Ecological site R237XY211AK
Western Alaska Maritime Scrubland Loamy Flood Plains

Last updated: 7/23/2020
Accessed: 05/12/2025

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): 237X–Ahklun Mountains

The Ahklun Mountains Major Land Resource Area (MLRA 237) is in western Alaska (fig. 1). This MLRA covers approximately 14,555 square miles, and it includes the mountains, hills, and valleys of the Kilbuck Mountains in the north and the Ahklun Mountains in the south. Except for the Kilbuck Mountains and the highest ridges of the Ahklun Mountains, the MLRA was extensively glaciated during the Pleistocene (Kautz et al., 2004). Today, a few small glaciers persist in mountainous cirques (Gallant et al., 1995). The present-day landscape and landforms reflect this glacial history; glacial moraines and glacial drift cover much of the area (USDA-NRCS, 2006). The landscape of the MLRA is primarily defined by low, steep, rugged mountains cut by narrow-to-broad valleys. Flood plains and terraces of varying sizes are common at the lower elevations in the valley bottoms. Glacially carved valleys host many lakes. Togiak Lake is one of the largest lakes in the region. It is 13 miles long and about 9,500 acres in size. Major rivers include the Goodnews, Togiak, Kanektok, Osviak, Eek, and Arolik Rivers. Where the Goodnews and Togiak Rivers reach the coast, the nearly level to rolling deltas support numerous small lakes.

This MLRA has two distinct climatic zones: subarctic continental and maritime continental (fig. 2). The high-elevation areas are in the subarctic continental zone. The mean annual precipitation is more than 75 inches, and the mean annual air temperature is below about 27 degrees F (-3 degrees C) in extreme locations. The warmer, drier areas at the lower elevations are in the maritime continental zone. The mean annual precipitation is 20 to 50 inches, and the mean annual air temperature is about 30 to 32 degrees F (-0.2 to 1.2 degrees C) (PRISM). This climatic zone is influenced by both maritime and continental factors. The temperatures in summer are moderated by the open waters of the Bering Sea, and the temperatures in winter are more continental due to the presence of ice in the sea (Western Regional Climate Center, 2017). The seasonal ice reaches its southernmost extent off the coast of Alaska in Bristol Bay (Alaska Climate Research Center, 2017). The western coast of Alaska is also influenced by high winds from strong storms and airmasses in the Interior Region of Alaska (Hartmann, 2002).

The Ahklun Mountains MLRA is principally undeveloped wilderness. Federally managed lands include the Togiak and Alaska Maritime National Wildlife Refuges. The MLRA is sparsely populated, but it has several communities, including Togiak, Manokotak, Twin Hills, and Goodnews Bay. Togiak is the largest village. It has a population of approximately 855, most of which are Yup'ik Alaska Natives (U.S. Census Bureau, 2016). Major land uses include subsistence activities (fishing, hunting, and gathering) and wildlife recreation (USDA-NRCS, 2006; Kautz et al., 2004).

Ecological site concept

Ecological site R237XY211AK is on mid flood plains. The reference state has one community phase. No alternate states are recorded for this ecological site.

The reference plant community is open tall scrubland (Viereck et al., 1992). It consists of willows (Salix spp.) and an understory of hydrophilic, shade-tolerant forbs and graminoids. Bluejoint (*Calamagrostis canadensis*) and myriad forbs such as field horsetail (*Equisetum arvense*), common cowparsnip (*Heracleum maximum*), and fireweed

(Chamerion angustifolium) are in the understory.

Associated sites

R237XY210AK	**Western Alaska Maritime Scrubland Gravelly Flood Plains** Ecological site R237XY211AK is on mid flood plains throughout the Ahklun Mountains area. Other ecological sites on flood plains in this area are distinguished by differences in elevation, disturbance, landform, location, associated soils, and type and amount of plants. These sites include R237XY210AK, R237XY212AK, and F237XY216AK. Site R237XY226AK is in depressions of flood plains. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.
F237XY216AK	**Boreal Woodland Loamy Flood Plains** Ecological site R237XY211AK is on mid flood plains throughout the Ahklun Mountains area. Other ecological sites on flood plains in this area are distinguished by differences in elevation, disturbance, landform, location, associated soils, and type and amount of plants. These sites include R237XY210AK, R237XY212AK, and F237XY216AK. Site R237XY226AK is in depressions of flood plains. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.
R237XY212AK	**Western Alaska Maritime Scrubland Silty Flood Plains** Ecological site R237XY211AK is on mid flood plains throughout the Ahklun Mountains area. Other ecological sites on flood plains in this area are distinguished by differences in elevation, disturbance, landform, location, associated soils, and type and amount of plants. These sites include R237XY210AK, R237XY212AK, and F237XY216AK. Site R237XY226AK is in depressions of flood plains. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.
R237XY226AK	**Western Alaska Maritime Grassland Peat Flood Plains, Depression** Ecological site R237XY211AK is on mid flood plains throughout the Ahklun Mountains area. Other ecological sites on flood plains in this area are distinguished by differences in elevation, disturbance, landform, location, associated soils, and type and amount of plants. These sites include R237XY210AK, R237XY212AK, and F237XY216AK. Site R237XY226AK is in depressions of flood plains. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.

Similar sites

R237XY210AK	**Western Alaska Maritime Scrubland Gravelly Flood Plains** No other ecological sites in the survey area support a similar feltleaf willow community; however, several other ecological sites are on flood plains. These sites are subject to flooding and support a variety of hydrophilic plants. Differences in soil, landform, disturbance regime, and location result in distinct vegetative communities. Site R237XY210AK is on low flood plains that are subject to a different frequency and duration of flooding and are associated with different soils. Because of these differences, unique ecological sites are needed.
R237XY212AK	**Western Alaska Maritime Scrubland Silty Flood Plains** No other ecological sites in the survey area support a similar feltleaf willow community; however, several other ecological sites are on flood plains. These sites are subject to flooding and support a variety of hydrophilic plants. Differences in soil, landform, disturbance regime, and location result in distinct vegetative communities. Site R237XY212AK is in wetter areas that support more hydrophilic plant species. Because of these differences, unique ecological sites are needed.
F237XY216AK	**Boreal Woodland Loamy Flood Plains** No other ecological sites in the survey area support a similar feltleaf willow community; however, several other ecological sites are on flood plains. These sites are subject to flooding and support a variety of hydrophilic plants. Differences in soil, landform, disturbance regime, and location result in distinct vegetative communities. Site F237XY216AK is forested and is on mid to high flood plains along the Izavieknik River. Because of these differences, unique ecological sites are needed.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix alaxensis*

Herbaceous	(1) *Calamagrostis canadensis* (2) *Equisetum arvense*

Physiographic features

Site characteristics specifically relate to the reference plant community phase. Each ecological site has a specific set of site characteristics and disturbance dynamics that results in a unique plant community composition, structure, and function. Site characteristics (climate, geology, topography, and soil characteristics) are dynamic across a landscape. Subtle changes in site characteristics can result in a different plant community phase or ecological site. Definitions of site characteristics are provided in the United States Department of Agriculture Handbook 296 (USDA-NRCS, 2006), Geomorphic Description System (Schoeneberger and Wysocki, 2012), Field Book for Describing and Sampling Soils (Schoeneberger et al., 2012), and Soil Survey Manual (Soil Science Division Staff, 2017).

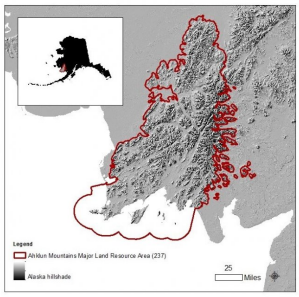

Figure 1. The Ahklun Mountains area (MLRA 237) is in western Alaska.

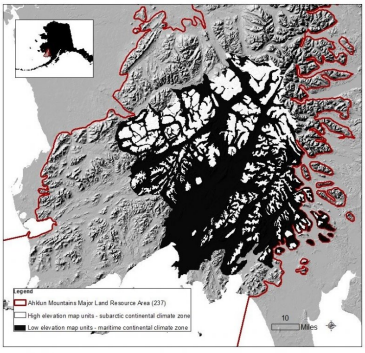

Figure 2. High-elevation and low-elevation map units in the area, which illustrate the primary climatic influence.

Table 2. Representative physiographic features

Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Geomorphic position, flats	(1) Talf
Landforms	(1) Mountain valleys or canyons > Flood plain (2) Plains > Flood plain
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional

Ponding frequency	None
Elevation	15–1,650 ft
Slope	0–5%
Water table depth	40–60 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Climate of land resource region (LLR): Maritime continental (Western Regional Climate Center, 2017); short, warm summers and long, cold winters (USDA-NRCS, 2006)

Climate of major land resource area (MLRA): Maritime continental in the lowlands and subarctic continental at higher elevations. The mean annual precipitation is 20 to 30 inches in the lowlands, and it increases to more than 45 inches at the higher elevations. The mean annual air temperature along the coast is about 34 degrees F (1 degree C) (PRISM, 2014). Strong winds are common throughout the year.

Table 3. Representative climatic features

Frost-free period (characteristic range)	75-140 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	

Influencing water features

Soil features

Typic Cryofluvents, occasionally flooded, are correlated to this ecological site. These soils are well drained. The saturated hydraulic conductivity is moderately low or moderately high in the stratified silt and fine sand in the upper part of the soils and high or very high in the sandy and gravelly alluvium in the lower part.

Table 4. Representative soil features

Drainage class	Well drained

Ecological dynamics

Three major ecological sites are on flood plains throughout the Ahklun Mountains area. A relatively minor woodland ecological site is on flood plains in the corridor of the Izavieknik River. The three major ecological sites on flood plains are distinguished by landform and elevation above the associated source of floodwater. These sites are characterized as on low, mid, and high flood plains. Landform, flooding characteristics, and soil features primarily determine the vegetation supported in each ecological site.

Ecological site R237XY211AK is on mid flood plains. This site supports one plant community, which is the reference community. The site is subject to flooding, but it does not appear to shift the vegetation to a post-disturbance community.

Disturbance Dynamics

No known disturbance regime associated with this ecological site results in an early community phase. Based on data collected, the reference plant community is resilient to flooding. Anthropogenic disturbances that remove vegetation, such as construction of trails, may exacerbate the effects of flooding or promote further disturbances such as erosion. These disturbances can alter the reference plant community and result in a different plant community; however, this was not recorded in situ.

Flooding
Flooding is the major disturbance regime on mid flood plains. The intensity and frequency of flooding greatly affect the distribution and abundance of vegetation in Alaskan riverine systems (Wohl, 2007). Flooding can create barren, moist areas that are ideal for colonization. Floods also bury organic layers, add nutrients to the soil, deposit seed banks, and decrease competition for light and space (Rood et al., 2007; Yarie et al., 1998).

Slope and proximity to a river make these mid flood plains susceptible to occasional, brief periods of flooding, particularly during snowmelt in spring. No unique post-flood community was recorded. The soils are not subject to surface or subsurface ponding because they are well drained, and the elevation above the source of the floodwater typically prevents scouring of the existing vegetation. The wet, well drained soils are ideal for feltleaf willow and the corresponding understory species (Innes, 2014).

Fire
Although previous wildfires have been mapped in areas of this ecological site, no evidence of fire was recorded in situ.

Other Observations
In rare instances, balsam poplar (*Populus balsamifera*) will colonize this ecological site. Balsam poplar commonly helps to stabilize the riverbank (Harris, 1990). Once colonized, poplar likely will shade out feltleaf willow, which is shade intolerant (Innes, 2014). Although the mechanism and timing by which balsam poplar colonizes and overtakes feltleaf willow in this ecological site has not been recorded, it is hypothesized that flooding transports balsam poplar seeds, branches, and trees (colonization via vegetative reproduction) downstream from existing woodland ecological sites. Balsam poplar in this site was observed adjacent to or downriver from existing balsam poplar ecological sites (F237XY216AK and F237XY239AK).

Browsing by moose and caribou on willow has been documented in this ecological site. Browsing may occur during any season, but it appears to be most common in winter and summer. Browsing does not alter the vegetative community significantly; thus, an early browse sere is not required.

No alternate states are associated with this ecological site.

State and transition model

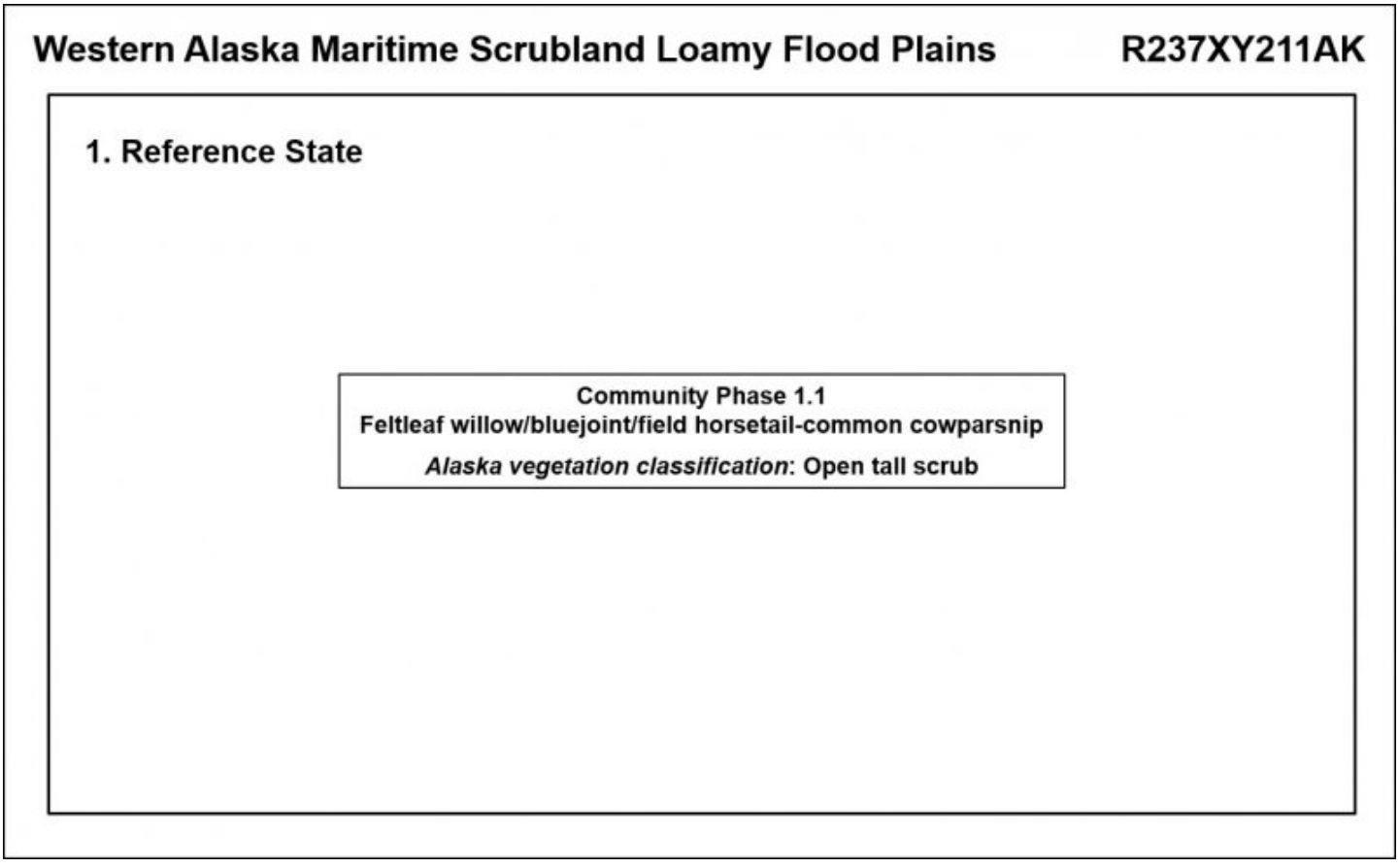

Figure 3. State-and-transition model.

State 1
Reference State

The reference state supports one community phase that is distinguished by the developed structure and dominance of the vegetation and the ecological function and stability of the community (fig. 3). The reference community phase consists of willow, graminoids, and forbs. This ecological site is subject to flooding, but it does not result in a unique post-flood community phase. This report provides baseline vegetation inventory data. Future data collection is needed to provide further information about existing plant communities and to determine if any disturbance regimes will result in transition of the reference plant community to another community. 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
Feltleaf willow/bluejoint/field horsetail-common cowparsnip (Salix alaxensis/Calamagrostis canadensis/Equisetum arvense-Heracleum maximum)

Figure 4. Typical area of plant community 1.1.

Community Phase 1.1 Canopy Cover Table

Vegetation data are aggregated across modal sample plots for this community phase and are provided as a frequency (percent) and mean canopy cover (percent) of the dominant and most 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)
S	Feltleaf willow	*Salix alaxensis*	SAAL	100	45 (20-75)
S	Tealeaf willow	*Salix pulchra*	SAPU15	20	4 (0-20)
G	Bluejoint	*Calamagrostis canadensis*	CACA4	100	50 (1-85)
F	Field horsetail	*Equisetum arvense*	EQAR	100	9 (2-20)
F	Common cowparsnip	*Heracleum maximum*	HEMA80	100	6 (0.1-15)
F	Tilesius' wormwood	*Artemisia tilesii*	ARTI	100	2 (0.1-5)
F	Fireweed	*Chamerion angustifolium*	CHAN9	80	4 (0-15)
F	Common ladyfern	*Athyrium filix-femina*	ATFI	80	2 (0-5)
F	Seacoast angelica	*Angelica lucida*	ANLU	60	3 (0-10)
F	Canadian burnet	*Sanguisorba canadensis*	SACA14	60	2 (0-5)

This dataset includes data from five sample plots. The sample lots are distributed across the Ahklun Mountains 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 are based on ocular estimates and rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover are rounded to the nearest integer. Data ranging from 10 to 100 percent cover are rounded to the nearest factor of 5.

Values for tall, medium, and stunted tree strata are used to calculate mean canopy cover and range. Regenerative trees are not included in the calculations.

Figure 5. Canopy cover and frequency of species in community 1.1.

The reference plant community is characterized as open tall scrub (fig. 4) (Viereck et al., 1992). The major plant strata are tall shrubs (more than 10 feet in height), tall graminoids (more than 2 feet), and medium forbs (4 to 24 inches) (fig. 5). The community consists dominantly of feltleaf willow (*Salix alaxensis*), but other willow species such as tealeaf willow (*S. pulchra*) may be present. The understory commonly is comprised of bluejoint and a variety of forbs, including field horsetail, common cowparsnip, fireweed, Tilesius' wormwood (*Artemisia tilesii*), seacoast angelica (*Angelica lucida*), and common ladyfern (*Athyrium filix-femina*). The ground cover is herbaceous litter, woody litter, and ground moss.

Additional community tables

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Approval

Michael Margo, 7/23/2020

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	05/12/2025
Approved by	Michael Margo
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:**