

Ecological site R236XY120AK Boreal Open Scrub Loamy Mid Flood Plains

Last updated: 2/13/2024
Accessed: 05/17/2024

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 well drained lowland mid flood plains. Site elevation ranges from sea level to 220 feet. Slopes are nearly level (0 – 2 percent).. This site has aquic, low nutrient soils with a relatively shallow (18 – 33 inches) water table that influences the vegetation.

The reference state supports two communities. The reference plant community is characterized as an open willow scrubland (Viereck et al., 1992). It is composed of one or more willow species with bluejoint and diverse forbs throughout. A woodland community may develop when the normal flooding disturbance is interrupted for extended periods.

Associated sites

R236XY119AK	Boreal Scrubland Sandy Flood Plains Both sites are on flood plains and can be found in the same riverine systems. These sites experience different flooding and ponding regimes. This site is on moderately well drained soils with relatively low water tables. R236XY119AK is on poorly drained soils with a high water table. Differences in site hydrology, soil factors, and disturbance regimes result in different communities in the respective reference states.
F236XY111AK	Boreal Forest Loamy Flood Plains Both sites are flood plains. F236XY111AK describes forested flood plains. The site and soil conditions in R236XY120 are too wet to support a forest.

Similar sites

R236XY119AK	Boreal Scrubland Sandy Flood Plains Both sites are on flood plains and can be found in the same riverine systems. These sites experience different flooding and ponding regimes. This site is on moderately well drained soils with relatively low water tables. R236XY119AK is on poorly drained soils with a high water table. Differences in site hydrology, soil factors, and disturbance regimes result in different communities in the respective reference states.
-------------	---

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Salix pulchra</i> (2) <i>Rubus arcticus</i>
Herbaceous	(1) <i>Calamagrostis canadensis</i> (2) <i>Polemonium acutiflorum</i>

Physiographic features

This site is on linear flood plain talfs. Elevation ranges from sea level to 220 feet. Slopes are nearly level (0 – 2 percent). This site occasionall floods for long periods during the growing season, and is typically followed by occasional periods of brief ponding. This site is found at all aspects.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain
Runoff class	Negligible to low
Flooding duration	Long (7 to 30 days)
Flooding frequency	Occasional

Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	0–61 m
Slope	0–1%
Water table depth	20–84 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible to low
Flooding duration	Long (7 to 30 days)
Flooding frequency	Occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	0–67 m
Slope	0–1%
Water table depth	20–84 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)	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

This site is on flood plains. Flooding events are occasional and long. Post-flood ponding is brief. The riverine system classification (Cowardin et al., 1979) varies for this site depending on location.

Soil features

Soils are young and weakly developed Inceptisols (Soil Survey Staff, 2013). Soils are very deep and moderately well drained. They support a cryic temperature regime and an udic moisture regime. Parent material is coarse-silty alluvium over sandy alluvium.

Soil characteristics affecting vegetation include soil hydrology and available nutrients. A water table is present between 8 and 33 inches in May and June. Aquic soil conditions begin at 20 inches. Wet soils restrict vegetation to

primarily facultative to obligate wetland species. Available nutrients are low in this soil, as indicated by an umbric epipedon and a cambic horizon. Low nutrient available limits the types and species of plants that are supported here.

Correlated soil components in MLRA 236: D36-Boreal scrub silty flood plains

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt
Drainage class	Moderately well drained
Permeability class	Moderate
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-25.4cm)	5.59–6.6 cm
Soil reaction (1:1 water) (0-25.4cm)	5.1–6
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	Moderately well drained
Permeability class	Moderate
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-25.4cm)	5.59–6.6 cm
Soil reaction (1:1 water) (0-25.4cm)	5.1–6
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is on lowland mid flood plains. Local site factors including local flooding dynamics and soil characteristics support two plant communities. The reference plant community is a relatively stable open tall scrubland (Vioreck et al., 1992). Plant species are primarily facultative upland to facultative wet wetland species. Species are tolerant of low soil nutrient levels common in this site.

Flooding is an occasional and long disturbance on this flood plain. Flooding intensity and frequency are critical in determining the distribution and abundance of vegetation in Alaskan riverine systems (Wohl, 2007). The reference plant community develops under normal flooding circumstances. Flooding does not appear to scour soil or vegetation and no post-flood community is identified on this site. In areas where flooding is less disruptive and soil conditions are better drained, the community may develop beyond a scrubland. Increased soil development and

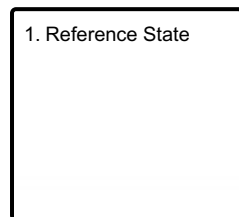
adequate propagule pressure from trees can allow a woodland to develop, as described by community 1.2.

Severe browsing of willows by moose occurs in the reference plant community. Browsing does not significantly affect the structure and function of this community or the ecological site.

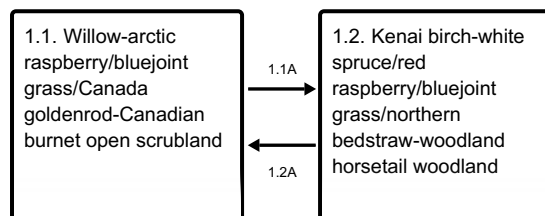
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant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

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1A - Site hydrology shifts, no flooding

1.2A - Return of typical flooding regime

State 1 Reference State

The reference state supports two community phases grouped by the structure and dominance of the vegetation (e.g., trees, shrubs, forbs, and graminoids) and their ecological function and stability. The presence of these communities is dictated by changes in site hydrology. The reference community phase is represented by open grassland interspersed with forbs and graminoids. A transition to a post-reference community phase may occur if the reference community phase is not subject to flooding for a longer period than normal. This would allow for colonization and growth of trees. No alternate states have been observed. All community phases in this report are characterized using the Alaska vegetation classification system (Vioreck et al., 1992).

Dominant plant species

- willow (*Salix*), shrub
- arctic raspberry (*Rubus arcticus*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- tall Jacob's-ladder (*Polemonium acutiflorum*), other herbaceous

Community 1.1

Willow-arctic raspberry/bluejoint grass/Canada goldenrod-Canadian burnet 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	Arctic raspberry	<i>Rubus arcticus</i>	RUAR	100	15
S	Tealeaf willow	<i>Salix pulchra</i>	SAPU15	90	20
G	Bluejoint grass	<i>Calamagrostis canadensis</i>	CACA4	100	65
F	Tall Jacob's-ladder	<i>Polemonium acutiflorum</i>	POAC	90	7
F	Fireweed	<i>Chamerion angustifolium</i>	CHAN9	80	4
F	Northern bedstraw	<i>Galium boreale</i>	GABO2	70	5
F	Canadian burnet	<i>Sanguisorba canadensis</i>	SACA14	60	15
F	Horsetails	<i>Equisetum spp.</i>	EQUIS	20, 20, 40 [^]	7, 4, 20

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

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

The reference community phase is characterized by open scrubland consisting of one or more willow species interspersed with forbs and graminoids throughout. Typically, this community consists of patchy tealeaf (*Salix pulchra*), feltleaf willow (*S. alaxensis*), and Bebb willow (*S. bebbiana*) and bluejoint grass (*Calamagrostis canadensis*), tall Jacob's-ladder (*Polemonium acutiflorum*), Canadian burnet (*Sanguisorba canadensis*), fireweed (*Chamerion angustifolium*), and woodland horsetail (*Equisetum sylvaticum*). Other extant species may include arctic raspberry (*Rubus arcticus*), alder (*Alnus spp.*), silvery sedge (*Carex canescens*), marsh pea (*Lathyrus palustris*), seacoast angelica (*Angelica lucida*), and purple marshlocks (*Comarum palustre*). Mosses commonly are in the ground cover (about 15 percent total mean cover). The ground cover may include herbaceous litter (about 85 percent) and woody litter (about 1 percent).

Community 1.2
Kenai birch-white spruce/red raspberry/bluejoint grass/northern bedstraw-woodland horsetail woodland



Figure 10. 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)
T	Kenai birch	<i>Betula papyrifera</i> var. <i>kenaica</i>	BEPAK	133 [*]	15 [*]
T	White spruce	<i>Picea glauca</i>	PIGL	100	15 [*]
S	American red raspberry	<i>Rubus idaeus</i>	RUID	100	6
G	Bluejoint grass	<i>Calamagrostis canadensis</i>	CACA4	67	65
F	Northern bedstraw	<i>Galium boreale</i>	GABO2	100	3
F	Fireweed	<i>Chamerion angustifolium</i>	CHAN9	100	1
F	Woodland horsetail	<i>Equisetum sylvaticum</i>	EQSY	100	2

* Trees may be present in multiple strata within one plot; therefore, it is possible for species of this plant group to have a constancy value of more than 100 percent.

[^] Tall, medium, and stunted individuals are counted as canopy trees. Regenerative individuals are not included.

Figure 11. Constancy and canopy cover of plants in community 1.3.

This post-reference community phase is characterized by mixed woodland that has graminoids, forbs, and shrubs throughout. Typically, this community consists of mixed Kenai birch (*Betula papyrifera* var. *kenaica*) and white spruce (*Picea glauca*) and an understory of bluejoint grass (*Calamagrostis canadensis*), American red raspberry (*Rubus idaeus*), northern bedstraw (*Galium boreale*), woodland horsetail (*Equisetum sylvaticum*), and fireweed (*Chamerion angustifolium*). Other species may include Canada goldenrod (*Solidago canadensis*), silvery sedge (*Carex canescens*), Bebb willow (*Salix bebbiana*), and arctic raspberry (*Rubus arcticus*). Mosses are a relatively minor component of the ground cover (about 5 percent total mean cover). Other ground cover commonly includes herbaceous litter (about 95 percent) and woody litter (about 1 percent). Note: The vegetation and soils for this community were sampled at three locations. Due to the limited data available, personal field observations were used to aid in describing the plant community.

Pathway 1.1A Community 1.1 to 1.2



Willow-arctic
raspberry/bluejoint
grass/Canada goldenrod-
Canadian burnet open
scrubland



Kenai birch-white spruce/red
raspberry/bluejoint
grass/northern bedstraw-
woodland horsetail woodland

The reference plant community is resilient to flooding disturbances. An atypical shift in site hydrology can decrease the effects of flooding. Slower growing, less hydrophytic plants colonize and grow. A woodland may develop on this landform if the site hydrology remains dry for an extended period.

Pathway 1.2A

Community 1.2 to 1.1



Kenai birch-white spruce/red raspberry/bluejoint grass/northern bedstraw-woodland horsetail woodland



Willow-arctic raspberry/bluejoint grass/Canada goldenrod-Canadian burnet open scrubland

The return of the typical site hydrology increases hydrophytic pressures on vegetation. Plants susceptible to a high water table and mechanical scouring die back. Hydrophytic shrubs and herbaceous plants increase in foliar cover.

Additional community tables

Inventory data references

Modal points for Community 1.1

10SS04006

10SS04905

10SS10705

10SS11103

Modal points for community 1.2

10SS07505

10SS07703

10SS07805

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.

Rood, S.B., L.A. Goater, J.M. Mahoney, C.M. Pearce, and D.G. Smith. 2007. Floods, fire, and ice: Disturbance ecology of riparian cottonwoods. *Canadian Journal of Botany* 85(11): 1,019-1,032.

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.

Wohl, E.E. 2007. Review of effects of large floods in resistant-boundary channels. In Gravel-Bed Rivers VI: From Process Understanding to River Restoration, Volume 11. H. Habersack, H. Piégay, and M. Rinaldi, editors. Elsevier Science, Amsterdam. Pages 181-211.

Yarie, J., L. Viereck, K. Van Cleve, and P. Adams. 1998. Flooding and ecosystem dynamics along the Tanana River. BioScience 48(9): 690-695.

Contributors

Phil Barber
Michael Margo
Sue Tester
Kendra Moseley
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	05/17/2024
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:**

17. **Perennial plant reproductive capability:**
