

# Ecological site R237XY205AK

## Western Alaska Maritime Scrubland Loamy Swales

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. 3). 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. 4). 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 R237XY205AK is in swales of glaciated plains and mountains. Landform, soil moisture content, and climatic factors differentiate this ecological site. The reference state supports one plant community, which is the reference community. No alternate states are associated with this ecological site. The reference plant community is open tall scrubland (Viereck et al., 1992). The community consists dominantly of one or more species of willow (*Salix* spp.) and an understory of various forbs, graminoids, and non-willow shrubs. Understory plants may include bluejoint (*Calamagrostis canadensis*), fireweed (*Chamerion angustifolium*), and woolly geranium (*Geranium erianthum*).

### Associated sites

<b>R237XY230AK</b>	<b>Western Alaska Maritime Scrubland Silty Plains and Mountain Slopes, Lower</b>
<b>R237XY201AK</b>	<b>Western Alaska Maritime Scrubland Gravelly Slopes</b>

<b>R237XY202AK</b>	<b>Western Alaska Maritime Mosaic Gravelly Slopes</b>
<b>R237XY203AK</b>	<b>Western Alaska Maritime Scrubland Gravelly Drainage, Escarpment</b>
<b>R237XY220AK</b>	<b>Western Alaska Maritime Mosaic Loamy Hummocks</b>
<b>F237XY239AK</b>	<b>Boreal Forest Loamy Slopes</b>
<b>R237XY206AK</b>	<b>Western Alaska Maritime Dwarf Scrubland Loamy Drainage, High Elevation</b>
<b>R237XY208AK</b>	<b>Western Alaska Maritime Scrubland Peat Depressions</b>
<b>R237XY210AK</b>	<b>Western Alaska Maritime Scrubland Gravelly Flood Plains</b>
<b>R237XY211AK</b>	<b>Western Alaska Maritime Scrubland Loamy Flood Plains</b>
<b>R237XY212AK</b>	<b>Western Alaska Maritime Scrubland Silty Flood Plains</b>
<b>R237XY215AK</b>	<b>Western Alaska Maritime Scrubland Loamy Plains</b>
<b>R237XY217AK</b>	<b>Western Alaska Maritime Dwarf Scrubland Gravelly Slopes, High Elevation</b>
<b>R237XY218AK</b>	<b>Western Alaska Maritime Dwarf Scrubland Gravelly Slopes, Concave</b>
<b>R237XY222AK</b>	<b>Western Alaska Maritime Scrubland Loamy Hummocks</b>

R237XY204AK	<p><b>Western Alaska Maritime Scrubland Loamy Slopes</b></p> <p>Site R237XY205AK is in swales of mountains and glaciated plains. Common associated sites on these landforms are R237XY201AK, R237XY202AK, R237XY203AK, R237XY204AK, R237XY206AK, R237XY208AK, R237XY210AK, R237XY211AK, R237XY212AK, R237XY215AK, R237XY217AK, R237XY218AK, R237XY220AK, R237XY222AK, F237XY239AK, and R237XY230AK. These sites typically are differentiated by one or more criteria, including landform, landform position, associated soils, associated disturbance regimes, and the type and amount of plants. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut. This is especially noticeable in smaller concave areas that support site R237XY205AK but have species from surrounding ecological sites intermixed.</p>
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**Similar sites**

R237XY206AK	<p><b>Western Alaska Maritime Dwarf Scrubland Loamy Drainage, High Elevation</b></p> <p>Ecological site R237XY206AK is in high-elevation drainageways, and it supports a reference plant community of willow. Differences in elevation, landform (drainageways versus swales), and disturbance regimes require the use of unique ecological sites (R237XY205AK and R237XY206AK). Various ecological sites on flood plains support one or more willow-dominant communities. The flood plains are subject to hydrologic disturbances, which make separate ecological sites necessary.</p>
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Figure 1. This ecological site is in swales. Low and dwarf shrubs from surrounding ecological sites may be intermixed with willow at the edges of the swales.

Figure 2. The reference plant community typically supports dense stands of willow.

Table 3. 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>Chamerion angustifolium</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 4. Representative physiographic features

Slope shape across	(1) Concave
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Slope shape up-down	(1) Concave (2) Linear
Landforms	(1) Plains > Swale (2) Mountains > Swale
Flooding frequency	None
Ponding frequency	None
Elevation	0 – 910 m
Slope	0 – 40 %
Water table depth	0 – 80 cm
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 5 Representative climatic features

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

### Influencing water features

#### Soil features

The Pegati and Pungokepek soils are correlated to this ecological site. These soils are somewhat poorly drained or well drained. The saturated hydraulic conductivity of the Pungokepek soils is moderately high or high in the upper part and high or very high in the lower part. The saturated hydraulic conductivity of the Pegati soils is high or very high in the upper part and moderately high in the lower part. Both soils are strongly acid or very strongly acid in the upper part and moderately acid or slightly acid in the lower part.

**Table 6. Representative soil features**

Drainage class	Somewhat poorly drained to well drained
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## Ecological dynamics

R237XY205AK describes swales across a large range of elevations, from glaciated plains to the lower third of mountain slopes, across the Ahklun Mountains. Swales are relatively small in size when compared to the mountain slopes and plains on which they are found. Various other ecological sites may be found on these landforms, but R237XY205AK stands out by supporting a community of obligate to facultative wetland species in concave areas.

Swale community composition is a product of landform, soil, and climate characteristics. Swales collect a thick winter snowpack, unlike the surrounding wind-scoured landscapes. These concave positions provide adequate protection from the wind and adequate soil moisture for a willow community to thrive. Willows are an adaptable group and many species can tolerate a variety of habitats and soil moisture conditions (Anderson and Welsh, 1974; Moore, 2003). The willows in the reference plant community are usually three to ten feet tall, though they are usually shorter at higher elevations. It is likely that community productivity follows an elevation gradient, though plant production was not recorded. If future data shows a significant difference in production along an elevational gradient between mountains and plains, then this ecological site may be divided into two ecological sites.

### Disturbance Dynamics

There is no known disturbance in this ecological site that results in an early community phase. The reference plant community is resilient to the disturbance described below. Anthropogenic disturbances that remove vegetation, such as trail building, may promote further disturbances like erosion that can alter the reference plant community and result in a separate plant community.

### Hydrological Influences

Precipitation and seasonal snowmelt usually result in a seasonal water table. The reference plant community, comprised of facultative to obligate wetland species, thrives in wet soil and anaerobic conditions, and increases in soil moisture do not meet the resilience threshold required to create an early community phase. Natural variations in plant richness and cover may be evident between landforms, elevations, and drainage classes supporting this ecological site, but not enough to warrant an early community phase or a separate ecological site.

### Other Observations

These swales are circular to linear in shape and are typically adjacent to ecological sites that support low and dwarf shrubs. These low and dwarf shrubs can colonize swale edges and push into the reference plant community (fig. 4). These ecotonal edge effects are common.

Slight to moderate browsing by moose and caribou on willow has been documented. These concave, protected areas likely provide shelter for wildlife. Browsing does not appear to influence the plant community in richness or cover in a way that requires an early browsing community phase or alternate state.

No alternative states have been observed for this ecological site.

## State and transition model

**Figure 3. State-and-transition model.**

## Additional community tables

**Table 7. Community 1.1 plant community composition**

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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## Other references

Alaska Climate Research Center. 2017. Climatological data–Bristol Bay. <http://oldclimate.gi.alaska.edu>. Accessed September 19, 2017.

Anderson, J.P., and S.L. Welsh. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham Young University Press, Provo, UT.

Gallant, A.I., E.F. Binnian, J.M. Omernik, and M.B. Shasby. 1995. Ecoregions of Alaska. U.S. Geological Survey Professional Paper 1567. Government Printing Office, Washington, D.C.

Hartmann, B. 2002. Climate regions of Alaska. The Alaska Climate Research Center. <http://oldclimate.gi.alaska.edu/ClimTrends/30year/regions1.html>. Modified August 28, 2002. Accessed September 19, 2017.

Kautz, D.R., P. Taber, and S. Nield (editors). 2004. Land resource regions and major land resource areas of Alaska. U.S. Department of Agriculture, Natural Resources Conservation Service, Palmer, AK. Revised 2012.

Moore, L. 2003. Plant fact sheet for Sitka willow (*Salix sitchensis*). U.S. Department of Agriculture, Natural Resources Conservation Service, National Plant Data Center, Baton Rouge, LA.

PRISM Climate Group. 2014. PRISM climate data. Oregon State University. <http://prism.oregonstate.edu>. Accessed March 27, 2018.

Schoeneberger, P.J., and D.A. Wysocki. 2012. Geomorphic description system. Version 4.2. U.S. Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and Soil Survey Staff. 2012. Field book for describing and sampling soils. Version 3.0. U.S. Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

Soil Science Division Staff. 2017. Soil survey manual. Ditzler, C., K. Scheffe, and H.C Monger, editors. U.S. Department of Agriculture Handbook 18. Government Printing Office, Washington, D.C.

U.S. Census Bureau. 2016. Vintage 2016 population estimates: Population estimates. <https://www.census.gov>. Accessed August 14, 2017.

U.S. 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.

Viereck, L.A., C.T. Dyrness, A.R. Batten, and K.J. Wezlick. 1992. The Alaska vegetation classification. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station General Technical Report PNW-GTR-286. Portland, OR.

Western Regional Climate Center. 2017. Climate of Alaska. <http://wrcc.dri.edu>. Accessed September 19, 2017.

## Contributors

Kendra Moseley  
Michael Margo  
Stephanie Schmit  
Sue Tester  
Charlotte Crowder

## 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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