

# **Ecological site F237XY262AK**

## **Boreal Forest Mountain Backslopes and Footslopes, Linear to Concave**

Last updated: 4/13/2021  
Accessed: 05/03/2024

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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. 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. 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 whom 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**

This proposed ecological concept is correlated to the STATSGO soil component E37-Boreal taiga-loamy frozen colluvial slopes. Site F237XY262AK is the basis for the ecological site group ESG23X2237X00X. This ecological site description (ESD) will be revised when field data are collected that can be used to confirm or update the following information.

## Hypothesized Reference Plant Community

This ecological site covers the Alaska black spruce taiga. The reference plant community is a black spruce forest that has ericaceous shrubs and various forbs and graminoids throughout. These areas may have permafrost.

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Classification crosswalk (community descriptions of similar landscapes and landforms in other vegetation classification systems)

\*Similar ecological sites in AK637 (Togiak National Wildlife Refuge): None

\*LANDFIRE Biophysical Settings: Western North American Boreal Black Spruce Dwarf-Tree Peatland-Boreal Complex (USDA et al., 2007)

\*Alaska Vegetation Classification System: I.A.3.d (Vlreck et al., 1992)

\*Circumboreal Vegetation Mapping (CBVM) Project: Alaska-Yukon Wet Black Spruce Woodlands & Scrub Coniferous (Jorgensen and Meidinger, 2015)

\*Alaska Arctic Tundra Vegetation: None (Raynolds et al., 2006)

\*U.S. National Vegetation Classification Database 2.03: G579–Central Alaskan-Yukon Boreal Mesic Forest Group and G546–Alaskan-Yukon Boreal Black Spruce Wet Forest Group (USNVC, 2019)

**Table 1. Dominant plant species**

|            |   |
|------------|---|
| Tree       | (1) <i>Picea mariana</i>  |
| Shrub      | (1) <i>Ledum palustre ssp. decumbens</i><br>(2) <i>Vaccinium uliginosum</i> |
| Herbaceous | (1) <i>Equisetum sylvaticum</i><br>(2) <i>Carex bigelowii</i>               |

## Physiographic features

This ecological site is on linear to concave backslopes and footslopes of boreal mountains.

**Table 2. Representative physiographic features**

|                     |                                |
|---------------------|--------------------------------|
| Hillslope profile   | (1) Footslope<br>(2) Toeslope  |
| Slope shape up-down | (1) Linear<br>(2) Concave      |
| Landforms           | (1) Mountains > Mountain slope |

## Climatic features

## Influencing water features

## Soil features

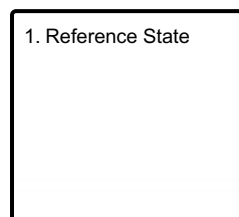
The soils commonly are moist and probably somewhat poorly drained or poorly drained. A dense organic layer insulates the soils, which allows for the formation of seasonal frost and permafrost.

## Ecological dynamics

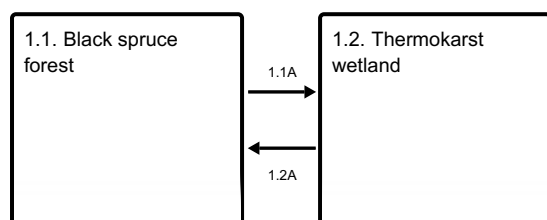
The vegetation is influenced by slope shape, soil characteristics, seasonal frost, and permafrost. A dense, commonly acidic, organic layer restricts the vegetation in this site. The conditions of the site favor an open or closed black spruce forest that has an understory of shrubs and a ground cover of moss.

## State and transition model

### Ecosystem states



### State 1 submodel, plant communities



1.1A - Thermokarst development.

1.2A - Permafrost return.

## State 1 Reference State

The reference state supports all the communities that are a result of natural disturbances on this landform.

## Community 1.1 Black spruce forest

The reference plant community commonly is an open or closed black spruce forest. The trees may be stunted. The cold, wet conditions contribute to the buildup of peat, which creates conditions that favor facultative or obligate wetland species in the understory.

### Dominant plant species

- black spruce (*Picea mariana*), tree
- marsh Labrador tea (*Ledum palustre* ssp. *decumbens*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- dwarf birch (*Betula nana*), shrub
- sweetgale (*Myrica gale*), shrub
- sedge (*Carex*), grass
- cottongrass (*Eriophorum*), grass
- horsetail (*Equisetum*), other herbaceous

## Community 1.2 Thermokarst wetland

This community is comprised of species common in wetlands and marshes. Facultative or obligate wetland species are dominant. The community may be grassland or a graminoid-forb meadow.

### Dominant plant species

- sweetgale (*Myrica gale*), shrub
- leatherleaf (*Chamaedaphne calyculata*), shrub
- sedge (*Carex*), grass
- cottongrass (*Eriophorum*), grass
- bulrush (*Scirpus*), grass
- bulrush (*Trichophorum*), grass
- roundleaf sundew (*Drosera rotundifolia*), other herbaceous

## **Pathway 1.1A**

### **Community 1.1 to 1.2**

Thermokarst development. Fire or increased temperatures can cause seasonal frost to disappear and permafrost to move deeper in the soil profile. Melting pockets of permafrost can tip over black spruce trees; thus, these individuals were given the colloquial name of "drunken trees." The thermokarst microtopography formed by these melted areas commonly results in ponded areas. Facultative wet and obligate wetland species will thrive and less water-tolerant species will die back in these areas.

## **Pathway 1.2A**

### **Community 1.2 to 1.1**

Permafrost return. As peat builds up, permafrost may return and the vegetation may transition toward community 1.1.

## **Additional community tables**

### **Other references**

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## Approval

Curtis Talbot, 4/13/2021

## 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  | 05/03/2024        |
| Approved by                                 | Curtis Talbot     |
| 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):**
- 
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):**
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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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