

Ecological site R236XY103AK

Subarctic Graminoid Loamy Mountain Depressions

Last updated: 2/13/2024
Accessed: 10/06/2026

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 ecological site is in mountain depressions. Site elevation is between 280 and 2,950 feet above sea level. Slopes are gentle (4 – 7 percent). Concave slope shape and highly organic, very poorly drained soils with a year-round water table shape the vegetation on this site. The reference state supports two communities. The reference plant community is characterized as an open scrubland (Viereck et al., 1992). It is composed of facultative to obligate wetland shrub, forb, and graminoid species. Sphagnum mosses are present and greatly influence the vegetation on this site. Low points in depression centers support an emergent graminoid wetland community.

Associated sites

R236XY106AK	Subarctic Dwarf Scrub Dry Loamy Slopes R236XY106AK describes upper hill slopes. These areas feature the depressions described by R236XY103AK.
R236XY151AK	Subarctic Open Willow Loamy Plain Swales R236XY151AK describes swales on hills. Swales are distinct microfeatures found on the same hillslopes as the depressions described by R236XY103AK.
R236XY105AK	Subarctic Scrub Mosaic Gravelly Hillslopes R236XY105AK describes hill side slopes. These slopes feature the depressions described by R236XY103AK.

Similar sites

R236XY109AK	Subarctic Low Scrub Peat Drainages Both sites are in depressions on larger features. R236XY109AK is in plains depressions, which are at lower elevations and undergo longer ponding disturbances. Site and soil hydrology is a major factor differentiating the vegetation on these similar sites.
R236XY127AK	Subarctic Sedge Peat Plain Depressions R236XY127AK is in depressions of plains and hills. Differences in soil and site hydrology and characteristics are major factors differentiating the graminoid reference plant community in R236XY127AK and the scrubland described here.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Salix pulchra</i> (2) <i>Vaccinium uliginosum</i>
Herbaceous	(1) <i>Carex aquatilis</i> (2) <i>Eriophorum russeolum</i>

Physiographic features

This site is in concave depressions on mountain and hill slopes. Elevation ranges from 280 to 2,950 feet above sea level. Slopes are gentle (4 – 7 percent). This site is found at all aspects. This site experiences occasional, brief ponding during the growing season, but no flooding. A water table is present at the soil surface throughout the year.

Table 2. Representative physiographic features

Geomorphic position, hills	(1) Base Slope
Geomorphic position, mountains	(1) Center third of mountain flank
Slope shape across	(1) Concave
Slope shape up-down	(1) Concave
Landforms	(1) Mountains > Depression (2) Hills > Depression
Runoff class	Low to medium
Flooding frequency	None

Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	90 – 900 m
Slope	0 – 10 %
Water table depth	0 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Low to medium
Flooding frequency	None
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	90 – 900 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

Wet soil conditions in these concave slope features restrict vegetation to facultative to obligate wetland species. The ponded community phase (1.2) can support an emergent wetland community. Precipitation, throughflow, and slope run off are the main sources of water.

Soil features

Soils are wet Histosols with well decomposed organic material (Soil Survey Staff, 2013). Soils are very deep and very poorly drained. They support a cryic temperature regime and an aquic moisture regime. Parent material is organic material over slope alluvium or colluvium.

Soil characteristics affecting vegetation include soil hydrology and organic material. Hemic soil materials (0 – 10 inches) and sapric soil materials (10 – 37 inches) are present in the profile. Hemic materials have an intermediate water content when saturated (Soil Survey Staff, 2013). A water table is present at the soil surface throughout the year, including the growing season. Wet soils influence the vegetation by restricting the vegetation that can grow here during the important early growing season months.

Correlated soil components in MLRA 236: D36-Western maritime sedge organic mountains; Cryosaprists

Table 5. Representative soil features

Parent material	(1) Slope alluvium (2) Colluvium
Surface texture	(1) Mucky peat
Drainage class	Very poorly drained
Permeability class	Very slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified

Surface fragment cover >3"	Not specified
Available water capacity (0-25.4cm)	7.62 – 14.99 cm
Soil reaction (1:1 water) (0-25.4cm)	5.8 – 6.3
Subsurface fragment volume <=3" (Depth not specified)	20 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained to poorly drained
Permeability class	Very slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	0 %
Surface fragment cover >3"	0 %
Available water capacity (0-25.4cm)	7.62 – 14.99 cm
Soil reaction (1:1 water) (0-25.4cm)	5.6 – 6.5
Subsurface fragment volume <=3" (Depth not specified)	20 %

Subsurface fragment volume >3" (Depth not specified)	0 %
---	-----

Ecological dynamics

This site describes depressions on mountains. Local site factors including soil characteristics and site hydrology support two plant communities. The reference plant community is an open low scrubland comprised of facultative to obligate wetland shrubs, forbs, and graminoids.

Spatial and temporal patterns in site hydrology distinguish two plant communities. Thick organic soil horizons develop from Sphagnum mosses. These mosses contain upwards of 90% water by volume. As a result, a water table is present at the soil surface throughout the year. Wet soils influence the vegetation by restricting the vegetation that can grow here throughout the year.

Low areas in a depression are more heavily influenced by hydrological conditions. Low areas can be found throughout a depression, but are most common in the center. Surface ponding may be present, particularly during periods of snow melt and precipitation. Vegetation in these areas forms an emergent graminoid wetland.

Willows are slightly browsed by moose. This does not appear to affect the ecological processes of the site.

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 (%)
-------	-------------	--------	-----------------	----------------------	------------------

Table 8. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
-------	-------------	--------	-----------------	----------------------	------------------

Inventory data references

Modal points for Community 1.1 09BL10103 09BL10104 Modal points for Community 1.2 08SS08303 08LL05805 10TD09202

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

Kautz, D.R., P. Taber, and S. Nield, editors. 2012. Land Resource Regions and Major Land Resource Areas of Alaska. United States Department of Agriculture, Natural Resources Conservation Service (USDA–NRCS).

PRISM Climate Group. (PRISM) Oregon State University. <https://prism.oregonstate.edu>. Date created October 2018. Accessed 3 Mar 2023.

Scenarios Network for Alaska and Arctic Planning (SNAP).? Historical Monthly Temperature – 1km, 1901-2009. <http://ckan.snap.uaf.edu/dataset/>. Accessed 20 Mar 2023.

Scenarios Network for Alaska and Arctic Planning (SNAP).? 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 20 Mar 2023.

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. 2006. 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.

US Environmental Protection Agency (EPA). Level III Ecoregions of the Conterminous United States. UP ESP Office of Research and Development. Corvallis, OR. <http://edg.epa.gov/>. Created 16 Apr 2013. Accessed 20 Mar 2023.

Contributors

Phil Barber
Michael Margo
Sue Tester
Steph Schmit
Kendra Moseley
Steff Shoemaker
Jamin Johanson

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	10/06/2026
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:
