USDA Natural Resources Conservation Service

Ecological site R236XY136AK
Subarctic Low Scrub Loamy Plain Drainages

Last updated: 2/13/2024
Accessed: 05/21/2025

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 in narrow (less than 35 feet wide) lowland drainageways. Site elevation ranges from 30 to 340 feet above sea level. Slopes are nearly level to gentle (0 – 4 percent). Soil and site hydrology shape the vegetation on this landform. Soils are very poorly drained and this site undergoes frequent, long flooding with a year-round water table.

The reference state supports two communities. The reference plant community is characterized as an open tall scrubland (Viereck et al., 1992). It is composed of one or more willow species with an understory of graminoids and forbs. The second community is wetter and comprised of facultative wet to obligate wetland species.

Associated sites

R236XY144AK	**Subarctic Scrub Peat Terraces** R236XY144AK describes terrace treads. These areas are located at higher elevations within a drainageway than the talfs described by this site.

R236XY175AK	**Subarctic Scrub Loamy Steep Coastal Bluffs** R236XY175AK describes the steeply sloped bluffs lining the drainageways described by this site. Differences in site hydrology and flooding disturbances due to slope and soil characteristics are reflected in the different vegetation between these sites.
R236XY130AK	**Subarctic Scrub Scrub Tundra Loamy Plains and Hills** R236XY130AK describe well drained linear and convex positions on hills and rolling plains. These plains are dissected by the drainageways described by R236XY136AK. Differences in site and soil hydrology are reflected in different reference plant communities.

Similar sites

R236XY107AK	**Western Alaska Maritime Scrub Gravelly Drainages** Both sites describe drainages. R236XY107AK is surrounded by slopes of less than 10 percent and R236XY136AK typically is surrounded by slopes of more than 10 percent. The resulting differences in soil and disturbance regime are reflected in the vegetation.
R236XY109AK	**Subarctic Low Scrub Peat Drainages** Both sites describe drainages. Drainages described by R236XY109AK are typically wider than 25 feet, while those described here are narrower than 35 feet. Resulting differences in site characteristics, soils and disturbance regime result in different reference plant communities.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix pulchra* (2) *Vaccinium uliginosum*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Equisetum arvense*

Physiographic features

This site is in plain drainageways. Drainageways are less than thirty-five feet wide and slopes of surrounding landforms are more than ten percent. Slopes are concave across and linear down. Elevation ranges from 30 to 340 feet above sea level. Slope gradients are nearly level to gentle (0 – 4 percent). This site is found at all aspects.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Talf
Landforms	(1) Plains > Drainageway
Runoff class	Negligible to low

Flooding duration	Long (7 to 30 days)
Flooding frequency	Frequent
Elevation	30–340 ft
Slope	0–4%
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	Long (7 to 30 days)
Flooding frequency	Frequent
Elevation	20–350 ft
Slope	0–5%
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 frequently floods for long periods of time. Flooding is low energy and does not appear to scour soil or vegetation. The main hydrologic drivers of vegetation on this site are soil drainage and a water table.

Soil features

Soils are young and weakly developed Inceptisols (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 organic material over coarse-loamy alluvium over gravelly alluvium.

Soil characteristics affecting vegetation include soil hydrology and poor soil development. These very poorly drained soils support a water table is present at the soil surface throughout the year. in May and June. Aquic conditions are present beginning at six inches. Wet soil conditions restrict the vegetation to primarily facultative to obligate wetland species. Soil is poorly developed as indicated by an ochric epipedon and a cambic horizon. A lack of soil development can further restrict the plant species found in these drainages.

Correlated soil components in MLRA 236: Ungiuq

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Peat
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)	2.4–3.9 in
Soil reaction (1:1 water) (0-10in)	4.7–6
Subsurface fragment volume <=3" (Depth not specified)	75%
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)	2.4–3.9 in
Soil reaction (1:1 water) (0-10in)	4.7–6
Subsurface fragment volume <=3" (Depth not specified)	75%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is in lowland, narrow drainageways less than thirty-five feet wide. Local site factors including soil characteristics, site hydrology, and area topology support two communities. The reference plant community is an open willow scrubland with hydrophytic graminoids and forbs throughout. Wetter instances of this landform are more likely to support less shrubs and more facultative wet to obligate wetland species, which coincided with community 1.2.

Site hydrology, as influenced by soil factors and slope, shape vegetation on this site. Soils are very poorly drained with a water table at the soil surface throughout the year. Under typical conditions, the open willow scrubland of the reference plant community develops. Flooding is a frequent and long occurrence on this landform. Flood energy is low due and vegetation is typically left unscoured. However, increased periods of flooding during the growing season may act similar to ponding, creating anoxic or hypoxic conditions that can restrict vegetation. Increased area wetness can cause a shift to less shrubs and more wetland herbaceous species. Area wetness may increase as a result of a rise in inputs from slope run off due to greater precipitation or a fire on associated landforms. Some drainages, such as those with nearly level slopes, may also be more prone to wet conditions.

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

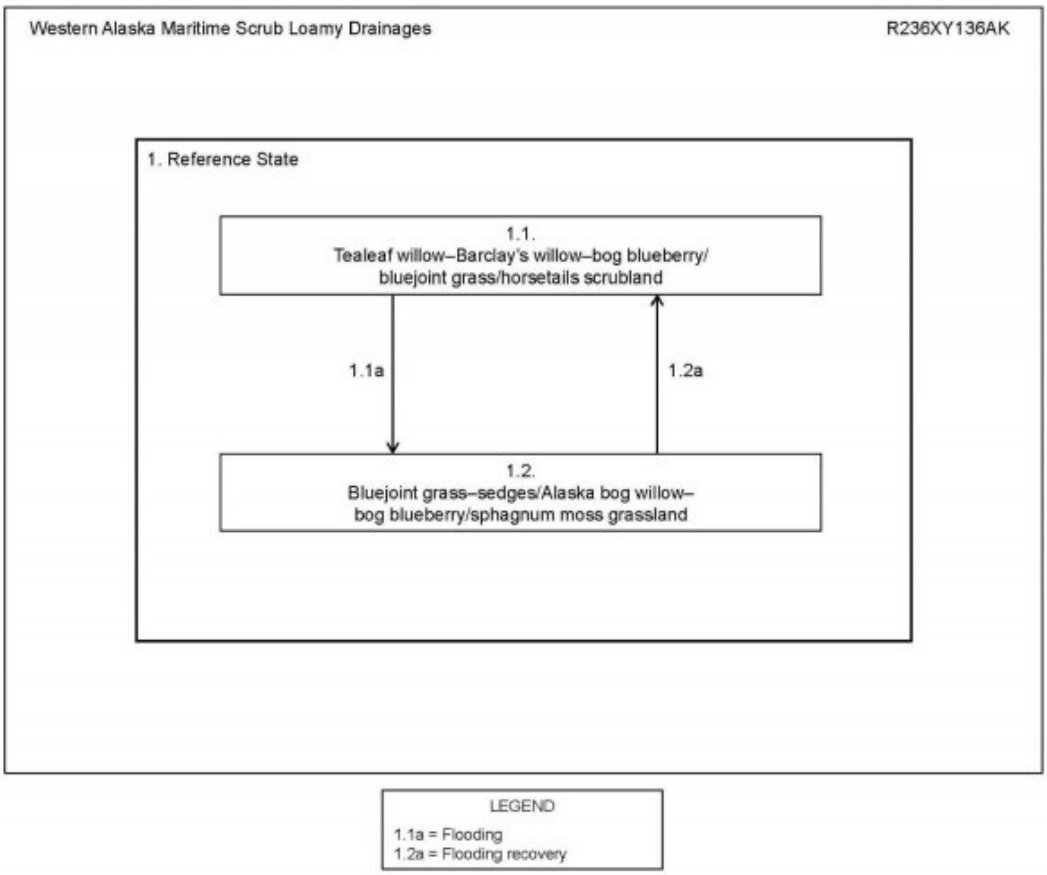

Figure 8. State-and-transition model.

State 1
Reference State

The reference state supports two community phases, which are grouped by the structure and dominance of the vegetation (e.g., shrubs, forbs, and graminoids) and by their ecological function and stability. The presence of these communities is dictated temporally by frequent periods of flooding. The reference community phase is represented by a scrubland community that has open areas of graminoids and forbs. No alternate states have been observed.

Community 1.1
Tealeaf willow-Barclay's willow-bog blueberry/bluejoint grass/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	Tealeaf willow	*Salix pulchra*	SAPU15	100	40
S	Bog blueberry	*Vaccinium uliginosum*	VAUL	40	35
S	Barclay's willow	*Salix barclayi*	SABA3	40	20
S	Dwarf birch	*Betula nana*	BENA	40	20
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	15
F	Fireweed	*Chamerion angustifolium*	CHAN9	80	2
F	Horsetails	*Equisetum spp.*	EQUIS	80, 80^	8, 4

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

Figure 10. Constancy and canopy cover of plants in community 1.1.

The reference community phase is characterized by scrubland that has graminoids and forbs throughout. Typically, this community consists of dense patches of tealeaf (*Salix pulchra*) and Barclay's willow (*S. barclayi*) with bluejoint grass (*Calamagrostis canadensis*), bog blueberry (*Vaccinium uliginosum*), horsetails (Equisetum spp.), and fireweed (*Chamerion angustifolium*) throughout. Other extant species typically include dwarf birch (*Betula nana*), marsh Labrador tea (*Ledum palustre* ssp. decumbens), various sedges (Carex spp.) and cottongrasses (Eriophorum spp.), and purple marshlocks (*Comarum palustre*). Individuals and small clusters of white spruce (*Picea glauca*) and Kenai birch (*Betula papyrifera* var. kenaica) trees may be present, but they do not develop into an area of woodland or forestland. Mosses typically are in the ground cover (40 percent total mean cover), and lichens are a minor component (about 2 percent). The ground cover also includes herbaceous litter (about 60 percent cover) and woody litter (about 2 percent). About 6 percent of the surface is covered by water.

Community 1.2
Bluejoint grass-sedges/Alaska bog willow-bog blueberry/sphagnum moss grassland

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	Alaska bog willow	*Salix fuscescens*	SAFU	100	20
S	Bog blueberry	*Vaccinium uliginosum*	VAUL	100	9
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	25
G	Water sedge	*Carex aquatilis*	CAAQ	100	10
G	White cottongrass	*Eriophorum scheuchzeri*	ERSC2	50	20
F	Purple marshlocks	*Comarum palustre*	COPA28	100	4
M	Sphagnum mosses	*Sphagnum spp.*	SPHAG2	100^	45

^ Sphagnum mosses are identified to the genus level.

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

The early flooding community phase is characterized by grassland that has patches of shrubs and forbs throughout. Typically, this community consists of bluejoint grass (*Calamagrostis canadensis*); white cottongrass (*Eriophorum scheuchzeri*); several sedges, including water sedge (*Carex aquatilis*); and patches of Alaska bog willow (*Salix fuscescens*), bog blueberry (*Vaccinium uliginosum*), and purple marshlocks (*Comarum palustre*) throughout. Other species include dwarf birch (*Betula nana*), tall Jacob's-ladder (*Polemonium acutiflorum*), sweetgale (*Myrica gale*), and bog rosemary (*Andromeda polifolia*). Sphagnum mosses (Sphagnum spp.) are abundant in the ground cover (45 percent total mean cover). The ground cover may also include herbaceous litter (about 40 percent) and woody litter (about 1 percent). About 10 percent of the surface is covered with water. About 3 percent is bare soil. 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

Tealeaf willow-Barclay's willow-bog blueberry/bluejoint grass/horsetails scrubland

Bluejoint grass-sedges/Alaska bog willow-bog blueberry/sphagnum moss grassland

Increased soil wetness levels can exclude shrubs and shift site preference to facultative wet to obligate wetland species. Longer periods of flooding during the growing season act similar to ponding, creating anoxic or hypoxic conditions that restrict vegetation. Increased site wetness may be a result of a rise in inputs from slope run off due to greater precipitation or a fire on associated landforms. Some drainages, such as those with nearly level slopes, may also be more prone to wet conditions.

Pathway 1.2a
Community 1.2 to 1.1

Bluejoint grass-sedges/Alaska bog willow-bog blueberry/sphagnum moss grassland

Tealeaf willow-Barclay's willow-bog blueberry/bluejoint grass/horsetails scrubland

Decreased hydrologic pressure, associated with a decrease in water inputs, will allow slower growing and less hydrophytic species to colonize. Decreased area wetness may be a result of less input from run off or decreases in precipitation. Of note, some drainages described by this site, such as those with nearly level slopes, may also be more prone to wet conditions.

Additional community tables

Inventory data references

Modal points for Community 1.1
07SS09805
08SS13304

Modal points for community 1.2
08LL09405
10SS06208

References

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Contributors

Phil Barber
Michael Margo

Sue Tester
Kendra Moseley
Steph Schmit
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	05/21/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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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:**