USDA Natural Resources Conservation Service

Ecological site R236XY108AK
Subarctic Graminoid Peat Flood Plains

Last updated: 2/13/2024
Accessed: 05/18/2024

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.

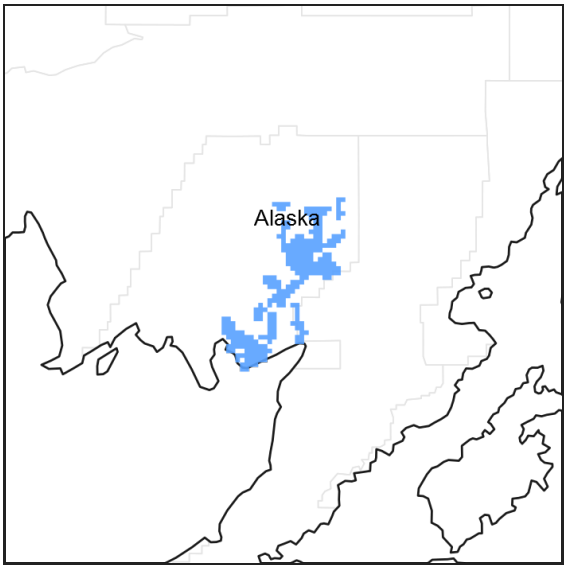


Figure 1. Mapped extent

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 site is on lowland flood plains. Site elevation is between 20 and 150 feet above sea level. Slopes are nearly level (0 – 3 percent). Soils are organic, very deep, and very poorly drained. Site hydrology shapes the vegetation on this landform.

The reference state supports three communities. The reference plant community is characterized as an open low scrubland (Viereck et al., 1992). It is composed of a mix of hydrophytic shrubs with large spans of facultative to obligate wetland graminoid and forb species. The other two communities are a result of ponding frequency and water depth. The wettest areas typically support the deepest organic soils and are void of shrubs. Areas between the reference plant community and community 1.3 support an intermediary community with characteristics of the other communities.

Associated sites

R236XY173AK	**Subarctic Riparian Complex Loamy Flood Plains** Both sites are on flood plains. R236XY173AK describes convex flood plain positions. Slope shape and soil factors create wetter habitat in this site. These conditions are reflected in the vegetation of the reference plant community.
R236XY127AK	**Subarctic Sedge Peat Plain Depressions** Both sites are on flood plains. This site describes the flood plain talf, while R236XY127AK describes concave dips. Differences in site hydrology and soil characteristics result in distinct reference plant communities.

Similar sites

R236XY163AK	**Boreal Herbaceous Loamy Flood Plain Sloughs** Both are flood plain sites that support similar post-flood communities. Vegetative differences are most evident in comparisons of the reference plant community. Differences in soils (gravelly versus organic) can further distinguish these sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Myrica gale* (2) *Salix pulchra*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Comarum palustre*

Physiographic features

This site is on linear flood plain talfs. Elevation ranges from 20 to 150 above sea level. Slopes are nearly level (0 – 3 percent). This site is found at all aspects.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Talf (2) Dip
Landforms	(1) Alluvial plain > Flood plain
Runoff class	Low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional

Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	6–46 m
Slope	0–3%
Water table depth	0 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional
Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	0–283 m
Slope	0–3%
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 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)	533-864 mm
Frost-free period (actual range)	75-100 days
Freeze-free period (actual range)	65-90 days
Precipitation total (actual range)	381-1,041 mm
Frost-free period (average)	90 days
Freeze-free period (average)	75 days
Precipitation total (average)	737 mm

Influencing water features

Site hydrology shapes the vegetation on this site. Run off is low to negligible and a water table is present at the soil surface throughout the year. Most species on this site are facultative to obligate wetland species. Precipitation is the main source of water.

Soil features

Soil is an organic Histosols. Soils are very deep and very poorly drained. They support a cryic temperature regime and an aquic moisture regime. Parent material is grassy organic material.

Hydrology is the major soil factor affecting vegetation. Aquic conditions exist throughout the soil profile and a water table is present at the soil surface throughout the year. Organic decomposition is relatively slow compared with

organic accumulation, resulting in hemic or fibric soil materials. These conditions restrict vegetation to mostly facultative to obligate wetland species.

Correlated soil components in MLRA 236: Snakeriver, D36-Western maritime grass organic flood plains

Table 5. Representative soil features

Parent material	(1) Organic material
Surface texture	(1) Peat
Drainage class	Very poorly drained
Permeability class	Moderate
Soil depth	152 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)	5–5.8
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	152 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)	4.5–5.9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is on lowland flood plains. Site factors including local elevation and soil characteristics support three co-occurring vegetative communities. Ponding is the major disturbance on this site. Flood events are low energy and do not scour the soil or vegetation. The reference community phase is an open scrubland of medium and low shrubs with patches of dense graminoids and hydrophilic forbs throughout.

Spatial patterns in site hydrology support three flood plain communities. Ponding period and water depth during the growing season greatly influence vegetation. The reference plant community grows on areas of less ponding. The water table is low enough during the growing season to support shrubs. Areas with the ponded surface water throughout the growing season are typically void of shrubs and support community 1.3. These areas contain the deepest organic soils. Community 1.2 is an intermediary between the reference plant community and community 1.3.

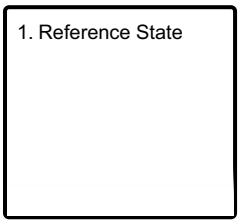
Changes to site hydrology can shift one community to the other. Increased ponding can result from increased precipitation or an increase in run-off due to an upstream disturbance such as fire. The reference plant community is susceptible to dieback from increased periodic length and surface depth of ponding. Community 1.2 or 1.3 will develop. Similarly, decreased water input can shift community 1.2 or 1.3 to the reference plant community.

Willows are browsed by moose. This does not appear to affect the ecological processes of the site and does not result in a separate community in the reference state.

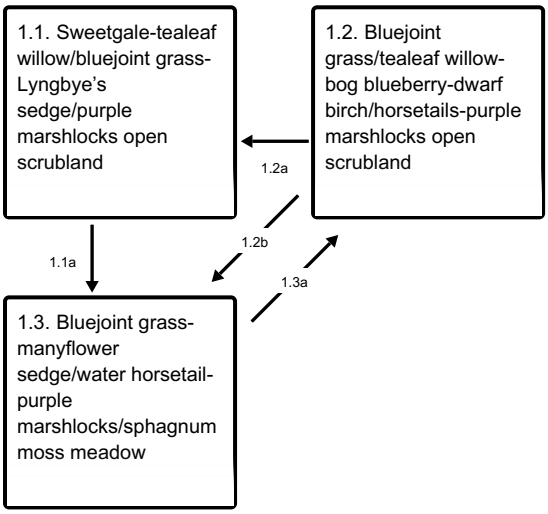
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant 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 - Raised water table

1.2a - Lowered water table

1.2b - Raised water table

1.3a - Lowered water table

State 1
Reference State

The reference state supports three community phases, which are grouped by the structure and dominance of the vegetation (e.g., graminoids, shrubs, and forbs) and by their ecological function and stability. The reference community phase is characterized by open scrubland consisting of medium and tall hydrophilic shrubs and interstitial areas of bluejoint grass (*Calamagrostis canadensis*). The community phases are temporally dictated by ponding associated with floodwater. No alternate states have been observed.

Community 1.1
Sweetgale-tealeaf willow/bluejoint grass-Lyngbye's sedge/purple marshlocks open 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	Tealeaf willow	*Salix pulchra*	SAPU15	100	15
S	Sweetgale	*Myrica gale*	MYGA	88	20
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	50
G	Lyngbye's sedge	*Carex lyngbyei*	CALY3	38	10
F	Purple marshlocks	*Comarum palustre*	COPA28	100	5
F	Water horsetail	*Equisetum fluviatile*	EQFL	50	8
M	Sphagnum mosses	*Sphagnum spp.*	SPHAG2#	63	20

Sphagnum mosses are identified to genus level.

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

The reference community phase is characterized by open scrubland that includes patchy, dense shrubs surrounded by myriad graminoids and forbs. Typically, the scrubland community consists of myriad facultative, facultative wet, and obligate species, including tealeaf willow (*Salix pulchra*), sweetgale (*Myrica gale*), bluejoint grass (*Calamagrostis canadensis*), Lyngbye's sedge (*Carex lyngbyei*), water horsetail (*Equisetum fluviatile*), and purple marshlocks (*Comarum palustre*). Other less common species may include Northwest Territory sedge (*Carex utriculata*), Alaska bog willow (*Salix fuscescens*), and arctic raspberry (*Rubus arcticus*). Mosses, dominantly sphagnum moss (Sphagnum spp.), make up 20 percent of the ground cover. Other ground cover includes herbaceous litter (about 75 percent cover), woody litter (about 1 percent), and water (about 2 percent). Medium, stunted, or regenerative white spruce (*Picea glauca*) and regenerative paper birch (*Betula papyrifera*) may be in this community. These individual trees commonly are from neighboring woodland or forests and generally do not survive due to the ponding.

Community 1.2
Bluejoint grass/tealeaf willow-bog blueberry-dwarf birch/horsetails-purple marshlocks 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	Tealeaf willow	*Salix pulchra*	SAPU15	100	10
S	Dwarf birch	*Betula nana*	BENA	50	20
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	45
F	Horsetails	*Equisetum spp.*	EQUIS	50, 50, 25^	1, 30, 2
F	Purple marshlocks	*Comarum palustre*	COPA28	100	5

^ Horsetails (*Equisetum spp.*) are represented by three species—*E. arvense*, *E. pratense*, and *E. sylvaticum*, respectively.

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

The late ponding community phase is characterized by open scrubland that includes low and medium shrubs and a wide variety of graminoids and forbs throughout. Typically, the community consists of various hydrophilic and water-tolerant species, including tealeaf willow (*Salix pulchra*), dwarf birch (*Betula nana*), bluejoint grass (*Calamagrostis canadensis*), horsetails (Equisetum spp.), and purple marshlocks (*Comarum palustre*). The presence of myriad facultative wet and obligate forbs and graminoids indicates the site is almost constantly wet. The indicator species include tall cottongrass (*Eriophorum angustifolium*), arctic sweet coltsfoot (Petasites fridigus), Northwest Territory sedge (*Carex utriculata*), roundleaf sundew (*Drosera rotundifolia*), and American speedwell (*Veronica americana*). Mosses commonly are on the surface (about 28 percent total mean cover). Other ground cover commonly includes herbaceous litter (about 75 percent cover) and water (about 6 percent).

Community 1.3
Bluejoint grass-manyflower sedge/water horsetail-purple marshlocks/sphagnum moss meadow

Figure 12. Typical area of community 1.3.

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.)

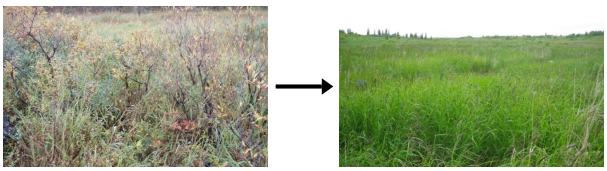
Plant group	Common name	Scientific name	USDA plant code	Constancy (percent)	Average canopy cover (percent)
S	Alaska bog willow	*Salix fuscescens*	SAFU	71	1
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	55
G	Manyflower sedge	*Carex pluriflora*	CAPL6	43	Trace
F	Purple marshlocks	*Comarum palustre*	COPA28	100	4
F	Water horsetail	*Equisetum fluviatile*	EQFL	86	3
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2*	71	45

* Sphagnum mosses are identified to genus level.

Figure 13. Constancy and canopy cover of plants in community 1.3.

The early ponding community phase is characterized by a meadow consisting of moisture-tolerant graminoids and forbs. Typically, the community consists of various facultative or obligate wetland species, including bluejoint grass (*Calamagrostis canadensis*), manyflower sedge (*Carex pluriflora*), water horsetail (*Equisetum fluviatile*), purple marshlocks (*Comarum palustre*), and Alaska bog willow (*Salix fuscescens*). Many other wetland species may be present, including water sedge (*Carex aquatilis*), red cottongrass (*Eriophorum russeolum*), Lyngbye's sedge (*C. lyngbyei*), kneeling angelica (*Angelica genuflexa*), and sweet gale (*Myrica gale*). Sphagnum mosses (Sphagnum spp.) commonly are prevalent in the ground cover. Other ground cover commonly includes herbaceous litter (about 75 percent cover) and water (about 6 percent).

Pathway 1.1a
Community 1.1 to 1.3



Sweetgale-tealeaf willow/bluejoint grass-Lyngbye's sedge/purple marshlocks open scrubland

Bluejoint grass-manyflower sedge/water horsetail-purple marshlocks/sphagnum moss meadow

A raised water table stresses extant species of the reference plant community. Less tolerant species die back to be replaced by more tolerant forbs and graminoids. Water table increases are the result of increased water input to an area. This could be caused by increased precipitation, including more snow during the winter or more rain during the growing season. A raised water table could also be a result of an upstream disturbance such as a fire, which increases run off rates.

Pathway 1.2a
Community 1.2 to 1.1

Bluejoint grass/tealeaf willow-bog blueberry-dwarf birch/horsetails-purple marshlocks open scrubland

Sweetgale-tealeaf willow/bluejoint grass-Lyngbye's sedge/purple marshlocks open scrubland

A lowered water table would allow less resilient, slower growing species to colonize. A lowered water table could be a result of a decrease in precipitation, a decrease in upstream run off into the site or improved drainage in the flood plain site.

Pathway 1.2b
Community 1.2 to 1.3

Bluejoint grass/tealeaf willow-bog blueberry-dwarf birch/horsetails-purple marshlocks open scrubland

Bluejoint grass-manyflower sedge/water horsetail-purple marshlocks/sphagnum moss meadow

A raised water table stresses extant species. Less tolerant species die back to be replaced by more tolerant wetland forb and graminoid species. Water table increases are the result of increased water input to an area. This could be caused by increased precipitation, including more snow during the winter or more rain during the growing season. A raised water table could also be a result of an upstream disturbance such as a fire, which increases run off rates.

Pathway 1.3a
Community 1.3 to 1.2

Bluejoint grass-manyflower sedge/water horsetail-purple marshlocks/sphagnum moss meadow

Bluejoint grass/tealeaf willow-bog blueberry-dwarf birch/horsetails-purple marshlocks open scrubland

A lowered water table would allow less resilient, slower growing species to colonize. A lowered water table could be a result of a decrease in precipitation, a decrease in upstream run off into the site or improved drainage in the flood plain site.

Additional community tables

Inventory data references

Modal points for Community 1.1
07AO01804
07DM01508
09SS03603
10SS00905

Modal points for community 1.2

10SS00507
07CS13910

Modal points for community 1.3
07MM21804
07CS19006
10SS00501

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	05/18/2024
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):**

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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:**
