USDA Natural Resources Conservation Service

Ecological site R236XY121AK
Boreal Tall Scrub Loamy Flood Plains

Last updated: 2/13/2024
Accessed: 05/08/2024

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.

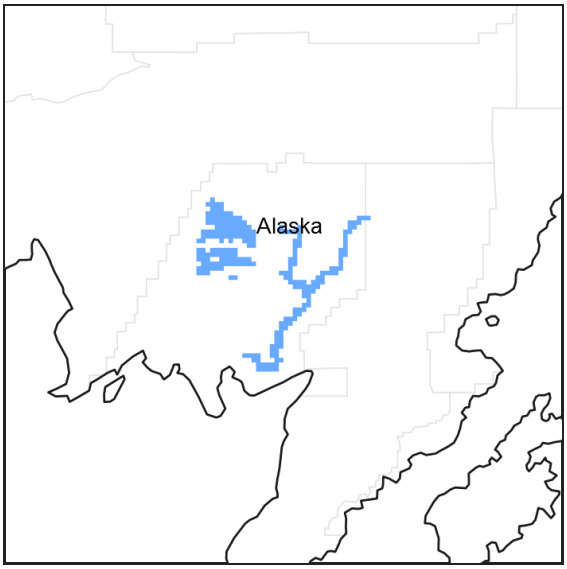

Figure 1. Mapped extent

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 ecological site is on lowland low flood plains. Site elevation is between 20 and 810 feet above sea level. Slopes are nearly level (0 – 3 percent). Soil hydrology and post-flood ponding shape the vegetation on this landform.

The reference state supports two communities. The reference plant community is characterized as a closed tall scrubland (Viereck et al., 1992). It is composed of a mix of alder and willow in the canopy with bluejoint and diverse forbs in the understory. The second community is wetter and supports more obligate wetland species.

Associated sites

F236XY111AK	**Boreal Forest Loamy Flood Plains** Both sites can be located on the same flood plain. F236XY111AK is rarely flooded with poorly drained soils. It supports a forest community in the reference state that is not present in this site.
F236XY176AK	**Boreal Woodland Loamy Flood Plains** Both sites are on flood plain talfs. F236XY176AK supports a black spruce forest on this site. Soils are more acidic, with an umbric epipedon, and support aquic conditions not found in this site.
R236XY153AK	**Boreal Willow Silty Low Flood Plains** Both sites are flood plains and can be found in the same riverine system. R236XY153AK describes low flood plains that are frequently flooded. These sites support different communities in the reference state.
R236XY156AK	**Subarctic Ericaceous Scrub Loamy Terraces** R236XY156AK described flood plain terraces. These areas do not flood and site hydrology is different than the site described herein.

Similar sites

R236XY153AK	**Boreal Willow Silty Low Flood Plains** Both sites are flood plains and can be found in the same riverine system. R236XY153AK describes low flood plains that are frequently flooded. These sites have similar reference plant communities but they are associated with different soils and unique disturbance regimes.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Alnus incana subsp. tenuifolia* (2) *Salix alaxensis*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Impatiens noli-tangere*

Physiographic features

This site is on linear slopes of lowland flood plains.. Elevation typically ranges from 20 to 810 feet above sea level. Slopes are nearly level (0 – 3 percent). This site floods occasionally for brief periods during the growing season. This is followed by occasional, brief ponding. This site is found at all aspects.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Talf
Landforms	(1) Valley > Flood plain (2) Alluvial plain > Flood plain
Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days)

Flooding frequency	Occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	6–244 m
Slope	0–3%
Water table depth	Not specified
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	Occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Rare to occasional
Elevation	0–555 m
Slope	0–4%
Water table depth	79 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

This site is on flood plains. Flooding events are occasional and brief. Post-flood ponding is brief.

Soil features

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

Soil hydrology influences vegetation on this site. Redox concentrations point towards anaerobic soil conditions

during some point of the year. Occasional, brief ponding linked with flooding inundates this ecological site. Wet soils favor hydrophygic vegetation on this site.

Correlated soil components in MLRA 236: D36-Boreal scrub loamy flood plains; Lewispoint

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt
Drainage class	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)	4.06–4.83 cm
Soil reaction (1:1 water) (0-25.4cm)	4.7–5.6
Subsurface fragment volume <=3" (Depth not specified)	16%
Subsurface fragment volume >3" (Depth not specified)	0%

Table 6. Representative soil features (actual values)

Drainage class	Moderately well drained to 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)	4.06–5.84 cm
Soil reaction (1:1 water) (0-25.4cm)	4.6–6.1
Subsurface fragment volume <=3" (Depth not specified)	1–16%
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, often co-occurring plant communities. The reference plant community is a closed tall scrubland (Viereck et al., 1992). Plant species are primarily facultative upland to facultative wetland species.

Flooding is an occasional and brief 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. Areas that undergo post-flood ponding typically support a less diverse community. The hypoxic or anoxic condition that may result from ponding is a major abiotic stress that can determine the presence or absence of vascular plants (Vartapetian and Jackson, 1996). Wetter areas typically exclude the more hydrologically-sensitive species found in the reference plant community.

Slight to sever 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

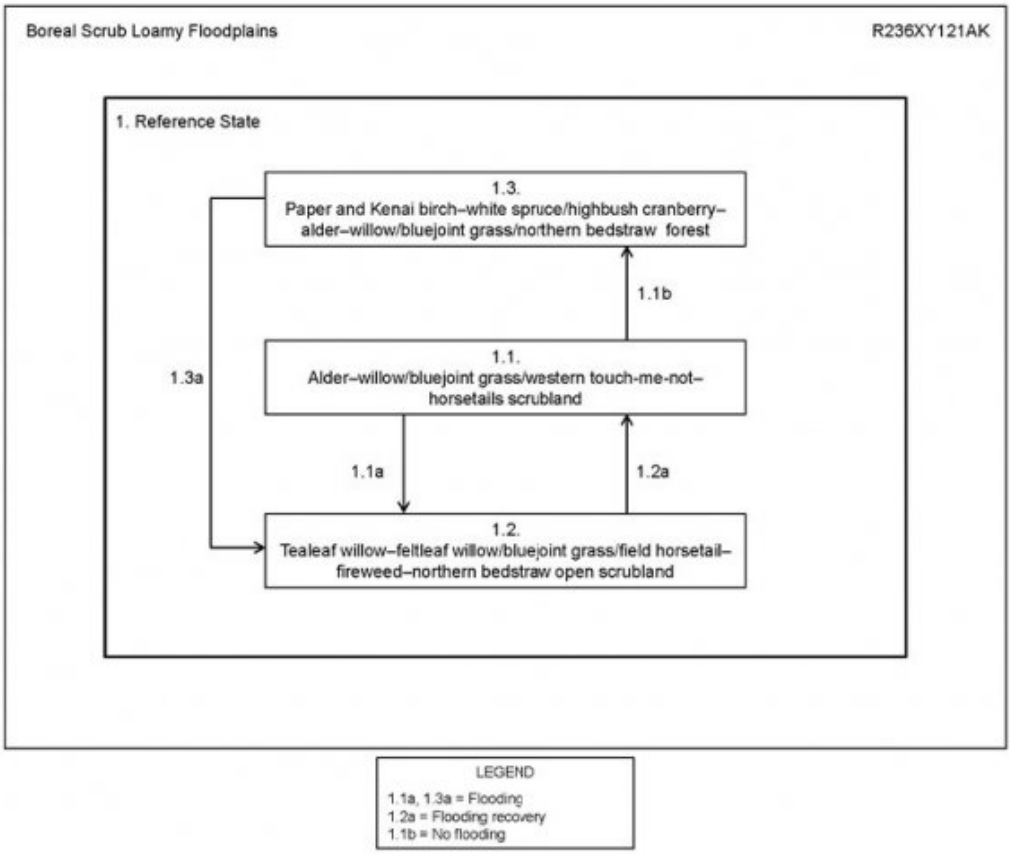

Figure 8. State-and-transition model.

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 reference plant community is characterized by a closed tall scrubland. The presence of this and related communities are dictated temporally and spatially by soil hydrology, a flooding regime, and post-flood ponding disturbances. All community phases in this report are characterized using the Alaska vegetation classification system (Viereck et al., 1992).

Dominant plant species

- thinleaf alder (*Alnus incana ssp. tenuifolia*), shrub
- feltleaf willow (*Salix alaxensis*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- western touch-me-not (*Impatiens noli-tangere*), other herbaceous

Community 1.1
Alder–willow/bluejoint grass/western touch-me-not–horsetails scrubland

Figure 9. 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	Thinleaf alder	*Alnus incana* ssp. *tenuifolia*	ALINT	68	40
S	American red raspberry	*Rubus idaeus*	RUID	64	9
S	Feltleaf willow	*Salix alaxensis*	SAAL	59	15
S	Sitka alder	*Alnus viridis* ssp. *sinuata*	ALVIS	55	40
S	Tealeaf willow	*Salix pulchra*	SAPU15	50	5
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	96	55
F	Spreading woodfern	*Dryopteris expansa*	DREX2	77	7
F	Western touch-me-not	*Impatiens noli-tangere*	IMNO	73	10
F	Horsetails	*Equisetum spp.*	EQUIS	64, 32, 32^	10, 20, 25

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

Figure 10. Constancy and canopy cover of community 1.1.

The reference community phase is characterized by tall scrubland with forbs and graminoids dispersed throughout. This community consists of a tall shrub overstory of Sitka alder (*Alnus viridis* ssp. sinuata), thinleaf alder (*Alnus incana* ssp. tenuifolia), and feltleaf willow (*Salix alaxensis*) and an understory of bluejoint grass (*Calamagrostis canadensis*), western touch-me-not (*Impatiens noli-tangere*), spreading woodfern (*Dryopteris expansa*), and horsetails (Equisetum spp.). Other extant species may include tealeaf willow (*Salix pulchra*), American red raspberry (*Rubus idaeus*), arctic starflower (*Trientalis europaea*), and fireweed (*Chamerion angustifolium*). The ground cover commonly includes mosses (about 10 percent total mean cover), herbaceous litter (about 80 percent), and woody litter (about 8 percent). Sparse trees may be present on this site, particularly in well drained areas.

Dominant plant species

- thinleaf alder (*Alnus incana ssp. tenuifolia*), shrub
- feltleaf willow (*Salix alaxensis*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- western touch-me-not (*Impatiens noli-tangere*), other herbaceous

Community 1.2
Tealeaf willow-feltleaf willow/bluejoint grass/field horsetail-fireweed-bedstraw open scrubland

Figure 11. 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	90	25
S	Feltleaf willow	*Salix alaxensis*	SAAL	40	50
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	55
F	Fireweed	*Chamerion angustifolium*	CHAN9	80	8
F	Northern bedstraw	*Galium boreale*	GABO2	70	2
F	Field horsetail	*Equisetum arvense*	EQAR	60	20

Figure 12. Constancy and canopy cover of plants in community 1.2.

This early flooding community phase is characterized by willow (Salix spp.) scrubland that has bluejoint grass (*Calamagrostis canadensis*) and forbs throughout. Typically, this community consists of a patchwork of tealeaf willow (*Salix pulchra*) and feltleaf willow (*Salix alaxensis*) and open areas of bluejoint grass, fireweed (*Chamerion angustifolium*), northern bedstraw (*Galium boreale*), and field horsetail (*Equisetum arvense*). Other species may include alders (Alnus spp.), Barclay's willow (*Salix barclayi*), western touch-me-not (*Impatiens noli-tangere*), common ladyfern (*Athyrium filix-femina*), and other horsetails (Equisetum spp.). Mosses are a minor component of the ground cover (about 8 percent total mean cover). Other ground cover commonly includes herbaceous litter (about 80 percent) and woody litter (about 5 percent). About 25 percent is bare soil.

Pathway 1.1a
Community 1.1 to 1.2

Alder–willow/bluejoint grass/western touch-me-not–horsetails scrubland

Tealeaf willow-feltleaf willow/bluejoint grass/field horsetail-fireweed-bedstraw open scrubland

The reference plant community is resilient to normal flooding disturbances. Well drained soils support a wide diversity of shrubs, forbs and graminoids. When areas become wetter, due to an increase in the effects of ponding, less tolerant species die and the community becomes dominated by facultative wet to obligate wetland species.

Pathway 1.2a
Community 1.2 to 1.1

Tealeaf willow-feltleaf willow/bluejoint grass/field horsetail-fireweed-bedstraw open scrubland

Alder–willow/bluejoint grass/western touch-me-not–horsetails scrubland

If area hydrology shifts to become drier, community 1.2 can shift to the less hydrophytic reference plant community. Decreases in the effects of ponding due to less water inflow initiate this change.

Additional community tables

Inventory data references

Modal points for Community 1.1
08MM13207
08AO07701
08AO20108
09AO14401
09AO13002
09AO14305
09SC00501
10SS10906

Modal points for community 1.2
09AO14002
10SS03903
10SS07204

References

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Contributors

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

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	05/08/2024
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):**

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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:**
