USDA Natural Resources Conservation Service

Ecological site R236XY133AK
Subarctic Graminoid Loamy Tidal Coastal Plains

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

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.

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:
Mesic graminoid herbaceous (III.A.2 - level III) / Bluejoint-herb community (III.A.2.b - level IV)
(Viereck et al., 1992)

Ecological site concept

This ecological site is on linear tidal flats of the coastal plain shore complex. Site elevation is between sea level to 30 feet. Slopes are nearly level. Site and soil hydrology are the major influencers of vegetation on this site. Soils are poorly drained and a water table is present throughout the growing season. Flooding from tidal events and storms introduce salt and brackish water to this site, significantly influencing the vegetation here.

The reference state supports two communities. The reference plant community is characterized as mesic graminoid herbaceous meadow (Viereck et al., 1992). It is composed of one or more grass species with mixed forbs throughout. Microtopographic lows and areas closest to the sea are generally wetter than the reference state, and supports primarily obligate wetland species tolerant to higher salt concentrations.

Associated sites

R236XY129AK	**Subarctic Low Scrub Peat Coastal Plains** Both sites are part of the coastal plain shore complex. R236XY129AK describes scrub marshes associated with organic Histosols. Those scrub marshes typically have water at the surface. R236XY133AK supports primarily herbaceous species on minimally developed silt loam Entisols.

Similar sites

R236XY135AK	**Western Alaska Maritime Scrub Loamy Plains, Coastal** Both sites are part of the coastal plain and support large populations of herbaceous species. R236XY135AK is better drained and only has a water table at the beginning of the growing season. It supports willows, which are not present in R236XY133AK.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Calamagrostis canadensis* (2) *Leymus mollis*

Physiographic features

This site is on linear tidal flats of the coastal plain shore complex. Elevation ranges from sea level to 30 feet. Slopes are nearly level (0 – 1 percent). Flooding is very frequent and coincides with tidal inundation. Ponding is occasional and brief and is more common in low-lying areas of this site. This site is found at all aspects.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Tidal flat (2) Shore complex > Tidal flat
Runoff class	Negligible to low
Flooding frequency	Very frequent
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	0–9 m
Slope	0–1%
Water table depth	0 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Negligible to medium
Flooding frequency	Frequent to very frequent
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	0–85 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

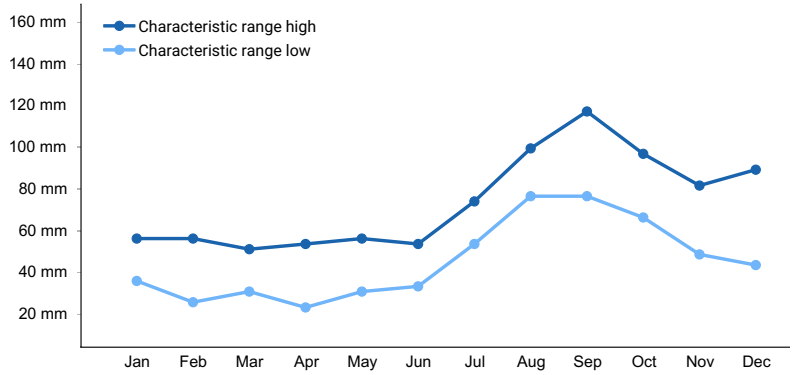


Figure 1. Monthly precipitation range

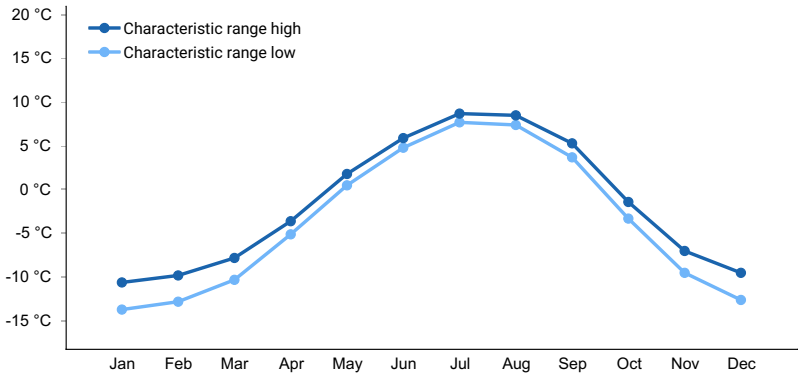


Figure 2. Monthly minimum temperature range

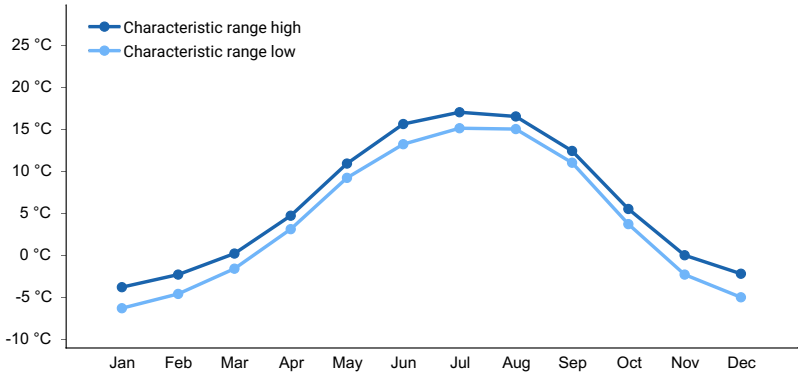


Figure 3. Monthly maximum temperature range

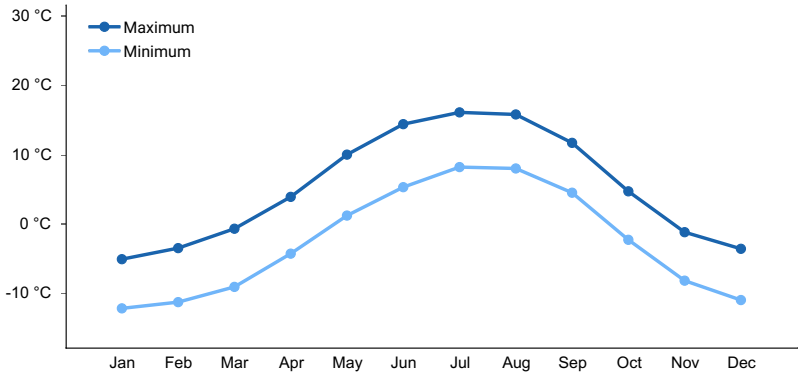


Figure 4. Monthly average minimum and maximum temperature

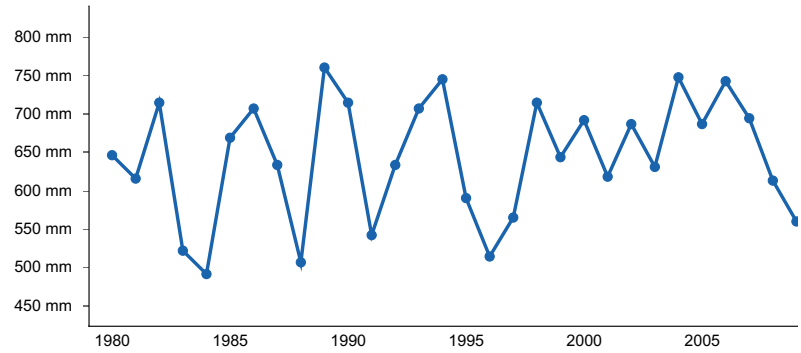


Figure 5. Annual precipitation pattern

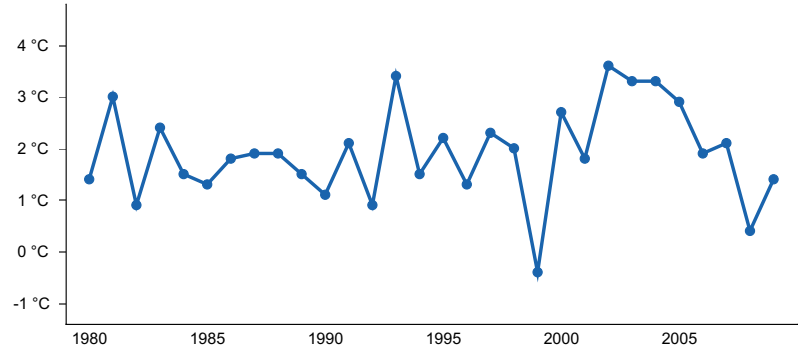


Figure 6. Annual average temperature pattern

Influencing water features

This site is flooded and ponded. Very frequent flooding restricts vegetation to facultative to obligate wetland species that are tolerant of saltwater and salt spray. Freshwater is delivered to this system from upstream areas that dissect the coastal plain. Saltwater inundation is common, especially at lower elevations nearest the coast.

Soil features

Soils are minimally developed Entisols (Soil Survey Staff, 2013). They are very deep and very poorly drained. They support a cryic temperature regime and a peraquic moisture regime. Parent material is composed of marine deposits.

Hydrology is the main soil characteristic affecting vegetation. A water table is present at the soil surface throughout the growing season. Aquic conditions are present between 5 and 72 inches. These soil conditions restrict vegetation to facultative to obligate wetland species.

Correlated soil components in MLRA 236:
Mudie
D36-Western maritime grass silty coastal plains
E36-Maritime wet meadow-silty low coastal plains

Table 5. Representative soil features

Parent material	(1) Marine deposits
Surface texture	(1) Silt loam
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)	2.29–4.06 cm
Soil reaction (1:1 water) (0-25.4cm)	6–7.3
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	Slow to moderate
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-25.4cm)	2.29–9.14 cm
Soil reaction (1:1 water) (0-25.4cm)	6–7.3
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This site is on linear tidal flats of the coastal shore complex. Local site factors, including microtopographic elevation,

soil characteristics, and area hydrologic dynamics create two vegetative communities. The reference plant community is a mesic graminoid herbaceous mixed meadow. Vegetation is restricted to salt-tolerant species and both communities are comprised of facultative to obligate wetland species.

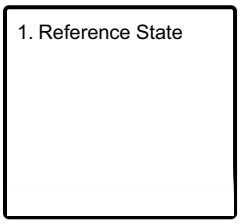
Spatial and temporal patterns in site hydrology support two communities. Microtopographic lows and areas closest to the sea are identified as wetter areas on this site and are more likely to pond, supporting community 1.2. Flooding and ponding events and relative water table depths are susceptible to changes in tidal flooding and drainage patterns, storm scouring, and soil development.

This site is not susceptible to fire disturbance. Grazing is noted on grasses and sedges in both communities and does not appear to affect the ecological processes of this site.

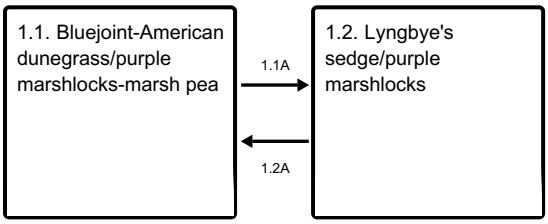
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant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

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1A - Raised water table, decreased drainage

1.2A - Lowered water table, increased drainage

State 1
Reference State

The reference state supports two community phases, which are distinguished by the developed structure and dominance of the vegetation and by their ecological function and stability. The reference community phase is grassland. The presence of each community is dictated temporally by a disturbance regime of frequent flooding. This report provides baseline inventory data for the vegetation in the ecological site. Future data collection is needed to provide further information about existing plant communities and the disturbance regimes that result in transitions from one community to another. Common and scientific names are from the USDA PLANTS database. Community phases are characterized by the Alaska Vegetation Classification System (Viereck et al., 1992).

Community 1.1
Bluejoint-American dunegrass/purple marshlocks-marsh pea

Figure 7. Typical area of community 1.1.

Community Phase 1.1 Canopy Cover Table

Vegetation data is aggregated across modal sample plots for this community phase and is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	80	40
G	Lyngbye's sedge	*Carex lyngbyei*	CALY3	60	3
G	American dunegrass	*Leymus mollis*	LEMO8	40	40
F	Purple marshlocks	*Comarum palustre*	COPA28	80	5
F	Marsh pea	*Lathyrus palustris*	LAPA4	80	2
F	Marsh willowherb	*Epilobium palustre*	EPPA	60	Trace

The sample plots are distributed across the survey area and are independent of one another.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, L = lichens

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

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

The reference plant community phase is mesic graminoid herbaceous (Viereck et al., 1992). This community consists of bluejoint (*Calamagrostis canadensis*), American dunegrass (*Leymus mollis*), purple marshlocks (*Comarum palustre*), and marsh pea (*Lathyrus palustris*). Other species extant in this community include Lyngbye's sedge (*Carex lyngbyei*), wideleaf polargrass (*Arctagrostis latifolia*), and marsh willowherb (*Epilobium palustre*). A low concentration of mosses typically is present. The ground cover includes herbaceous litter and water. Some areas are bare soil.

Dominant plant species

- bluejoint (*Calamagrostis canadensis*), grass
- Lyngbye's sedge (*Carex lyngbyei*), grass
- American dunegrass (*Leymus mollis*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous
- marsh pea (*Lathyrus palustris*), other herbaceous
- marsh willowherb (*Epilobium palustre*), other herbaceous

Community 1.2
Lyngbye's sedge/purple marshlocks

Figure 9. Typical area of community 1.2.

Community Phase 1.2 Canopy Cover Table

Vegetation data is aggregated across modal sample plots for this community phase and is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
G	Lyngbye's sedge	*Carex lyngbyei*	CALY3	100	80
G	Largeflower speargrass	*Poa eminens*	POEM	100	Trace
G	Lesser saltmarsh sedge	*Carex glareosa*	CAGL4	50	Trace
F	Purple marshlocks	*Comarum palustre*	COPA28	50	10

This dataset includes data from 2 sample plots. The sample plots are distributed across the survey area and are independent of one another. Due to the limited data available for this community phase, personal field observations were also used to aid in describing the vegetative community.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, L = lichens

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

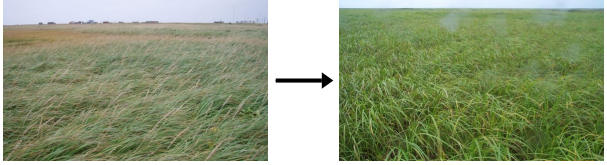
Figure 10. Frequency and canopy cover of plants in community 1.2.

The early community phase is a wet graminoid herbaceous meadow (Viereck et al., 1992). This community consists of dense Lyngbye's sedge and purple marshlocks. Other species may include bluejoint, largeflower speargrass (*Poa eminens*), lesser saltmarsh sedge (*Carex glareosa*), and fourleaf mare's-tail (*Hippuris tetraphylla*). Mosses and lichens are not in this saline plant community. The ground cover commonly includes herbaceous litter and surface water. Some areas are bare soil.

Dominant plant species

- Lyngbye's sedge (*Carex lyngbyei*), grass
- largeflower speargrass (*Poa eminens*), grass
- lesser saltmarsh sedge (*Carex glareosa*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2



Bluejoint-American dunegrass/purple marshlocks-marsh pea

Lyngbye's sedge/purple marshlocks

A rise in the relative water table or increased ponding duration can cause a community shift towards more obligate wetland species. An increase in the water table can result from increased upstream precipitation in an area. It could also be the result of soil scouring and removal during winter storm surges. Increased ponding may be the result of a shift in tidal flat microtopography, where shifting drainages cut off an existing outlet and cause an area to pond.

Lower areas are naturally more likely to pond and support community 1.2.

Pathway 1.2A
Community 1.2 to 1.1

Lyngbye's sedge/purple marshlocks

Bluejoint-American dunegrass/purple marshlocks-marsh pea

A decrease to the relative water table or decreased ponding duration can cause a community shift towards more facultative wetland species. The water table may decrease as a result of decreased upstream precipitation. It can also result from the build-up and development of the soil profile. Area microtopography may also change as the drainage patterns of the tidal flats shift over time, eventually draining ponded areas.

Additional community tables

Inventory data references

Modal points for Community 1.1
07CS01203
07AO01303
07MM01506

Modal points for community 1.2
07CS01201
07CS16001

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

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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	05/13/2025
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:

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17. **Perennial plant reproductive capability:**
