

# Ecological site R237XY219AK

## Western Alaska Maritime Dwarf Scrubland Gravelly Slopes, Very Steep

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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 R237XY219AK is associated with shallow, gravelly soils on steep, upper backslopes of mountains. Climate, landform, elevation, slope, and soil characteristics combine to create a unique ecological site. The reference state supports two plant communities, including the reference plant community and an early community phase created by erosion. An alternate state is caused by massive landslides. The reference plant community is *Dryas* dwarf scrubland (Viereck et al., 1992). Shrub species include eightpetal mountain-avens (*Dryas octopetala*) and black crowberry (*Empetrum nigrum*). Forbs and graminoids typically are throughout and include sedges (*Carex* spp.), hairgrasses (*Deschampsia* spp.), narcissus anemone (*Anemone narcissiflora*), and heartleaf saxifrage (*Saxifraga nelsoniana*).

### Similar sites

<b>R237XY204AK</b>	<p><b>Western Alaska Maritime Scrubland Loamy Slopes</b></p> <p>Several ecological sites in the Ahklun Mountains area support a reference community consisting of low and dwarf shrubs similar to those of site R237XY219AK. Ecological site R237XY204AK supports some of the same species, but site R237XY219AK is at much higher elevations and supports distinct alpine plants typically not in site R237XY204AK. Differences in landform and related disturbance regimes create unique vegetative communities that require separate ecological sites.</p>
<b>R237XY217AK</b>	<p><b>Western Alaska Maritime Dwarf Scrubland Gravelly Slopes, High Elevation</b></p> <p>Several ecological sites in the Ahklun Mountains area support a reference community consisting of low and dwarf shrubs similar to those of site R237XY219AK. Site R237XY217AK may support plants similar to those in site R237XY219AK; however, site R237XY217AK is on different mountain landforms. Differences in landform and related disturbance regimes create unique vegetative communities that require separate ecological sites.</p>
<b>R237XY218AK</b>	<p><b>Western Alaska Maritime Dwarf Scrubland Gravelly Slopes, Concave</b></p> <p>Several ecological sites in the Ahklun Mountains area support a reference community consisting of low and dwarf shrubs similar to those of site R237XY219AK. Site R237XY218AK may support plants similar to those in site R237XY219AK; however, site R237XY218AK is on different mountain landforms. Differences in landform and related disturbance regimes create unique vegetative communities that require separate ecological sites.</p>

Figure 1. The reference plant community is on steep, upper backslopes of mountains.

Figure 2. A massive landslide spread downslope and across a mountain valley (Walsh, 2014b).

Table 3. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Dryas octopetala</i> (2) <i>Empetrum nigrum</i>
Herbaceous	(1) <i>Carex</i> (2) <i>Anemone narcissiflora</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) Convex
Slope shape up-down	(1) Linear
Geomorphic position, mountains	(1) Upper third of mountainflank (2) Center third of mountainflank
Landforms	(1) Mountains > Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	200 – 1,400 m
Slope	30 – 90 %
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)	60-120 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	

### Influencing water features

#### Soil features

There are two documented soils correlated with this ecological site.

The Highlake soil is extremely gravelly, somewhat excessively drained, and moderately deep to lithic bedrock. The characteristics of

Highlake are described in the tables below.

R237XY219AK is correlated with E37-Maritime dwarf scrub-gravelly colluvial slopes. This is a STATSGO-level soil component that covers the same mountain landforms as Highlake but in areas mapped at a larger scale (NRCS mapping order 5).

**Table 6. Representative soil features**

Drainage class	Somewhat excessively drained
Depth to restrictive layer	50 – 100 cm

## Ecological dynamics

Ecological site R237XY219AK is on steep upper backslopes in the Ahklun Mountains area (fig. 1). Various ecological sites are on mountains. Sites R237XY204AK, R237XY202AK, and R237XY205AK are backslopes and footslopes. Sites R237XY217AK, R237XY206AK and R237XY219AK are in high-elevation, alpine areas. Site R237XY217AK is on alpine summits and shoulders, and site R237XY206AK is in upper drainageways.

Site R237XY219AK is defined by landform shape, slope, and soil characteristics. Alpine and subalpine dwarf shrubs are dominant. The soils exhibit minor development and are extremely gravelly and moderately deep to bedrock. Nitrogen-fixing plants such as mountain-avens (*Dryas* spp.) are common. These plants colonize barren areas and add nitrogen to the soil (Crocker and Major, 1955), which creates suitable conditions for seeds of alpine and subalpine forbs and graminoids. Alder (*Alnus* spp.) is a common nitrogen-fixing colonizer on many mountain slopes, but it is not at these high elevations.

### Disturbance Dynamics

#### Erosion

Landslides are the major disturbance in this ecological site. Small-scale events can remove varying amounts of the existing vegetation. This disturbance results in one early community phase. Recently disturbed areas are stable enough to support fragmented patches of vegetation and provide for new colonization. The plant species in areas of post-erosion recovery can differ significantly from those in the reference plant community.

#### Wind Exposure

These steep, high-elevation slopes are exposed to high winds. Although this disturbance does not result in an early community phase, it can dictate the plants that can colonize by dispersing airborne seeds and scouring plants and soil.

#### Other Observations

A nonvegetated alternate state is in areas where massive landslides have created unstable talus slopes. This state is synonymous with the nonvegetated miscellaneous areas of the Ahklun Mountains area.

## 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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**Table 8. Community 1.2 plant community composition**

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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**Table 9. Community 2.1 plant community composition**

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

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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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