(1) <i>Carex</i>

Physiographic features

This site is on linear slopes of plain talfs. Elevation ranges from 10 to 190 feet above sea level. Slopes are nearly level to gentle (0 – 8 percent). Flooding does not occur. Ponding a frequent and long event, particularly on the shallowest slopes. This site is found at all aspects.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Talf
Landforms	(1) Plains > Plain
Runoff class	Low to medium
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	0 – 60 m
Slope	0 – 10 %

Water table depth	0 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Low to high
Flooding frequency	None
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	0 – 110 m
Slope	0 – 10 %
Water table depth	0 cm

Climatic features

The climate of this site reflects that of the MLRA, which is described as maritime polar (EPA, 2013). Temperatures are moderated by the nearby Bristol Bay and northern Pacific bodies of water. Annual precipitation ranges from 21 – 34 inches with approximately 40 percent occurring during the June-September growing season (PRISM, 2018).

Table 4 Representative climatic features

Frost-free period (characteristic range)	80-100 days
Freeze-free period (characteristic range)	70-90 days
Precipitation total (characteristic range)	530-860 mm
Frost-free period (actual range)	80-100 days
Freeze-free period (actual range)	70-90 days
Precipitation total (actual range)	380-1,040 mm
Frost-free period (average)	90 days

Freeze-free period (average)	80 days
Precipitation total (average)	740 mm

Influencing water features

Due to its landscape position, this site is not influenced by wetland or riparian water features. Precipitation and snow melt are the main sources of water.

Soil features

Soils are young and weakly developed Inceptisols (Soil Survey Staff, 2013). Soils are very deep and poorly drained. They support a cryic temperature regime and an aquic moisture regime. Parent material is herbaceous organic material over coarse-silty loess.

Soil hydrology affects the extant vegetation. This organic soil is wet, with a histic epipedon and aquic conditions throughout the soil profile. A water table is present at the soil surface at the beginning on the growing season (May and June). These conditions limit where a forest may develop in this site. A woodland typically only develops in the drier areas of this landform. Other soil factors, including extreme to strong acidity (pH 4.3 to 5.2) in the top ten inches of soil, may affect vegetation as well.

Correlated soil components in MLRA 236: Nushagak

Table 5. Representative soil features

Parent material	(1) Loess
Surface texture	(1) Mucky peat
Drainage class	Poorly drained
Permeability class	Slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	17.53 – 33.53 cm
Soil reaction (1:1 water) (0-25.4cm)	4.3 – 5.2

Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Table 6. Representative soil features (actual values)

Drainage class	Poorly drained
Permeability class	Slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	0 %
Surface fragment cover >3"	0 %
Available water capacity (0-101.6cm)	17.53 – 33.53 cm
Soil reaction (1:1 water) (0-25.4cm)	4.3 – 5.2
Subsurface fragment volume <=3" (Depth not specified)	0 %
Subsurface fragment volume >3" (Depth not specified)	0 %

Ecological dynamics

This site is on linear slopes of plain talfs. Local site factors, including soil hydrology and site topography and slope support three vegetative communities in the reference state. The reference plant community is a mixed birch and white spruce woodland.

Spatial patterns in site slope and hydrology shape three communities in the reference state. Trees, and the reference plant community, are most common in areas with the greatest slope gradient. The effects of soil wetness are decreased here due to increased run off and drainage. Level slopes generally support wetter soil, which exclude trees and support hydrophytic shrubs and graminoids. Additionally, the presence of trees indicates the likelihood of a nearby forested site. Increased propagule pressure and ecotonal edge effects increase the likelihood of a woodland developing on this soil.

Ponding is the major disturbance. This disturbance is unlikely to cause a shift in communities within the reference state in the short term.

A natural shift between communities is unlikely at the human management timescale. Changes in hydrologic inputs, such as an increase or decrease in precipitation due to climate change, may cause a shift in community. Likewise, improved drainage in the scrubland communities is likely to increase the chances of a woodland developing.

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

Figure 7. State-and-transition model.

Additional community tables

Table 7. Community 1.1 plant community composition

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

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Inventory data references

Modal points for Community 1.1 07SS11603 08LL11002 08SS15903 Modal points for community 1.2 07AO01606 07SS05602 07SS10503 07SS10705 07SS07804 10SS00804 Modal points for community 1.3 07SS06604 08SS16309 10SS01601 10SS02403 10SS02603

References

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Approval

Kirt Walstad, 2/13/2024

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	10/14/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

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

5. Number of gullies and erosion associated with gullies:

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

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

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

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

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

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

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

Dominant:

Sub-dominant:

Other:

Additional:

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

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

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

16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future

establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

17. Perennial plant reproductive capability:
