

# Ecological site R237XY210AK

## Western Alaska Maritime Scrubland Gravelly Flood Plains

Last updated: 7/23/2020  
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### 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. 2). 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. 3). 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 R237XY210AK is on low flood plains confined by steep escarpments or mountainsides. The site is subject to frequent (more than 50 times in 100 years), very brief periods (4 to 48 hours) of flooding. The associated soils are moderately well drained. The reference state has two community phases related to flooding. An alternate state is related to beaver activity. The reference plant community is open tall scrubland (fig. 1; Viereck et al., 1992) that consists dominantly of facultative or obligate wetland species. The community is dominantly dense willows such as tealeaf willow (*Salix pulchra*), Barclay's willow (*S. barclayi*), grayleaf willow (*S. glauca*), and Bebb willow (*S. bebbiana*) and an understory of hydrophilic, shade-tolerant shrubs, graminoids, and forbs. These include Canadian burnet (*Sanguisorba canadensis*), shrubby cinquefoil (*Dasiphora fruticosa*), field horsetail (*Equisetum arvense*), and bluejoint (*Calamagrostis canadensis*).

### Associated sites

<b>R237XY212AK</b>	<p><b>Western Alaska Maritime Scrubland Silty Flood Plains</b></p> <p>Ecological site R237XY210AK is dominantly on low flood plains throughout the Ahklun Mountains area. Other ecological sites on flood plains are distinguished by differences in elevation, disturbance, associated soils, and the type and amount of plants. These sites include R237XY211AK, R237XY212AK, and F237XY216AK. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.</p>
<b>R237XY226AK</b>	<p><b>Western Alaska Maritime Grassland Peat Flood Plains, Depression</b></p> <p>Ecological site R237XY226AK is in depressions of flood plains and is associated with site R237XY210AK. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.</p>
<b>R237XY211AK</b>	<p><b>Western Alaska Maritime Scrubland Loamy Flood Plains</b></p> <p>Ecological site R237XY210AK is dominantly on low flood plains throughout the Ahklun Mountains area. Other ecological sites on flood plains are distinguished by differences in elevation, disturbance, associated soils, and the type and amount of plants. These sites include R237XY211AK, R237XY212AK, and F237XY216AK. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.</p>

**Similar sites**

<b>R237XY212AK</b>	<p><b>Western Alaska Maritime Scrubland Silty Flood Plains</b></p> <p>Several ecological sites in the Ahklun Mountains area support a reference plant community characterized as willow scrubland. Although these sites may have plant communities similar to those of site R237XY210AK, the sites are differentiated by the soils, disturbance regimes, and reference state communities. Site R237XY212AK is on broad flood plains that are subject to a different frequency and duration of flooding than are the flood plains of site R237XY210AK. These broad flood plains also are associated with different soils. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.</p>
<b>F237XY216AK</b>	<p><b>Boreal Woodland Loamy Flood Plains</b></p> <p>Several ecological sites in the Ahklun Mountains area support a reference plant community characterized as willow scrubland. Although these sites may have plant communities similar to those of site R237XY210AK, the sites are differentiated by the soils, disturbance regimes, and reference state communities. Site F237XY216AK is correlated to different soils and is subject to a different disturbance regime. The reference plant community in this site is noticeably different than that of site R237XY210AK. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.</p>
<b>R237XY211AK</b>	<p><b>Western Alaska Maritime Scrubland Loamy Flood Plains</b></p> <p>Several ecological sites in the Ahklun Mountains area support a reference plant community characterized as willow scrubland. Although these sites may have plant communities similar to those of site R237XY210AK, the sites are differentiated by the soils, disturbance regimes, and reference state communities. Site F237XY211AK is correlated to different soils and is subject to a different disturbance regime. The reference plant community in this site is noticeably different than that of site R237XY210AK. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.</p>

**Figure 1.** The reference plant community is an open tall scrubland. Very dense willow is in some areas.

**Table 2.** Dominant plant species

Tree	Not specified
Shrub	(1) <i>Salix pulchra</i> (2) <i>Salix barclayi</i>
Herbaceous	(1) <i>Calamagrostis canadensis</i> (2) <i>Equisetum arvense</i>

### 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 3. Representative physiographic features

Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Geomorphic position, flats	(1) Talf
Landforms	(1) Plains > Flood plain
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Frequent
Ponding frequency	None
Elevation	10 – 70 m
Slope	0 %
Water table depth	0 – 100 cm

Aspect	W, NW, N, NE, E, SE, S, SW
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### 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 4 Representative climatic features

Frost-free period (characteristic range)	70-140 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	

### Influencing water features

#### Flooding

Flooding is the primary disturbance in the reference state. Flooding can create barren, moist areas ideal for colonization of new plants. Floods 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). This ecological site is subject to frequent, very brief periods of flooding that greatly affect the distribution and abundance of vegetation in Alaska riverine systems (Wohl, 2007).

Field observations indicate that specific areas of this ecological site are subject to more frequent or severe periods of flooding than are other areas. Areas adjacent to the source of the floodwater undergo longer, more frequent periods of flooding. These areas typically support community 1.2. As the frequency and duration of flooding decreases, willow increases. Reference plant community 1.1 is in these areas.

#### Water Table Influences

The soils associated with this site are moderately well drained. During the early part of the growing season (May), the water table is at a very shallow depth (less than 10 inches). During the remainder of the growing season (June through August), the water table is at a moderate depth (20 to 40 inches). During heavy rains in fall (September and October), the water table generally rises again to a very shallow depth. Because of the depth to and persistence of the water table, wetland indicator plants are common in the reference state.

### Soil features

The Awayak soils are correlated to this ecological site. The saturated hydraulic conductivity is moderately high to a depth of 3 inches and very high below that depth. Reaction is moderately acid to neutral (pH 5.6 to 7.3).

Table 5. Representative soil features

Drainage class	Moderately well drained
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### Ecological dynamics

Site R237XY210AK is dominantly on low flood plains confined by steep escarpments or mountainsides. The reference state supports the reference plant community and a distinct early flooding sere. These communities are shaped by the frequent, very brief periods of flooding, the moderately well drained soils, and the high water table during the growing season. Both communities of the reference state

support facultative or obligate wetland species such as willows and hydrophilic graminoids and forbs (fig. 1).

## Disturbance Dynamics

### Flooding

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### Beaver-Affected Areas

The sporadic presence of beavers in this ecological site can cause a vegetative shift to an alternate state. This shift is caused by a change in the water table and disturbance regime and the removal of certain shrubs for use as food and construction material.

### Other Observations

Browsing by moose on willow was documented in this ecological site. Browsing may occur during any season, but it is most common in winter. Moose browsing does not appear to significantly alter the vegetative community so an early browse sere is not needed.

One alternate state was observed in this ecological site. Beaver activity, particularly construction of dams, restructures the plant communities on these flood plains. Beavers are an introduced species in the Ahklun Mountains area, so their affect on this ecological site has not been researched fully.

## State and transition model

Figure 3. State-and-transition model.

## Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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	04/22/2026
Approved by	
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):**

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**5. Number of gullies and erosion associated with gullies:**

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**6. Extent of wind scoured, blowouts and/or depositional areas:**

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**7. Amount of litter movement (describe size and distance expected to travel):**

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**8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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**9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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**10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):

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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:

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13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

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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:

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