

Ecological site F236XY139AK

Boreal Woodland Loamy Rises

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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): 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 describes woodlands surrounding gallery forests. Gallery forests are non-flood plain forests that develop along river corridors. These forests do not spread out onto neighboring non-treed landforms, such as surround tundra. This site is on linear to convex plain talfs and rises. Site elevation is between 30 and 500 feet above sea level. Slopes are nearly level to gentle (0 – 8 percent). Soil factors and a fire regime shape the vegetation on this landform. Soils are Spodosols with naturally low fertility. Low-severity burns are typical for this ecological site, with an estimated fire return interval of around 100 years, based on tree age. The reference state supports three communities. The reference plant community is characterized as a mixed woodland (Viereck et al., 1992). The overstory is comprised of white spruce and paper birch with an open understory of ericaceous shrubs, grasses, mosses, and lichens. Post-fire communities are dominated first by fast growing herbaceous species and later shrubs. There are two alternate states on this site. One is the result of selective thinning and harvesting of trees. The second state results from complete removal of vegetation, often by bulldozer or plow.

Associated sites

R236XY130AK	Subarctic Scrub Scrub Tundra Loamy Plains and Hills Both sites are on plains. R236XY130AK is on wetter soils that experience cryoturbation. These soils support a low scrubland of ericaceous shrubs and do not support trees.
R236XY132AK	Subarctic Dwarf Scrub Dry Loamy Slopes Both sites are on plains. R236XY132AK is found on glaciated plains underlain with gravelly till or drift. These soils support a dwarf scrubland community. The soils in this site developed on eolian deposits and support a woodland.

Similar sites

F236XY157AK	Boreal Woodland Moist Loamy Plains Both sites support woodlands on loamy soils. Vegetation in F236XY157AK is hydrologically influenced and supports different communities in the reference state and different reference plant communities.
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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>Vaccinium vitis-idaea</i>
Herbaceous	(1) <i>Calamagrostis canadensis</i>

Physiographic features

This site is on linear to convex plain talfs and rises. Elevation generally ranges from 30 to 500 feet above sea level. Slopes are usually nearly level to gentle (0 – 8 percent). This site is found at all aspects. Flooding and ponding do not occur and there is no water table.

Table 2. Representative physiographic features

Hillslope profile	(1) Backslope
Geomorphic position, flats	(1) Rise (2) Talf
Landforms	(1) Plains > Plain (2) Plains > Hill (3) Plains > Rise
Runoff class	Negligible to medium
Flooding frequency	None
Ponding frequency	None
Elevation	10 – 150 m
Slope	0 – 10 %

Water table depth	150 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible to high
Flooding frequency	None
Ponding frequency	None
Elevation	0 – 480 m
Slope	0 – 70 %
Water table depth	150 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
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Influencing water features

Due to its landscape position, this site is not influenced by wetland or riparian water features. Precipitation is the main source of water.

Soil features

Soils are very deep and well drained. They support a cryic temperature regime and an udic moisture regime. Parent material is mossy or herbaceous organic material over eolian deposits.

Soil acidity and fertility affect vegetation. Spodosols are acidic soil with low fertility (Soil Survey Staff, 2013). However, the presence of volcanic ash, as indicated by andic soil properties between 3 and 9 inches, likely increases soil fertility. Volcanic ash likely alleviates some of the influential pressure of the ultra to moderately acidic soil and allows a wider range of plant species to grow on this site.

Correlated soil components in MLRA 236: D36-Boreal forest loamy eolian slopes, Ekwok, E36-Boreal forest-silty slopes

Table 5. Representative soil features

Parent material	(1) Eolian deposits
Surface texture	(1) Highly organic silt loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-25.4cm)	5.59 – 6.6 cm
Soil reaction (1:1 water) (0-25.4cm)	3.3 – 5.9
Subsurface fragment volume <=3" (Depth not specified)	Not specified

Subsurface fragment volume >3" (Depth not specified)	Not specified
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Table 6. Representative soil features (actual values)

Drainage class	Well drained
Permeability class	Moderate
Soil depth	150 cm
Surface fragment cover <=3"	0 %
Surface fragment cover >3"	0 %
Available water capacity (0-25.4cm)	4.83 – 6.6 cm
Soil reaction (1:1 water) (0-25.4cm)	3.3 – 10
Subsurface fragment volume <=3" (Depth not specified)	0 %
Subsurface fragment volume >3" (Depth not specified)	0 %

Ecological dynamics

This site describes woodlands surrounding gallery forests along and near rivers such as the Nushagak River. It is on plain talfs and rises. Local site factors including soil characteristics and a fire regime shape three communities in the reference state. The reference plant community is a mixed birch and white spruce forest.

Fire is the major disturbance on this site. Fire affects myriad biotic and abiotic characteristics, including soil factors (Liljedahl et al., 2007; Hinzman et al., 2006), and the richness and diversity of vegetation (Racine et al., 1987; Boucher, 2003). Fires in cooler and moister habitats tend to result in low-severity burns; those in warmer and drier habitats generally produce high-severity burns. Low-severity burns are typical for this ecological site. The relatively robust population of lichens and mosses in the early fire community phase suggests that while the overstory canopy may be removed, the understory may experience a patchy burn that avoids burning all areas. Fire cycles tend to be longer in Western and Southwest Alaska than in the Interior (Viereck and Schandelmeier, 1980; Trigg 1971). The mean age of white spruce in the reference plant community is 80 to 100 years, suggesting a current fire cycle of about a century.

Windthrow occurs in the reference plant community. It does not result in a unique community. However, it may keep the forest canopy open and promote plant diversity in the understory. Willows are browsed by moose. Caribou browse willow and lichens. This does not appear to affect the ecological processes of the site.

There are two alternate states on this site. The first state is the result of selective thinning and harvesting of trees. This occurs most frequently around villages and towns. The second state results from complete removal of vegetation, often by bulldozer or plow. Bulldozing not only removes vegetation but alters the soil and seedbank. This state is also most frequently found around inhabited areas.

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

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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Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 3.1 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 07SS01902 07AO03103 08AO09108 08SS13704 09AO12603 Modal points for Community 1.2 07MM05001 07AO02902 07DM00604 08AO08702 08SS13001 10SS06806 Modal points for Community 1.3 07DM01004 10SS08506 Modal points for Community 2.1 09SS04204 09SS04402 09SS04504 Modal points for Community 2.2 08SS13603 09SS03501 09SS03502 Modal points for Community 3.1 08LL06303 08LL10102

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Approval

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	10/07/2026
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:
