

Ecological site R236XY156AK

Subarctic Ericaceous Scrub Loamy Terraces

Last updated: 2/13/2024
Accessed: 04/29/2024

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.

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).

Classification relationships

Alaska Vegetation Classification:

Open low scrubland (II.C.2 - level III) / Mesic shrub birch – ericaceous shrubland (II.C.2.c - level IV)
(Viereck et al., 1992)

Ecological site concept

This ecological site is on non-forested flood plain terraces. Site elevation is between 30 and 850 feet above sea level. Slopes are nearly level (0 - 1 percent). Soil hydrology, strongly acidic soil pH, and soil and air temperature shape the vegetation on this landform. Year round ponding and aquic conditions in the soil restrict vegetation. Low acidity reduces available soil nutrients. This site is usually too wet and too cold to support trees. However, white spruce and black spruce may be present at lower elevations and in downriver areas of this site.

The reference state supports one community. The reference plant community is characterized as a mesic birch - ericaceous shrubland (Viereck et al., 1992). It is composed of dwarf birch, various ericaceous shrubs, and a sparse population of graminoids and forbs atop mossy ground cover. This site is usually too wet and too cold to support

trees. However, white spruce and black spruce may be present at lower elevations and in downriver locations of this site.

Associated sites

R236XY121AK	Boreal Tall Scrub Loamy Flood Plains R236XY121AK describes valley flood plain talfs. R236XY156AK describes the higher elevated terrace treads in the valley system. This site is usually too wet and too cold to support trees. However, white spruce and black spruce may be present at lower elevations and in downriver areas of this site.
F236XY165AK	Boreal Woodland Loamy Stream Terraces F236XY165AK describes the similar terrace tread landform but it is located in the forested boreal zone. The absence of trees distinguished R236XY156AK from that site.
R236XY144AK	Subarctic Scrub Peat Terraces R236XY144AK is wetter site in the depressions on the terrace tread described by R236XY156AK.

Similar sites

F236XY165AK	Boreal Woodland Loamy Stream Terraces Both site are on similar terrace treads. F236XY165AK is a boreal site and supports trees, unlike R236XY156AK. In the large ecotonal zone between boreal and Western Alaska maritime climates, there may be some overlap between these sites. A determination can be made based on the presence or absence of trees.
-------------	---

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Betula nana</i> (2) <i>Empetrum nigrum</i>
Herbaceous	(1) <i>Calamagrostis canadensis</i> (2) <i>Lycopodium annotinum</i>

Physiographic features

This site is on flood plain terraces. Elevation ranges from 30 to 850 feet above sea level. Slopes are nearly level (0 – 1 percent). Ponding is rare and flooding does not occur. A water table is found year round between soil depths of 26 and 51 inches. This site is found at all aspects.

Table 2. Representative physiographic features

Geomorphic position, terraces	(1) Tread
Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Landforms	(1) Valley > Flood plain (2) Valley > Terrace
Runoff class	Negligible to low
Flooding frequency	None
Ponding frequency	Rare
Elevation	30–850 ft
Slope	0–1%
Water table depth	26–51 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible to low
Flooding frequency	None
Ponding frequency	Rare
Elevation	10–1,080 ft
Slope	0–1%
Water table depth	26–51 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 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)	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

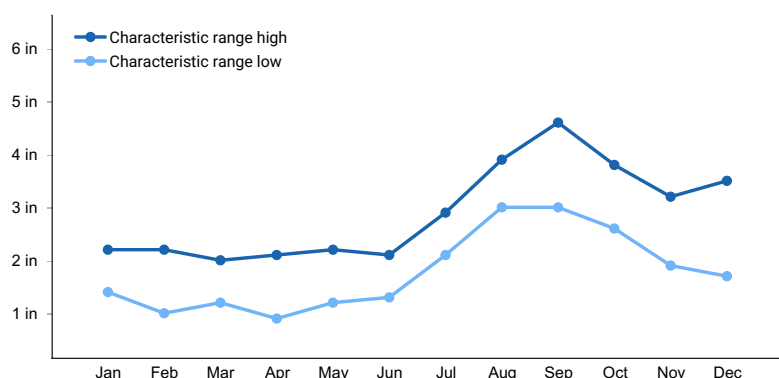


Figure 1. Monthly precipitation range

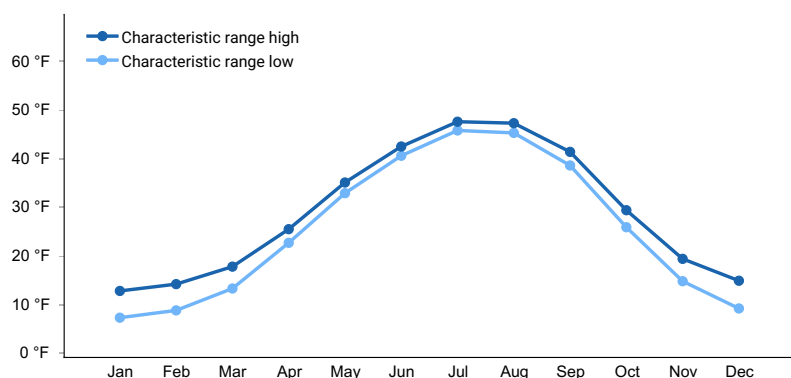


Figure 2. Monthly minimum temperature range

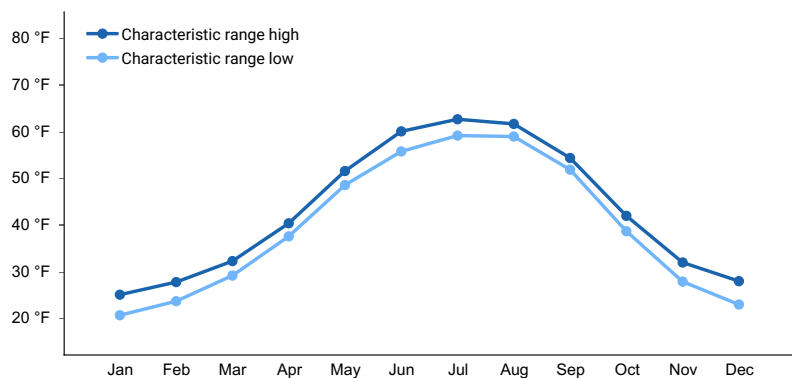


Figure 3. Monthly maximum temperature range

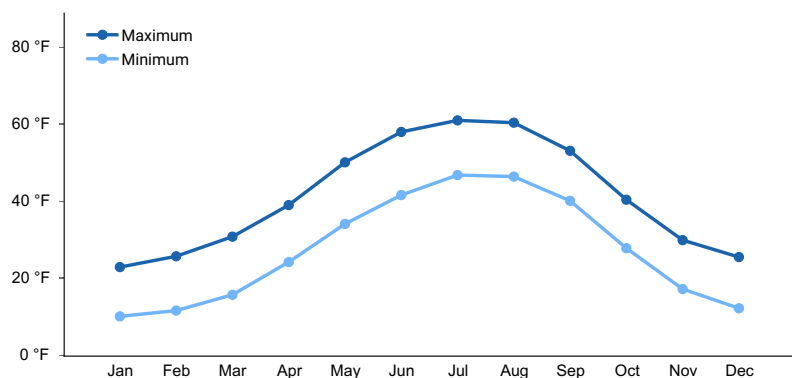


Figure 4. Monthly average minimum and maximum temperature

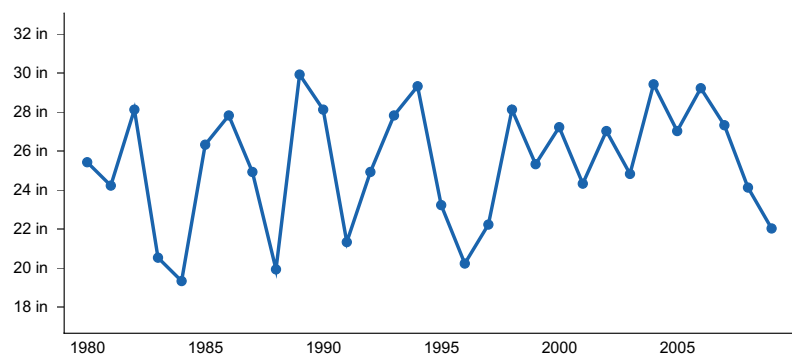


Figure 5. Annual precipitation pattern

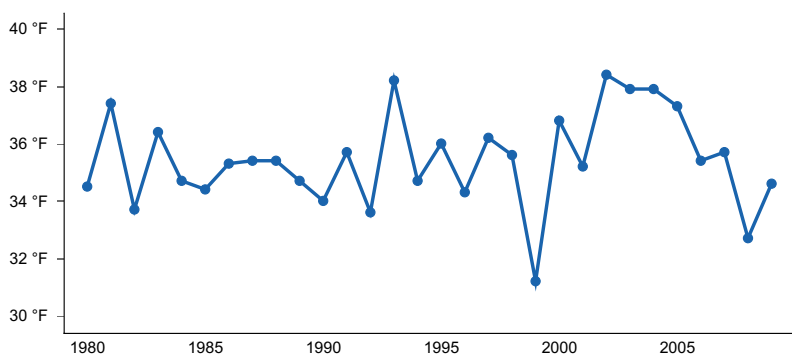


Figure 6. Annual average temperature pattern

Influencing water features

Due to its landscape position, this site is not influenced by wetland or riparian water features. Precipitation is the main source of water.

Soil features

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

Soil characteristics affecting vegetation include soil hydrology and weak soil development with moderate to low fertility. Aquic conditions are deep (49 – 72 inches) in the soil profile; redox concentrations are moderately deep. Water in the soil profile can restrict vegetation. Moderate to low soil fertility, exemplified by an umbric epipedon, further restricts vegetation on this site.

Correlated soil components in MLRA 236: D36-Western maritime low scrub loamy terraces

Table 5. Representative soil features

Parent material	(1) Organic material (2) Eolian deposits (3) Alluvium
Surface texture	(1) Highly organic silt loam
Drainage class	Moderately well drained
Permeability class	Moderate
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	2.8–3.1 in
Soil reaction (1:1 water) (0-10in)	4–5
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	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	2.8–3.1 in
Soil reaction (1:1 water) (0-10in)	4–5
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is on non-forested flood plain terraces. Local site factors such as soil hydrology, air and soil temperature

and soil acidity support one community on this site. The reference plant community is an open low scrubland with mixed ericaceous shrubs, graminoids and sparse forbs. A moderately deep water table and aquic conditions limit vegetation, as does very strong soil pH (4.5 – 5.0). This site is usually too wet and too cold to support trees. However, white spruce and black spruce may be present at lower elevations and in downriver areas of this site.

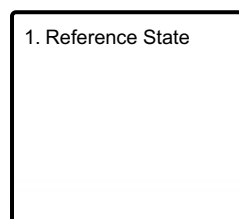
This site is stable and does not appear to support a unique post-disturbance community. These terraces are removed from the flooding effects experienced by nearby flood plains. They are generally too cool and wet for a fire disturbance (Vioreck et al., 1992).

There is no apparent browse or grazing on this site.

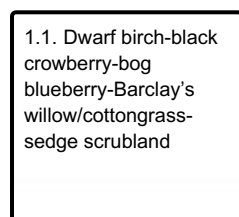
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant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

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1 Reference State

The reference state supports one community phase. This community is stable; no known disturbance regime will transition the community to an early sere. The reference community phase is low and dwarf scrubland. No alternate states have been observed. This report provides baseline inventory data for the vegetation in this ecological site. Future data collection is needed to provide further information about existing plant communities and the disturbance regimes that would result in transitions from one community to another.

Community 1.1 Dwarf birch-black crowberry-bog blueberry-Barclay's willow/cottongrass-sedge scrubland



Figure 7. 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	Bog blueberry	<i>Vaccinium uliginosum</i>	VAUL	100	26
S	Dwarf birch	<i>Betula nana</i>	BENA	100	21
S	Lingonberry	<i>Vaccinium vitis-idaea</i>	VAVI	100	12
S	Marsh Labrador tea	<i>Ledum palustre</i> ssp. <i>decumbens</i>	LEPAD	100	14
S	Black crowberry	<i>Empetrum nigrum</i>	EMNI	71	29
S	Barclay's willow	<i>Salix barclayi</i>	SABA3	29	6
G	Bluejoint grass	<i>Calamagrostis canadensis</i>	CACA4	86	6

Figure 8. Constancy and canopy cover of plants in community 1.1.

The reference community phase is characterized by scrubland that has graminoids and sporadic forbs throughout. Typically, the community consists of dwarf birch (*Betula nana*), black crowberry (*Empetrum nigrum*), bog blueberry (*Vaccinium uliginosum*), and lingonberry (*Vaccinium vitis-idaea*) with small, dense clusters of Barclay's willow (*Salix barclayi*). Other species may include bluejoint grass (*Calamagrostis canadensis*), cottongrasses (*Eriophorum* spp.), various sedges (*Carex* spp.), spirea (*Spiraea stevenii*), fireweed (*Chamerion angustifolium*), stiff clubmoss (*Lycopodium annotinum*), and field horsetail (*Equisetum arvense*). Individual stunted white spruce (*Picea glauca*) and paper birch (*Betula papyrifera*) trees may be present, particularly in areas where the site abuts a forested site. Mosses (total mean cover ~30 percent) and lichens (~15 percent) commonly are in the ground cover. Polytrichum mosses (*Polytrichum* spp.) and snow lichens (*Stereocaulon* spp.) are most common. Other ground cover commonly includes herbaceous litter (~50 percent cover) and woody litter (~7 percent).

Additional community tables

Inventory data references

Modal points for Community 1.1
 08LL06004
 09SS13002
 09SS13003

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.

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.

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	04/29/2024
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:**
-