USDA Natural Resources
Conservation Service

Ecological site R236XY163AK
Boreal Herbaceous Loamy Flood Plain Sloughs

Last updated: 2/13/2024
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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.

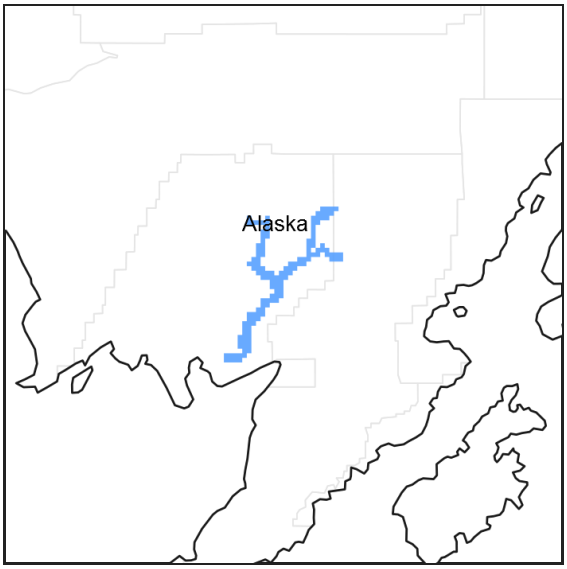

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

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 concave sloughs on lowland flood plains. Site elevation ranges from sea level to 80 feet. Slopes are nearly level (0 – 3 percent). Soil and site hydrology shape the vegetation on this landform. Flooding is frequent and brief and ponding is frequent and long during the growing season. Soils are poorly drained with aquic conditions that restrict vegetation to obligate wetland species.

The reference state supports one community. The reference plant community is characterized as a wet graminoids herbaceous meadow (Viereck et al., 1992). It is composed of a mix of facultative wet to obligate wetland species, including sedges and diverse forbs.

Associated sites

R236XY155AK	**Boreal Scrub Loamy Flood Plains, Wet** R236XY155AK describes flood plains. The site describe here is in corresponding flood plain sloughs.
R236XY172AK	**Boreal Dwarf Scrub Peat Flood Plains Depressions** Both sites are on flood plains. R236XY172AK describes dips on flood plains, which can be found near to the sloughs describe by this ecological site.

Similar sites

R236XY153AK	**Boreal Willow Silty Low Flood Plains** Both sites are on boreal low flood plains. R236XY163AK is in flood plain sloughs. Site and soil hydrology are different between these areas, as are flooding and ponding disturbances. The resulting reference state vegetation and ecological dynamics are different between these flood plain sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix pulchra* (2) *Salix*
Herbaceous	(1) *Carex rostrata* (2) *Comarum palustre*

Physiographic features

This site is on concave to linear sloughs on lowland flood plains. Elevation ranges from sea level to 80 feet. Slopes are nearly level (0 – 3 percent). This site is found at all aspects. Flooding is frequent and brief and ponding is frequent and long.

Table 2. Representative physiographic features

Slope shape across	(1) Concave (2) Linear
Slope shape up-down	(1) Linear
Landforms	(1) Plains > Flood plain
Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent

Elevation	0–80 ft
Slope	0–3%
Water table depth	0 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent
Elevation	0–810 ft
Slope	0–3%
Water table depth	0 in

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 norther 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)	75-100 days
Freeze-free period (characteristic range)	65-90 days
Precipitation total (characteristic range)	21-34 in
Frost-free period (actual range)	75-100 days
Freeze-free period (actual range)	65-90 days
Precipitation total (actual range)	15-41 in
Frost-free period (average)	90 days
Freeze-free period (average)	75 days
Precipitation total (average)	29 in

Influencing water features

This site is influenced by nearby riparian water features. This site is most commonly associated with braided river systems. Flooding events are predicted to be low energy in this site. Precipitation, seasonal snow melt, and run off are the main sources of water.

Soil features

Soils are young Entisols with little to no development in the soil profile (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 coarse-silty alluvium over sandy and gravelly alluvium.

Soil hydrology is the main soil factor affecting site vegetation. Frequent, long ponding contributes to site hydrology. A water table is present from September through May and aquic soil conditions are present throughout the soil profile. Redox concentrations and a reduced matrix are present between one and 13 inches. Wet soils restrict species to predominantly facultative wet to obligate wetland species on this site.

Correlated soil components in MLRA 236: D36-Boreal sedge gravelly flood plains

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt
Drainage class	Very poorly drained
Permeability class	Moderate
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	1.8–2.4 in
Soil reaction (1:1 water) (0-10in)	4.8–6.8
Subsurface fragment volume <=3" (Depth not specified)	40%
Subsurface fragment volume >3" (Depth not specified)	0%

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained
Permeability class	Moderate
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	1.8–2.4 in
Soil reaction (1:1 water) (0-10in)	4.8–6.8
Subsurface fragment volume <=3" (Depth not specified)	40%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is on concave, lowland flood plains of the Nushagak River and other braided river systems. This relatively small site is most often near river side channels. Local site factors, including microtopographic elevation within the site, soil characteristics, and ponding supports one vegetative community. The reference plant community is a wet graminoid herbaceous community (Viereck et al., 1992) comprised of one or more sedges (Carex spp.) species, bluejoint, and diverse forbs throughout.

Site and soil hydrology support one community. Aquic soil conditions and long periods of ponding during the growing season restrict vegetation to primarily facultative wet to obligate wetland graminoid and forb species. Flood events are predicted to be low energy and do not scour vegetation or soil. Shrubs, particularly hydrophytic species such as willow (Salix spp.) and sweetgale (*Myrica gale*), may be present. Ponding typically excludes trees, though sporadic individuals of balsam poplar or white spruce may be present under the right soil conditions and where propagule pressure from surrounding forested areas is high.

Willows, grasses, and sedges are browsed and grazed by moose. This does not 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

Ecosystem states

1. Reference State

State 1 submodel, plant communities

1.1. Northwest Territory sedge/purple marshlocks/sphagnum moss grassland

State 1
Reference State

The reference state supports one community phase. The reference plant community is characterized by a wet graminoid herbaceous meadow. This site is stable. All community phases in this report are characterized using the Alaska vegetation classification system (Viereck et al., 1992).

Dominant plant species

- sedge (*Carex*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous
- water horsetail (*Equisetum fluviatile*), other herbaceous

Community 1.1
Northwest Territory sedge/purple marshlocks/sphagnum moss grassland

Figure 8. Typical area of community 1.1.

Community Phase Canopy Cover

(Vegetation data in the table are provided as constancy (percent) and average canopy cover (percent) of the most dominant and ecologically relevant species for this community phase.)

Plant group	Common name	Scientific name	USDA plant code	Constancy (percent)	Average canopy cover (percent)
S	Willow	*Salix spp.*	SALIX	50	45
S	Tealeaf willow	*Salix pulchra*	SAPU15	50	40
G	Beaked sedge	*Carex rostrata*	CARO6	50	80
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	50	50
F	Purple marshlocks	*Comarum palustre*	COPA28	100	15
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2#	50	75

Sphagnum mosses (*Sphagnum spp.*) are combined and distinguished at the genus level.

Figure 9. Constancy and canopy cover of plants in community 1.1.

The reference plant community is characterized as a grassland consisting of facultative or obligate wetland graminoids and forbs. Typically, this community consists of dense Northwest Territory sedge (*Carex utriculata*) and dispersed hydrophilic forbs such as purple marshlocks (*Comarum palustre*) and Mackenzie's water hemlock (*Cicuta virosa*). Other species may include bluejoint grass (Calamagrostis canadensis), beaked sedge (*Carex rostrata*), water horsetail (*Equisetum fluviatile*), and buttercups (Ranunculus spp.). Mosses, particularly sphagnum mosses (Sphagnum spp.), generally are in the ground cover (about 35 percent total mean cover). Other ground cover commonly includes herbaceous litter (about 60 percent cover) and woody litter (about 2 percent). Water covers about 20 percent of the surface and 8 percent is bare soil.

Dominant plant species

- willow (*Salix*), shrub
- Northwest Territory sedge (*Carex utriculata*), grass
- sedge (*Carex*), grass

- bluejoint (*Calamagrostis canadensis*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous

Additional community tables

Inventory data references

Modal points for Community 1.1
08SS12808
09AO11704
09AO13603
09SS11505
10SS03902

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

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Contributors

Phil Barber
Steph Schmit
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	05/10/2025
Approved by	Kirt Walstad
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:

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

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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:**
