

Ecological site F220XY204AK

Subalpine Forests Organic Wet Slopes

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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): 220X–Alexander Archipelago-Gulf of Alaska Coast

The Alexander Archipelago-Gulf of Alaska Coast area consists of a narrow arc of islands and lower elevation coastal mountains in the Southern Alaska Region. This area spans from the Alexander Archipelago in southeastern Alaska, north and west along the coast of the Gulf of Alaska and Prince William Sound, and further west to the southern tip of the Kenai Peninsula and the northeastern islands of the Kodiak Archipelago. The area makes up about 27,435 square miles (USDA 2006). The terrain primarily consists of low to moderate relief mountains that are deeply incised. Throughout the area glaciers, rivers, and streams have cut deep, narrow to broad valleys. The broader valleys have nearly level to strongly sloping flood plains and stream terraces. Alluvial and colluvial fans and short footslopes are common in the valleys along the base of the mountains. Rocky headlands, sea cliffs, estuaries, and beaches are common along the coast. This area includes the Municipality of Juneau, Alaska's capital, and a number of smaller coastal towns and villages. Federally administered lands within this MLRA include Admiralty Island National Monument and part of Misty Fjords National Monument, Tongass National Forest, Chugach National Forest, and Glacier Bay, Wrangell-St. Elias, and Kenai Fjords National Parks and Preserves. The southern terminus of the Trans-Alaska Pipeline is in Valdez. During the late Pleistocene epoch, the entire area was covered with glacial ice. The numerous fjords of the Alexander Archipelago and Prince William Sound were formed chiefly as a result of glacial scouring and deepening of preglacial river valleys. Most glacial deposits have been eroded away or buried by mountain colluvium and alluvium, which cover about 90 percent of the present landscape. The remaining glacial and glaciofluvial deposits are generally restricted to coastal areas. During the Holocene epoch, volcanic activity within and adjacent to this area deposited a layer of volcanic ash of varying thickness on much of the landscape in the southeastern and northwestern parts of the area. Paleozoic, Mesozoic, and Lower Tertiary stratified sedimentary rocks and Cretaceous and Tertiary intrusive rocks underlie much of the area and are exposed on steep mountain slopes and ridges (USDA 2006). The dominant soil orders in this MLRA are Spodosols, Histosols, and Entisols. Soils in the area typically have a cryic soil temperature regime, an udic moisture regime, and have mixed mineralogy. Spodosols are common on mountains and hills having been formed in gravelly or cobbly colluvium, glacial till, and varying amounts of silty volcanic ash. These Spodosols commonly range from shallow to deep, are well to somewhat poorly drained, and typically classify as Humicryods or Haplocryods. Histosols that are poorly to very poorly drained occur on footslopes, discharge slopes, and valley floors. These wet histosols commonly classify as Cryosaprists, Cryohemists, and Cryofibrists. Histosols that are well drained occur on steep mountainsides. These dry Histosols commonly classify as Cryofolists. Entisols are common on flood plains, stream terraces, and outwash plains having been formed in silty, sandy, and gravelly to cobbly alluvium. These Entisols are generally deep, range from well to somewhat poorly drained, and commonly classify as Cryaquents and Cryofluvents. Miscellaneous (non-soil) areas make up about 23 percent of the MLRA. The most common miscellaneous areas are avalanche chutes, rock outcrop, rubble land, beaches, river wash, and water. This area represents the northern extent of the Pacific temperate rainforest and is characterized by productive stands of conifers. Western hemlock and Sitka spruce are the dominant trees on mountains and hills at the lower elevations. Due to warmer temperatures, western red cedar and Alaska cedar are more prevalent in the southern part of the area. Black cottonwood and mixed forest types occur on flood plains. Areas of peat and other sites that are too wet for forest growth support sedge-grass meadows and low scrub. The transition to subalpine and alpine communities typically occurs at elevations between 1500 to 3000 feet (Boggs et al. 2010, Carstensen 2007, Martin et al. 1995), which characterize the vegetation of the Southern Alaska Coastal Mountains area. For many decades, logging, commercial fishing, and mining have been the primary industrial land uses throughout much of the area. In recent years, changes in public interests, land use policies, and timber economics have contributed to a significant decline in the timber industry. Commercial fishing continues to be an important industry and most communities support a fleet of boats and fishing related facilities. A number of mines operate in the area and others have been prospected and proposed. Tourism and wildland recreation are becoming increasingly important. Subsistence hunting, fishing, and gathering provide food and a variety of other resources to local residents and remain the principal economy for residents of remote villages.

Classification relationships

Ecological site concept

This subalpine site occurs on mountain slopes and depressions at the lowest subalpine bands of elevation and represents a transition from warmer coastal rainforests to colder subalpine forests. This site has a harsh climate where tree species from lower elevations like western hemlock are no longer dominant. The soils are wet for much of the growing season and are very poorly drained. These wet soils are Histosols and are formed in saturated organic material. Bedrock typically occurs within 15 to 35 inches. The reference plant community is an open forest (25-60% cover) dominated by coniferous trees, ericaceous shrubs, and wetland indicator plant species. While mountain hemlock is the dominant tree species, western hemlock and Sitka spruce can also be an occasional stand component (Martin et al. 1995). Common understory species include oval-leaf blueberry, Alaska blueberry, deer cabbage, green false hellebore, strawberryleaf raspberry, deer fern, and fernleaf goldthread (Martin et al. 1995, Landfire 2009). The primary disturbance processes that maintain this plant community are exposure to cold temperatures, wind, blowdown, and avalanches (NatureServe 2018).

Associated sites

F220XY338AK	Subalpine Forests Dry Organic Slopes Occurs on similar bands of elevation on dry organic rich soils.
F220XY200AK	Subalpine Forest Gravelly Dry Slopes Occurs on similar bands of elevation on dry soils, leading to differences in reference plant community assemblages..

Similar sites

F220XY200AK	Subalpine Forest Gravelly Dry Slopes Both sites occur in a similar band of elevation and have similar overstory and understory species. F220XY200AK has more productive trees and less wetland indicator species.
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Table 1. Dominant plant species

Tree	(1) <i>Tsuga mertensiana</i>
Shrub	(1) <i>Vaccinium ovalifolium</i> (2) <i>Vaccinium alaskaense</i>
Herbaceous	(1) <i>Nephrophyllidium crista-galli</i> (2) <i>Veratrum viride</i>

Physiographic features

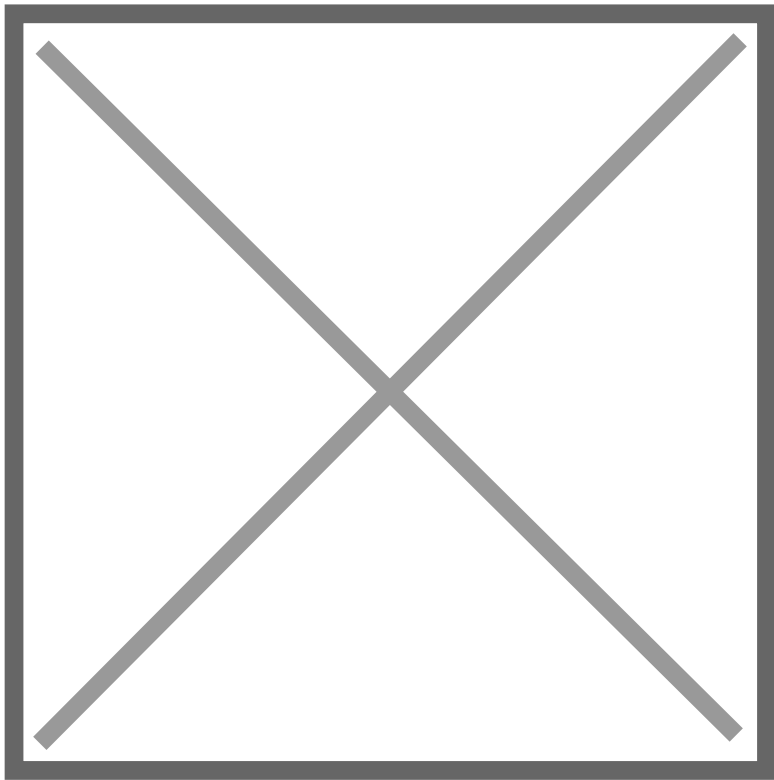


Figure 1.

Table 2. Representative physiographic features

Slope shape across	(1) Concave
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Climatic features

Cloudy conditions, high annual precipitation with long periods of snow cover, and moderate to cold temperatures characterize the climate of this area. The average annual precipitation throughout most of this area is 120 to 200 inches and can reach 250 inches or more at the highest elevations (USDA-NRCS 2006). The average annual snowfall in this area ranges from about 200 to 800 inches and can greatly exceed the annual snowmelt in many places, as evidenced by the abundance and extent of glaciers and ice fields (USDA-NRCS 2006). Site precipitation is at a minimum during the months of April through July and a maximum during the months of September through December.

At higher elevations, freezing temperatures are likely to occur during any month of the year. For this site, the growing season occurs over a short duration of time. For instance, July and August are the only months in which the representative low minimum monthly temperatures are not below freezing.

Table 3 Representative climatic features

Frost-free period (characteristic range)	100-130 days
Freeze-free period (characteristic range)	150-180 days
Precipitation total (characteristic range)	1,550-3,680 mm
Frost-free period (actual range)	80-170 days

Freeze-free period (actual range)	120-220 days
Precipitation total (actual range)	1,140-4,370 mm
Frost-free period (average)	120 days
Freeze-free period (average)	170 days
Precipitation total (average)	2,540 mm

- (1) HOONAH [USC00503695], Hoonah, AK
- (2) PELICAN [USC00507141], Hoonah, AK
- (3) SELDOVIA AP [USW00025516], Homer, AK
- (4) MAIN BAY [USC00505604], Valdez, AK
- (5) CORDOVA M K SMITH AP [USW00026410], Cordova, AK
- (6) YAKUTAT STATE AP [USW00025339], Yakutat, AK
- (7) HAINES AP [USW00025323], Haines, AK
- (8) GLACIER BAY [USC00503294], Gustavus, AK
- (9) GUSTAVUS [USW00025322], Gustavus, AK
- (10) JUNEAU INTL AP [USW00025309], Juneau, AK
- (11) SITKA AIRPORT [USW00025333], Sitka, AK
- (12) PETERSBURG 1 [USW00025329], Petersburg, AK
- (13) KETCHIKAN INTL AP [USW00025325], Ketchikan, AK
- (14) ANNETTE ISLAND AP [USW00025308], Metlakatla, AK

Influencing water features

During the growing season, these very poorly drained soils tend to have a water table near the soil surface (0 to 6 inches) for the entire growing season. Depth to the water table may decrease following summer storm events or spring snowmelt and increase during extended dry periods.

Due to the perceived depth and persistence of a water table, wetland indicator plants are common in the reference state.

Soil features

The soils of this site formed in saturated organic material that is primarily peat or mucky peat. The pH of the organic material ranges between extremely acidic and very strongly acidic (3.5 to 5.0 pH). Bedrock typically occurs at depths of 15 to 35 inches. Rock fragments do not typically occur on the soil surface. Rock fragments in the soil subsurface range between 0 and 10 percent of the soil profile by volume.

The soil moisture regime for these wet soils is aquic. The temperature regime for this site is classified as cryic, where the mean annual soil temperature is between 32°F and 46°F (USDA-NRCS 2006). Soils of this ecological site are Histosols and are typically classified as Lithic Cryosaprists or Lithic Cryohemists.

Table 4. Representative soil features

Parent material	(1) Organic material
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Surface texture	(1) Peat (2) Mucky peat
Drainage class	Very poorly drained
Permeability class	Slow to moderately rapid
Depth to restrictive layer	40 – 90 cm
Soil depth	40 – 90 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	9.65 – 25.91 cm
Soil reaction (1:1 water) (0-25.4cm)	3.5 – 10
Subsurface fragment volume <=3" (0-88.9cm)	0 – 10 %
Subsurface fragment volume >3" (0-88.9cm)	Not specified

Table 5. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Not specified
Depth to restrictive layer	20 – 100 cm
Soil depth	20 – 100 cm

Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	0.51 – 27.43 cm
Soil reaction (1:1 water) (0-25.4cm)	3.5 – 10
Subsurface fragment volume <=3" (0-88.9cm)	Not specified
Subsurface fragment volume >3" (0-88.9cm)	Not specified

Ecological dynamics

The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on historical data, current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

This MLRA has a harsh climate where glaciers and other miscellaneous areas are the dominant land cover. The non-glaciated areas are inhabited by a vegetative matrix resulting from a complex interaction among elevation, varying microclimates resulting from landscape topography, and natural disturbance regimes. The result is a heterogeneous landscape of ericaceous dwarf shrubs, low shrubs, tall shrubs, and forested plant communities. This site forms an aspect of this vegetative continuum. This ecological site occurs on mountain slopes and depressions on wet organic soils at the lowest subalpine bands of elevation.

This site occurs in the subalpine forest subzone (Carstensen 2007) just above coastal forests dominated by western hemlock and just below the subalpine parkland. Mountain hemlock is the tree species best adapted to the cold temperatures, bitter wind, and deep snowpack associated with the subalpine in this MLRA. Avalanches, creeping snowpack that crushes woody vegetation, fungal pathogens, and blowdown are small-patch disturbances that typically result in mortality of individual or small groups of trees in this site (Viereck et al. 1992; Carstensen 2007; Zouhar 2017; NatureServe 2018). These small-patch disturbances, combined with important site factors like elevation and drainage class, maintain vegetation within this site and the larger subalpine forest subzone.

The state-and-transition model that follows provides a detailed description of each known state, community phase, pathway, and transition. This model is based on available experimental research, field observations, literature reviews, professional consensus, and interpretations.

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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Other references

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Contributors

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Approval

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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	06/04/2025
Approved by	
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:
