Ecological site R236XY172AK
Boreal Dwarf Scrub Peat Flood Plains Depressions

Last updated: 2/13/2024
Accessed: 04/26/2024

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 lowland ecological site is in low braided river flood plain depressions. Site elevation is between sea level and 80 feet. Slopes are nearly level (0 percent). Site and soil hydrology caused by slope topography, highly organic soil and a ponding regime shape the vegetation on this landform. Soils are very poorly drained and support aquic soil conditions during the growing season. A water table is present at the soil surface in May and June, restricting vegetation during the important early growing season months. Ponding is occasional and brief in these concave depressions, further restricting vegetation.

The reference state supports two communities. The reference plant community is characterized as an open low scrubland (Viereck et al., 1992). It is composed of a facultative to obligate wetland scrubs with hydrophytic graminoids and forbs throughout. Depression centers are typically wetter than other areas, and support only facultative to obligate wetland species.

Associated sites

R236XY163AK	**Boreal Herbaceous Loamy Flood Plain Sloughs** R236XY163AK describes gravelly flood plain sloughs. Site hydrology and soil characteristics support a different reference state and reference plant community than that of R236XY172AK.

Similar sites

R236XY163AK	**Boreal Herbaceous Loamy Flood Plain Sloughs** Both sites describe flood plain features. R236XY163AK describes channels on low flood plains of braided rivers. This site is in large depressions. While both support hydrophytic vegetation, spatial and temporal differences in site factors such as ponding, flooding, soil characteristics and a water table are great enough to support two unique ecological sites.
R236XY155AK	**Boreal Scrub Loamy Flood Plains, Wet** Both sites are flood plain features. R236XY155AK describes channels on mid flood plains. This site is in large depressions. While both support hydrophytic vegetation, spatial and temporal differences in site factors such as ponding, flooding, soil characteristics and a water table are great enough to support two unique ecological sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Myrica gale* (2) *Betula nana*
Herbaceous	(1) *Comarum palustre* (2) *Carex*

Physiographic features

This site is in lowland low flood plain depressions. Elevation ranges from sea level to 80 feet. Slopes are nearly level (around 0 percent). This site is found at all aspects. A water table is present at 0 inches at the beginning of the growing season in May and June.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Talf (2) Dip
Slope shape across	(1) Concave (2) Linear

Slope shape up-down	(1) Linear
Landforms	(1) Plains > Flood plain (2) Alluvial plain > Depression
Runoff class	Negligible
Flooding frequency	Rare
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
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 frequency	Rare
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	0–200 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 bog-like site is influenced by riparian water features. Flooding is a rare event. Ponding occurs as a result of snow melt, throughflow and flooding inundation. Hydrophytic and emergent vegetation are present due to hydrologic influences in the concave flood plain depression.

Soil features

Soils are thick, organic Histosols (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 mossy organic material over coarse-silty alluvium.

Soil hydrology is the major soil characteristic affecting vegetation on this site. Soils are very poorly drained. A water table is present at the soil surface in May and June. 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: Halfmoon, D36-Boreal scrub organic flood plains

Table 5. Representative soil features

Parent material	(1) Alluvium (2) Organic material
Surface texture	(1) Peat (2) Mucky peat
Drainage class	Very poorly drained
Permeability class	Very slow to moderately slow
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	3–5.9 in
Soil reaction (1:1 water) (0-10in)	4–5.9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained
Permeability class	Very slow to moderate
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	3–5.9 in
Soil reaction (1:1 water) (0-10in)	4–6.5
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is in lowland low flood plain depressions. This bog-like site is associated with braided river systems such as the Nushagak River. Site hydrology, a product of landform, soil characteristics and a ponding disturbance, shapes site vegetation and is responsible for two communities in the reference states. The reference plant community is an open scrubland of facultative to obligate wetland species with hydrophytic graminoids and forbs

throughout.

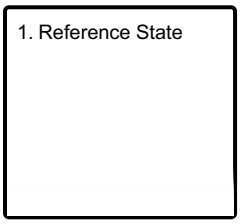
Spatial and temporal patterns in site hydrology create two communities. The reference plant community is associated with very poorly drained soils with a water table during the early growing season. Ponding occurs during the growing season, inhibiting available oxygen. Hypoxic or anoxic soil conditions stress vascular plants and directly shape the vegetative community (Vartapetian and Jackson, 1996). Vegetation is limited to facultative to obligate wetland species. The early community phase is in wetter depressions or in wetter areas of large depressions. These areas are common at the center of depressions. Increased hydrologic pressure due to longer ponding periods or an extended water table further restricts the plant species found in these wetter areas. A shift from one community to another can result from a change in relative water table depth and period length during the growing season.

Willows are slightly to moderately browsed by moose. This does not affect the ecological processes of the site, nor does it result in a distinct vegetative community.

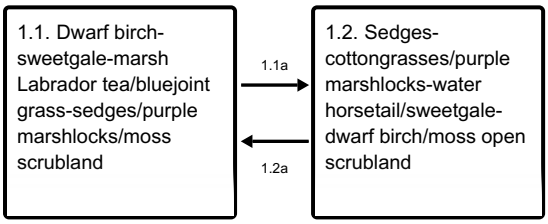
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant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

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1a - Increased hydrologic pressure.

1.2a - Decreased hydrologic pressure

State 1
Reference State

The reference state supports two community phases, which are grouped by the structure and dominance of the vegetation (e.g., shrubs, graminoids, and forbs) and by their ecological function and stability. The presence of these communities is dictated temporally by occasional periods of flooding and the potential for post-flood ponding. The reference community phase is represented by scrubland that has graminoids and forbs interspersed throughout. No alternate states have been observed.

Community 1.1
Dwarf birch-sweetgale-marsh Labrador tea/bluejoint grass-sedges/purple marshlocks/moss scrubland

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	Dwarf birch	*Betula nana*	BENA	100	25
S	Sweetgale	*Myrica gale*	MYGA	100	20
S	Marsh Labrador tea	*Ledum palustre* ssp. *decumbens*	LEPAD	100	15
S	Alaska bog willow	*Salix fuscescens*	SAFU	100	4
S	Cloudberry	*Rubus chamaemorus*	RUCH	100	4
S	Leatherleaf	*Chamaedaphne calyculata*	CHCA2	75	10
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	75	10
F	Purple marshlocks	*Comarum palustre*	COPA28	100	10
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2#	100	65

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

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

The reference community phase is characterized by scrubland consisting of low and dwarf shrubs with hydrophilic graminoids and forbs throughout. Annual plant cover is estimated visually to be highest among shrubs. Typically, this community consists of dwarf birch (*Betula nana*), sweetgale (*Myrica gale*), marsh Labrador tea (*Ledum palustre* ssp. decumbens), and leatherleaf (*Chamaedaphne calyculata*) with bluejoint grass (*Calamagrostis canadensis*) and purple marshlocks (*Comarum palustre*) throughout. Other species may include Alaska bog willow (*Salix fuscescens*), cloudberry (*Rubus chamaemorus*), small cranberry (*Vaccinium oxycoccos*), various sedges (Carex spp.), arctic sweet coltsfoot (*Petasites frigidus*), roundleaf sundew (*Drosera rotundifolia*), and water horsetail (*Equisetum fluviatile*). Individual regenerative white spruce (*Picea glauca*) trees may be present, particularly near the ecotonal edges of a forested ecological site, but they commonly do not survive to maturity. Mosses are dominant in the ground cover (about 85 percent total mean cover), commonly including various sphagnum mosses (Sphagnum spp.) and feathermosses (*Hylocomium splendens*, *Ptilium crista-castrensis*, *Pleurozium schreberi*). Lichens typically are a minor component (about 2 percent cover). The ground cover may include herbaceous litter (about 25 percent cover). About 1 percent of the surface is covered by water.

Community 1.2
Sedges-cottongrasses/purple marshlocks-water horsetail/sweetgale-dwarf birch/moss open scrubland

Figure 10. Typical area of community 1.2.

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	Sweetgale	*Myrica gale*	MYGA	75	10
S	Dwarf birch	*Betula nana*	BENA	75	9
S	Alaska bog willow	*Salix fuscescens*	SAFU	75	5
F	Purple marshlocks	*Comarum palustre*	COPA28	100	10
F	Water horsetail	*Equisetum fluviatile*	EQFL	100	3
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2#	100	90

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

Figure 11. Constancy and canopy cover of plants in community 1.2.

The early ponding community phase is characterized by open scrubland that has nearly equal proportions of low and dwarf shrubs and facultative or obligate wetland graminoids. Typically, this community consists of purple marshlocks (*Comarum palustre*) and water horsetail (*Equisetum fluviatile*); several shrubs such as sweetgale (*Myrica gale*), dwarf birch (*Betula nana*), and Alaska bog willow (*Salix fuscescens*); and myriad hydrophilic graminoids, including water sedge (*Carex aquatilis*), Northwest Territory sedge (*Carex utriculata*), creeping sedge (*Carex chordorrhiza*), and red cottongrass (*Eriophorum russeolum*). Other species may include bluejoint grass (*Calamagrostis canadensis*), white cottongrass (*Eriophorum scheuchzeri*), marsh Labrador tea (*Ledum palustre* ssp. decumbens), and Langsdorf's lousewort (*Pedicularis langsdorffii*). Rare regenerative or stunted white spruce (*Picea glauca*) trees from adjacent forested ecological sites may be present. Mosses, particularly sphagnum mosses (Sphagnum spp.), generally are dominant in the ground cover (about 95 percent total mean cover). The ground cover may also include herbaceous litter (about 6 percent cover) and woody litter (about 1 percent). About 2 percent of the surface is covered by water. About 1 percent is bare soil.

Pathway 1.1a
Community 1.1 to 1.2

Dwarf birch-sweetgale-marsh Labrador tea/bluejoint grass-sedges/purple marshlocks/moss scrubland

Sedges-cottongrasses/purple marshlocks-water horsetail/sweetgale-dwarf birch/moss open scrubland

Increased hydrologic pressure further restricts plant species to mostly facultative wet to obligate wetland species. Increased hydrologic pressure is caused by increased water input into the depression. Greater precipitation, more run-off input or a longer ponding period may cause this. Fire is expected to be a rare occurrence in this site.

However, a fire during a drought could burn part or all of the thick organic mat, raising the relative water table. This could also cause a vegetative shift.

Pathway 1.2a
Community 1.2 to 1.1

Sedges-cottongrasses/purple marshlocks-water horsetail/sweetgale-dwarf birch/moss open scrubland

Dwarf birch-sweetgale-marsh Labrador tea/bluejoint grass-sedges/purple marshlocks/moss scrubland

Decreased hydrologic pressure allows less hydrophytic species to colonize and develop sustaining populations. Decreases in precipitation or run-off from surround landforms may be a primary cause. Additionally, the continued build up of the organic layer can lower the associated water table, creating relatively drier soils in the area

Additional community tables

Inventory data references

Modal points for Community 1.1
07CS01705
10SS04606
10TD11001

Modal points for community 1.2
08LL09603
10TD10603

References

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Other references

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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	04/26/2024
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:**

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:**

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17. **Perennial plant reproductive capability:**
