USDA Natural Resources Conservation Service

Ecological site W1220X433
Maritime Forest Loamy Slopes

Last updated: 3/10/2025
Accessed: 05/10/2025

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 minerology. 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 temperature 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.

Ecological site concept

This site occurs on glacial moraines and mountain slopes of upland mountains. Flooding and ponding are not known to occur on these well drained soils. Slope range is generally 30-60% and elevation ranges from sea level to 1150 ft. Soil textures are loamy-skeletal to sandy-skeletal, or gravelly.

The reference state supports five community phases, and the reference community phase is represented by an open needleleaf forest. The presence of these and related communities are dictated temporally and spatially by the amount of time passed since the mountain slopes were subject to glaciation coupled with windthrow events that reset forest succession to earlier stages.

Associated sites

R220XY446AK	**Maritime Scrub Loamy Escarpments** Ecological site R220XY446AK occurs on hillslopes and escarpments that might abut ecological site F220XY433AK. However, the soils of site R220XY446AK are shallow with lithic contact occurring within 20 inches, resulting is a scrub community.

Similar sites

F220XY432AK	**Maritime Forest Gravelly Plain** Although ecological site F220XY433AK is similar to site F220XY432AK, site F220XY432AK is located on gravelly outwash plains and is subject to intense windthrow events. The differences in landform position, disturbance regime, and soil types result in similar, but unique, plant community phases for each ecological site.

Table 1. Dominant plant species

Tree	(1) *Picea sitchensis*
Shrub	(1) *Alnus viridis ssp. sinuata*
Herbaceous	(1) *Pleurozium schreberi* (2) *Hylocomium splendens*

Legacy ID

F220XY433AK

Physiographic features

This site occurs on glacial moraines and mountain slopes on upland mountains. Flooding and ponding are not known to occur and no water table is associated with this site. Slopes typically range from 30-60% and elevations range from 100 to 1,150 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Mountains > Moraine
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	100–1,150 ft
Slope	30–60%
Water table depth	60 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	0–1,150 ft
Slope	10–85%
Water table depth	60 in

Climatic features

Cloudy skies, moderate temperatures, and abundant rainfall characterize the temperate maritime climate of this site. Frequent winter storms may consist of snow or heavy rainfall. Moderate to strong winds from the south and southeast are common before and during storms throughout the year. Annual precipitation ranges from 44-94 inches, and annual snowfall ranges from 30-70 inches along the coast and up to 200 inches at higher elevations (USDA 2006). The average annual temperature at lower elevations ranges from about 38-43 degrees F (3-6 degrees C). The frost-free period ranges from about 90-140 days, and the freeze-free period ranges from about 125-180 days.

Table 4. Representative climatic features

Frost-free period (characteristic range)	89-139 days
Freeze-free period (characteristic range)	126-181 days
Precipitation total (characteristic range)	44-94 in
Frost-free period (actual range)	77-147 days
Freeze-free period (actual range)	116-184 days
Precipitation total (actual range)	31-140 in
Frost-free period (average)	110 days
Freeze-free period (average)	153 days
Precipitation total (average)	74 in

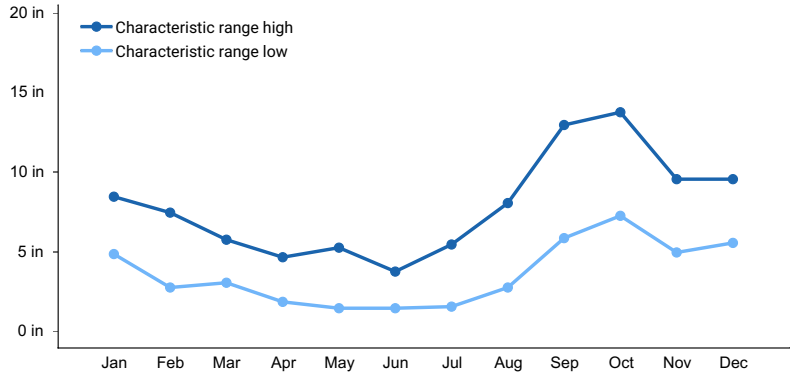


Figure 1. Monthly precipitation range

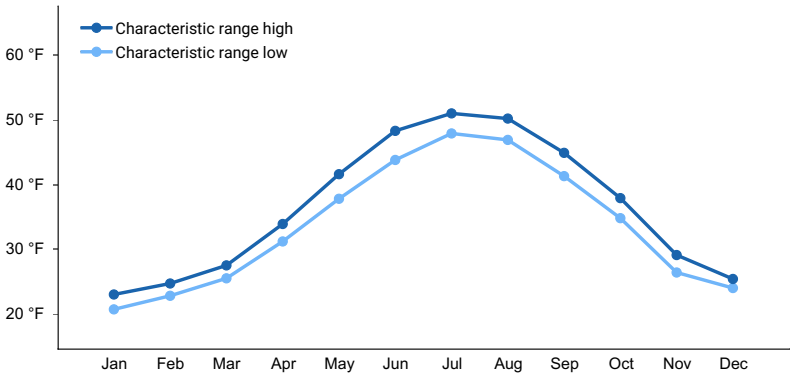


Figure 2. Monthly minimum temperature range

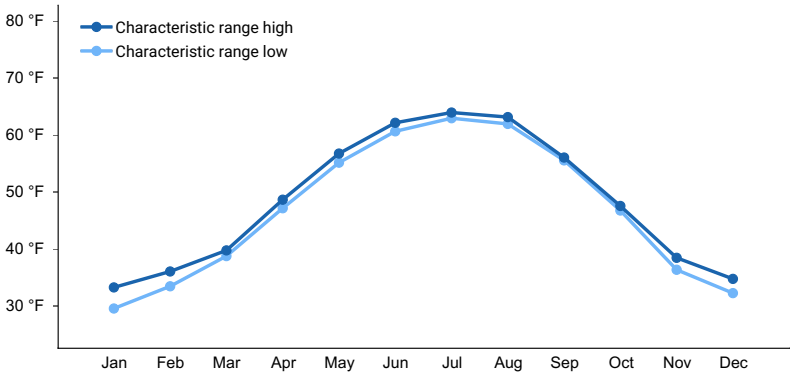


Figure 3. Monthly maximum temperature range

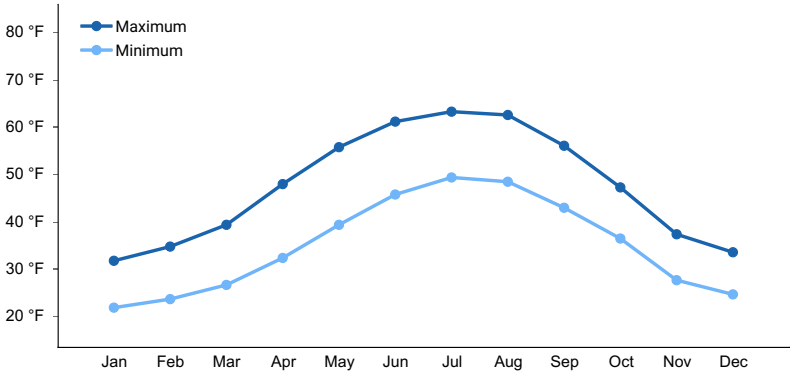


Figure 4. Monthly average minimum and maximum temperature

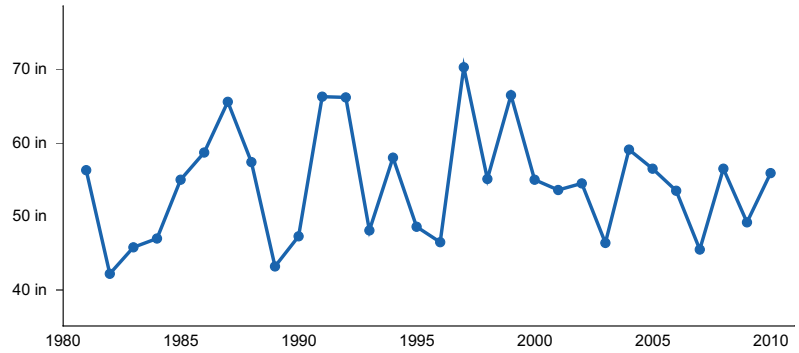


Figure 5. Annual precipitation pattern

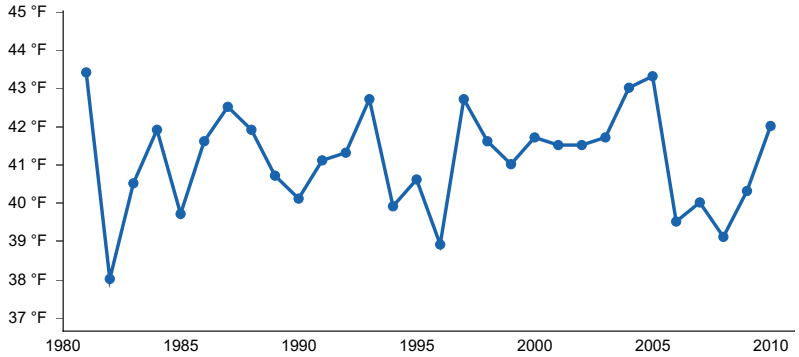


Figure 6. Annual average temperature pattern

Climate stations used

- (1) GUSTAVUS [USW00025322], Gustavus, AK
- (2) GLACIER BAY [USC00503294], Gustavus, AK
- (3) YAKUTAT STATE AP [USW00025339], Yakutat, AK
- (4) SKAGWAY AP [USW00025335], Skagway, AK
- (5) HAINES AP [USW00025323], Haines, AK
- (6) SELDOVIA AP [USW00025516], Homer, AK
- (7) MAIN BAY [USC00505604], Valdez, AK
- (8) CORDOVA M K SMITH AP [USW00026410], Cordova, AK
- (9) SITKA AIRPORT [USW00025333], Sitka, AK
- (10) JUNEAU INTL AP [USW00025309], Juneau, AK
- (11) ANNETTE ISLAND AP [USW00025308], Metlakatla, AK
- (12) PETERSBURG 1 [USW00025329], Petersburg, AK
- (13) KETCHIKAN INTL AP [USW00025325], Ketchikan, AK
- (14) PELICAN [USC00507141], Hoonah, AK

Influencing water features

Ponding and flooding are not known to occur and no water features are associated with this site.

Soil features

The soils of this site formed in colluvial deposits over residuum and glacial outwash. Soil textures are loamy-skeletal to sandy-skeletal and gravelly. Flooding and ponding are not known to occur on these well-drained soils. The soil moisture regime is udic and soils are shallow to deep.

Figure 7. Typical soil profile for Bearisland soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 8. Typical soil profile for Dagelet soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 9. Typical soil profile for Nunatak soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 10. Typical soil profile for Skarn soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Table 5. Representative soil features

Parent material	(1) Colluvium (2) Outwash
Surface texture	(1) Gravelly sandy loam (2) Very gravelly loamy coarse sand
Family particle size	(1) Loamy-skeletal (2) Sandy-skeletal
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	39–59 in
Soil depth	39–59 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	0.4–0.9 in
Calcium carbonate equivalent (0-10in)	0–2%
Clay content (0-20in)	8–21%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.2–8.3
Subsurface fragment volume <=3" (0-60in)	35–49%
Subsurface fragment volume >3" (0-60in)	5–15%

Table 6. Representative soil features (actual values)

Drainage class	Well drained
Permeability class	Moderate to rapid
Depth to restrictive layer	20–59 in

Soil depth	20–59 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–3%
Available water capacity (0-10in)	0.1–0.9 in
Calcium carbonate equivalent (0-10in)	0–2%
Clay content (0-20in)	5–21%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.2–8.3
Subsurface fragment volume <=3" (0-60in)	35–49%
Subsurface fragment volume >3" (0-60in)	3–15%

Ecological dynamics

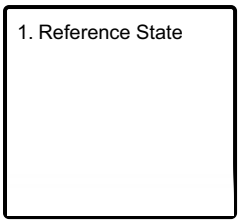
This site is associated with glacial moraines and mountain slopes of upland, coastal mountain ranges along the Gulf of Alaska. Until about 10,000 years ago, this area had many large continental-scale glacial ice sheets that advanced and retreated many times over millennia (Chapin 1994). Glacier Bay of today is a product of the Little Ice Age, a geologically recent glacial advance that occurred across most of the northern region. It reached its maximum extent about 1750 AD, when the glaciers terminated into the Icy Strait (Hall et al. 1994). Since then, the glaciers of Glacier Bay have thinned and retreated nearly 65 miles up the bay. Numerous tidewater glaciers still exist, including Johns Hopkins Glacier, Grand Pacific Glacier, Lamplugh Glacier, McBride Glacier, and Muir Glacier (Lawson 2015). The 250-year glacial retreat is attributed to less regional snowfall in the mountains, rising winter temperatures, and decreased cloud cover and lower precipitation during the growing season in summer (Hall et al. 2003).

This ecological site is associated with mountain slopes of Glacier Bay Inlet. The Glacier Bay Inlet area is surrounded by numerous glaciated mountain ranges, most notably the glacier-rich Fairweather, St. Elias, Alsek, and Takhinsha Ranges. As the glaciers advanced and subsequently retreated from Glacier Bay Inlet into these mountain ranges, vast mountain slopes and broad outwash plains were exposed, initiating the process of primary succession. Large amounts of silt and sediment from eroded underlying rock was transported and deposited by meltwater, creating broad alluvial outwash plains of Glacier Bay Inlet. These geomorphological processes have formed broad, flat to sloping glaciated plains and terraces. Ecological site F220XY433AK occurs on these mountain slopes and extends from the older landscapes of Glacier Bay Inlet, near Gustavus, Alaska, to the most recently deglaciated landscapes near Muir Inlet, Tarr Inlet, and John’s Hopkins Inlet.

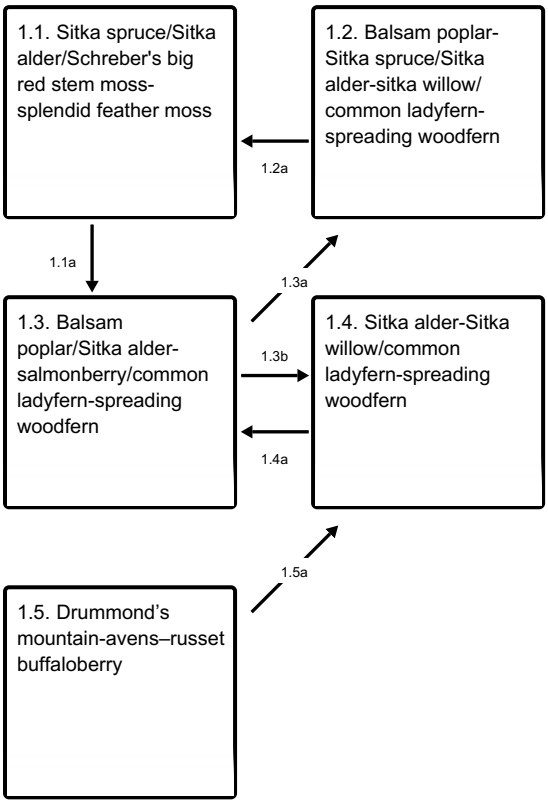
This site supports a reference state composed of five communities that make up a chronosequence of vegetation succession on mountain slopes following glacial retreat. As glaciers recede, Drummond’s mountain-avens (*Dryas drummondii*), an early successional species, will establish and survive in areas recently deglaciated and functions as an early nitrogen-fixing community that facilitates establishment of later successional species (Reiner 1971). With time, the mountain-avens community will begin to support a variety of other prostrate or dwarf shrubs. Various willows and Sitka alder will colonize and rapidly accelerate in abundance and distribution. Eventually, balsam poplar will establish and in time, become the dominant overstory species. During this phase, shade-tolerant Sitka spruce seedlings will establish, eventually become the dominant overstory species, and develop an extensive feathermoss understory (reference community phase 1.1). Natural succession to community phase 1.1 is believed to take 200 years.

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1a - Windthrow

1.2a - Primary succession

1.3a - Natural succession

1.3b - Windthrow

1.4a - Natural succession

1.5a - Natural succession

State 1
Reference State

The reference state for this sites is comprised of five community phases influenced by successional processes following glacial retreat coupled with windthrow disturbance events. The reference community phases is characterized as an open needleleaf spruce forest composed primarily of mature Sitka spruce with extensive feathermoss coverage.

Resilience management. This state has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

Dominant plant species

- Sitka spruce (*Picea sitchensis*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous

Community 1.1
Sitka spruce/Sitka alder/Schreber's big red stem moss-splendid feather moss

Figure 11. Typical plant community associated with community 1.1.

The reference plant community phase is characterized as open needleleaf spruce forest (Viereck et al. 1992). It is composed primarily of mature Sitka spruce with extensive feathermoss coverage. Sitka spruce and balsam poplar are also occasionally observed. Common understory species include Sitka alder, devilsclub, salmonberry, spreading woodfern, common ladyfern, heartleaf twayblade, stairstep moss, and Schreber's big red stem moss. The vegetative stratum that characterized this community phase are tall trees, medium shrubs, and medium forb.

Dominant plant species

- Sitka spruce (*Picea sitchensis*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous

Table 7. Soil surface cover

Tree basal cover	0-40%
Shrub/vine/liana basal cover	0-50%
Grass/grasslike basal cover	0%
Forb basal cover	0-40%
Non-vascular plants	50-100%
Biological crusts	0%
Litter	5-90%
Surface fragments >0.25" and <=3"	0-2%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Community 1.2
Balsam poplar-Sitka spruce/Sitka alder-sitka willow/ common ladyfern-spreading woodfern

Figure 12. Typical plant community associated with community 1.2.

Community phase 1.2 is characterized as an open mixed forest (Viereck et al. 1992). It is composed primarily of balsam poplar and Sitka spruce in the overstory with Sitka alder and Sitka willow dominating the shrub layer. Common ladyfern and spreading woodfern are amongst common understory species.

Dominant plant species

- Sitka spruce (*Picea sitchensis*), tree
- balsam poplar (*Populus balsamifera*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- common ladyfern (*Athyrium filix-femina*), other herbaceous
- spreading woodfern (*Dryopteris expansa*), other herbaceous

Table 8. Soil surface cover

Tree basal cover	0-25%
Shrub/vine/liana basal cover	30-90%
Grass/grasslike basal cover	0%
Forb basal cover	15-80%
Non-vascular plants	0-55%
Biological crusts	0%
Litter	45-90%
Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Community 1.3
Balsam poplar/Sitka alder-salmonberry/common ladyfern-spreading woodfern

Figure 13. Typical plant community associated with community 1.3.

Community phase 1.3 is characterized as broadleaf woodland (Viereck et al. 1992). It is composed primarily of mature balsam poplar. Common understory species include Sitka alder, devilsclub, salmonberry, spreading woodfern, common ladyfern, red baneberry, and Schreber's big red stem moss.

Dominant plant species

- balsam poplar (*Populus balsamifera*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- salmonberry (*Rubus spectabilis*), shrub
- common ladyfern (*Athyrium filix-femina*), other herbaceous
- spreading woodfern (*Dryopteris expansa*), other herbaceous

Table 9. Soil surface cover

Tree basal cover	5-60%
Shrub/vine/liana basal cover	25-90%
Grass/grasslike basal cover	0%
Forb basal cover	5-65%
Non-vascular plants	0-50%
Biological crusts	0%
Litter	50-100%
Surface fragments >0.25" and <=3"	0-10%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Community 1.4
Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Figure 14. A typical example of community phase 1.4.

Community phase 1.4 is characterized as closed tall scrub (Viereck et al. 1992). It is composed primarily of Sitka alder. Other common understory species include Sitka willow, russet buffaloberry, Barclay's willow, undergreen willow, spreading woodfern, and common ladyfern.

Dominant plant species

- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- common ladyfern (*Athyrium filix-femina*), other herbaceous
- spreading woodfern (*Dryopteris expansa*), other herbaceous

Table 10. Soil surface cover

Tree basal cover	0-3%
Shrub/vine/liana basal cover	0-100%
Grass/grasslike basal cover	0%
Forb basal cover	0-60%
Non-vascular plants	0-40%
Biological crusts	0%
Litter	30-95%
Surface fragments >0.25" and <=3"	0-70%
Surface fragments >3"	0%
Bedrock	0-2%
Water	0%
Bare ground	0-2%

Community 1.5
Drummond's mountain-avens–russet buffaloberry

Figure 15. Typical plant community associated with community phase1.5.

Community phase 1.5 is in the pioneering stage following deglaciation and is characterized as Dryas dwarf scrub with Drummond’s mountain-avens being most common (Viereck et al. 1992). Other species include russet buffaloberry, Sitka willow, Sitka alder, and dwarf fireweed.

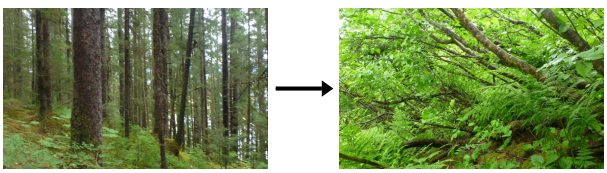
Dominant plant species

- Drummond's mountain-avens (*Dryas drummondii*), shrub
- russet buffaloberry (*Shepherdia canadensis*), shrub
- dwarf fireweed (*Chamerion latifolium*), other herbaceous

Table 11. Soil surface cover

Tree basal cover	0-2%
Shrub/vine/liana basal cover	0-90%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-95%
Non-vascular plants	0-10%
Biological crusts	0%
Litter	15-95%
Surface fragments >0.25" and <=3"	0-75%
Surface fragments >3"	0%
Bedrock	0-10%
Water	0-1%
Bare ground	0-5%

Pathway 1.1a
Community 1.1 to 1.3



Sitka spruce/Sitka alder/Schreber's big red stem moss-splendid feather moss

Balsam poplar/Sitka alder-salmonberry/common ladyfern-spreading woodfern

Windthrow event reduces overstory cover.

Pathway 1.2a
Community 1.2 to 1.1

Balsam poplar-Sitka spruce/Sitka alder-sitka willow/ common ladyfern-spreading woodfern

Sitka spruce/Sitka alder/Schreber's big red stem moss-splendid feather moss

Primary succession following glacial retreat.

Pathway 1.3a
Community 1.3 to 1.2

Balsam poplar/Sitka alder-salmonberry/common ladyfern-spreading woodfern

Balsam poplar-Sitka spruce/Sitka alder-sitka willow/ common ladyfern-spreading woodfern

Natural succession following glacial retreat or windthrow event.

Pathway 1.3b
Community 1.3 to 1.4

Balsam poplar/Sitka alder-salmonberry/common ladyfern-spreading woodfern

Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Windthrow event reduces overstory cover.

Pathway 1.4a
Community 1.4 to 1.3

Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Balsam poplar/Sitka alder-salmonberry/common ladyfern-spreading woodfern

Natural succession following glacial retreat or windthrow event.

Pathway 1.5a
Community 1.5 to 1.4

Drummond's mountain-avens–russet buffaloberry

Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Natural succession following glacial retreat.

Additional community tables

Table 12. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 13. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 14. Community 1.2 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 15. Community 1.2 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 16. Community 1.3 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 17. Community 1.3 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 18. Community 1.4 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 19. Community 1.4 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 20. Community 1.5 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 21. Community 1.5 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Inventory data references

NASIS ID Vegetation Plot Name
13NP01102 Community 1.1
13NP01103 Community 1.1

13TD02901 Community 1.1
13NP05101 Community 1.1
13NP01301 Community 1.2
13NP05501 Community 1.2
13NP01701 Community 1.2
13NP01903 Community 1.2
13NP01901 Community 1.2
13NP05504 Community 1.2
13TD06301 Community 1.2
13NP02201 Community 1.3
13NP05602 Community 1.3
13NP05603 Community 1.3
13TD03201 Community 1.3
13TD06703 Community 1.3
13NP05403 Community 1.3
13NP05503 Community 1.3
13TD01201 Community 1.3
13TD06702 Community 1.3
13NP02002 Community 1.4
13TD01704 Community 1.4
13TD06201 Community 1.4
13NP01104 Community 1.4
13NP04701 Community 1.4
13NP05402 Community 1.4
13NP03002 Community 1.4
13NP03003 Community 1.4
13TD01701 Community 1.4
13TD06302 Community 1.4
14DM01902 Community 1.4
13NP04302 Community 1.5
13NP04801 Community 1.5
13NP04802 Community 1.5
13TD02301 Community 1.5
13TD02302 Community 1.5
14DM01903 Community 1.5

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Approval

Marji Patz, 3/10/2025

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	05/10/2025
Approved by	Marji Patz
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:**

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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):**

---

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:**
