USDA Natural Resources
Conservation Service

Ecological site F220XY455AK
Maritime Forest Sandy Coastal Plain

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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 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 coastal plains and glacial outwash plains and deltas with slopes not typically exceeding 5%. Soils are sandy and somewhat poorly- to poorly-drained. A shallow water table persists throughout the growing season and ponding occasionally occurs. This site supports a reference state comprised of three community phases driven by isostatic rebound. Over time, the emergence of landmasses, or isostatic rebound, in this are reduces ponding and leads to primary succession of plant communities. A second state has been identified on this site and results from anthropogenic ditching. This management practice increases soil drainage and aeration, causing shifts in plant community dynamics and composition.

The reference community phase is characterized as an open needleleaf spruce forest. It is composed primarily of mature Sitka spruce and lodgepole pine. Western hemlock is common, although the cover is low. The understory is variable. Some areas have minimal shrub and forb cover and a ground cover that is dominantly moss. Other areas have a mixed shrub-forb-moss understory with a higher diversity of species. Common shrub species include Sitka alder, oval-leaf blueberry, and crowberry.

Associated sites

F220XY432AK	**Maritime Forest Gravelly Plain** Ecological site F220XY432AK also occurs on glaciated outwash plains, but is associated with higher and drier positions as compared to F220XY455AK. While site F220XY432AK is not subject to high water table influences, the site does experience windthrow, logging, and ditching disturbance.

Similar sites

F220XY466AK	**Maritime Forest Sandy Plains Eolian** Ecological site F220XY466AK supports a similar plant community on sandy soils but occurs on dunes and eolian hills and ridges.

Figure 1. Typical area of associated ecological site F220XY432AK. This site is adjacent to site F220XY455AK and is not subject to ponding because of isostatic rebound. With continued isostatic rebound, site F220XY455AK may transition to site F220XY432AK.

Table 1. Dominant plant species

Tree	(1) *Picea sitchensis* (2) *Pinus contorta*
Shrub	(1) *Alnus viridis ssp. sinuata* (2) *Empetrum nigrum*
Herbaceous	(1) *Hylocomium splendens*

Physiographic features

This site occurs on glacial outwash plains and on alluvium on coastal plains. A shallow, seasonal water table is associated with the reference plant community and ponding occasionally occurs. Slopes are generally under 5% and elevation ranges from sea level to 100 feet.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Outwash plain (2) Outwash plain > Outwash plain (3)
Runoff class	Medium
Flooding duration	Not specified
Flooding frequency	None to rare
Ponding duration	Not specified
Ponding frequency	Rare to occasional
Elevation	0–100 ft
Slope	0–5%
Water table depth	0–20 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Medium
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	0–230 ft
Slope	0–5%
Water table depth	0–60 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)	95-142 days
Freeze-free period (characteristic range)	147-183 days
Precipitation total (characteristic range)	55-145 in
Frost-free period (actual range)	84-170 days
Freeze-free period (actual range)	119-218 days
Precipitation total (actual range)	35-172 in
Frost-free period (average)	120 days
Freeze-free period (average)	168 days
Precipitation total (average)	97 in

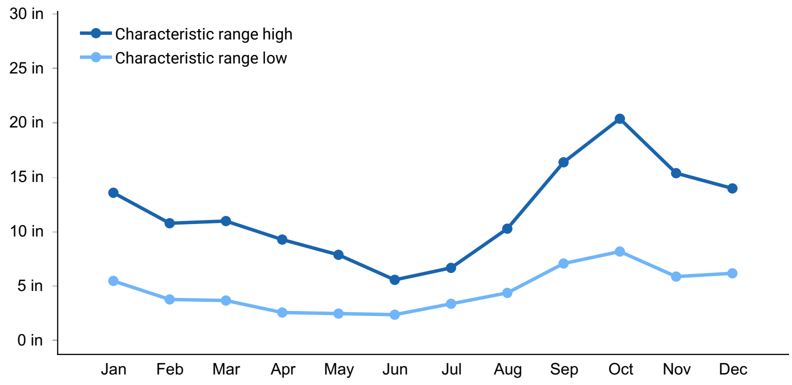


Figure 2. Monthly precipitation range

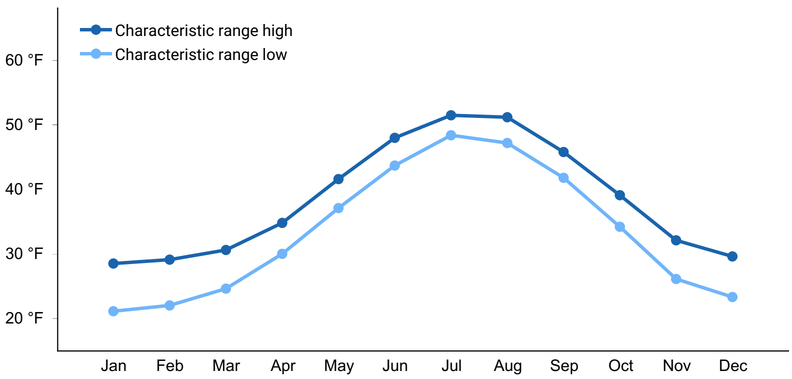


Figure 3. Monthly minimum temperature range

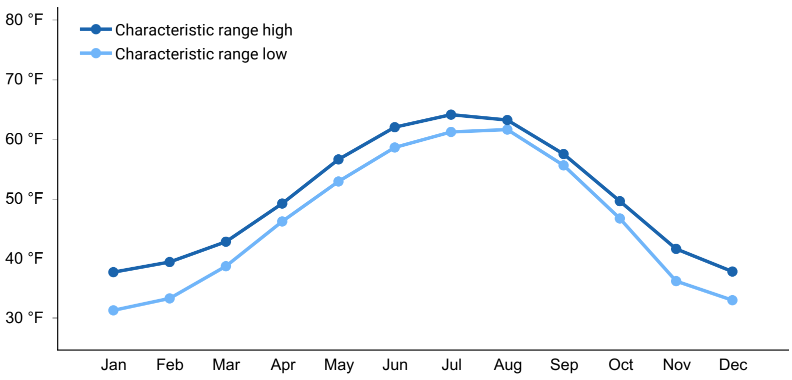


Figure 4. Monthly maximum temperature range

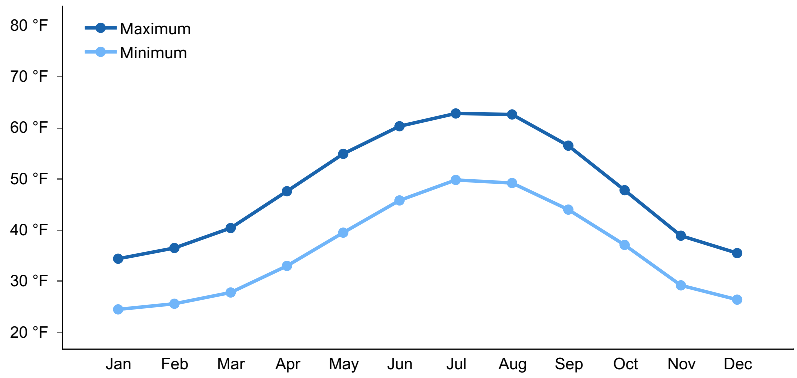


Figure 5. Monthly average minimum and maximum temperature

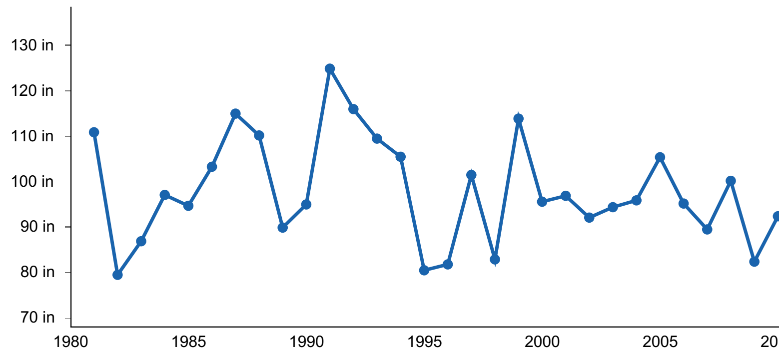


Figure 6. Annual precipitation pattern

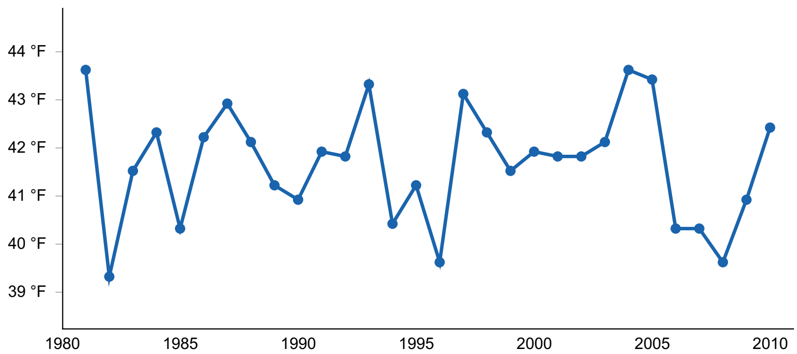


Figure 7. Annual average temperature pattern

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

This site is associated with a shallow water table and ponding at early stages of primary succession. Over time, isostatic rebound is thought to decrease ponding occurrence and lower the persistent water table.

Soil features

The soils of this site formed in very deep alluvial and glacial outwash deposits on coastal plains. Mineral soil textures range from sandy-skeletal to find-silty and organic textures are typically mucky peat. Soils are somewhat poorly- to poorly-drained and flooding is not known to occur. Ponding does occur as a result of a shallow, seasonal water table. Water table depth and ponding is driven by processes associated with isostatic rebound, causing soils to dry out over time and ultimately driving plant community composition.

Figure 8. This is an example of the Glacierbay soil series.

Figure 9. This is an example of the Perouse soil series.

Figure 10. This is an example of the Topsy soil series.

Table 5. Representative soil features

Parent material	(1) Outwash (2) Alluvium
Surface texture	(1) Loamy sand (2) Mucky peat (3) Silt loam (4) Fine sand (5) Cobbly fine sandy loam
Family particle size	(1) Sandy (2) Sandy-skeletal (3) Fine-silty
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Moderate to rapid
Depth to restrictive layer	60–0 in
Soil depth	60–0 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0 in
Clay content (0-20in)	2–8%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	3.5–8.5
Subsurface fragment volume <=3" (0-60in)	5–8%
Subsurface fragment volume >3" (0-60in)	0–15%

Table 6. Representative soil features (actual values)

Drainage class	Very poorly drained to somewhat poorly drained
Permeability class	Moderate to very rapid
Depth to restrictive layer	60–0 in
Soil depth	60–0 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0–5 in
Clay content (0-20in)	2–30%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0

Soil reaction (1:1 water) (0-40in)	3.5–8.5
Subsurface fragment volume <=3" (0-60in)	0–37%
Subsurface fragment volume >3" (0-60in)	0–15%

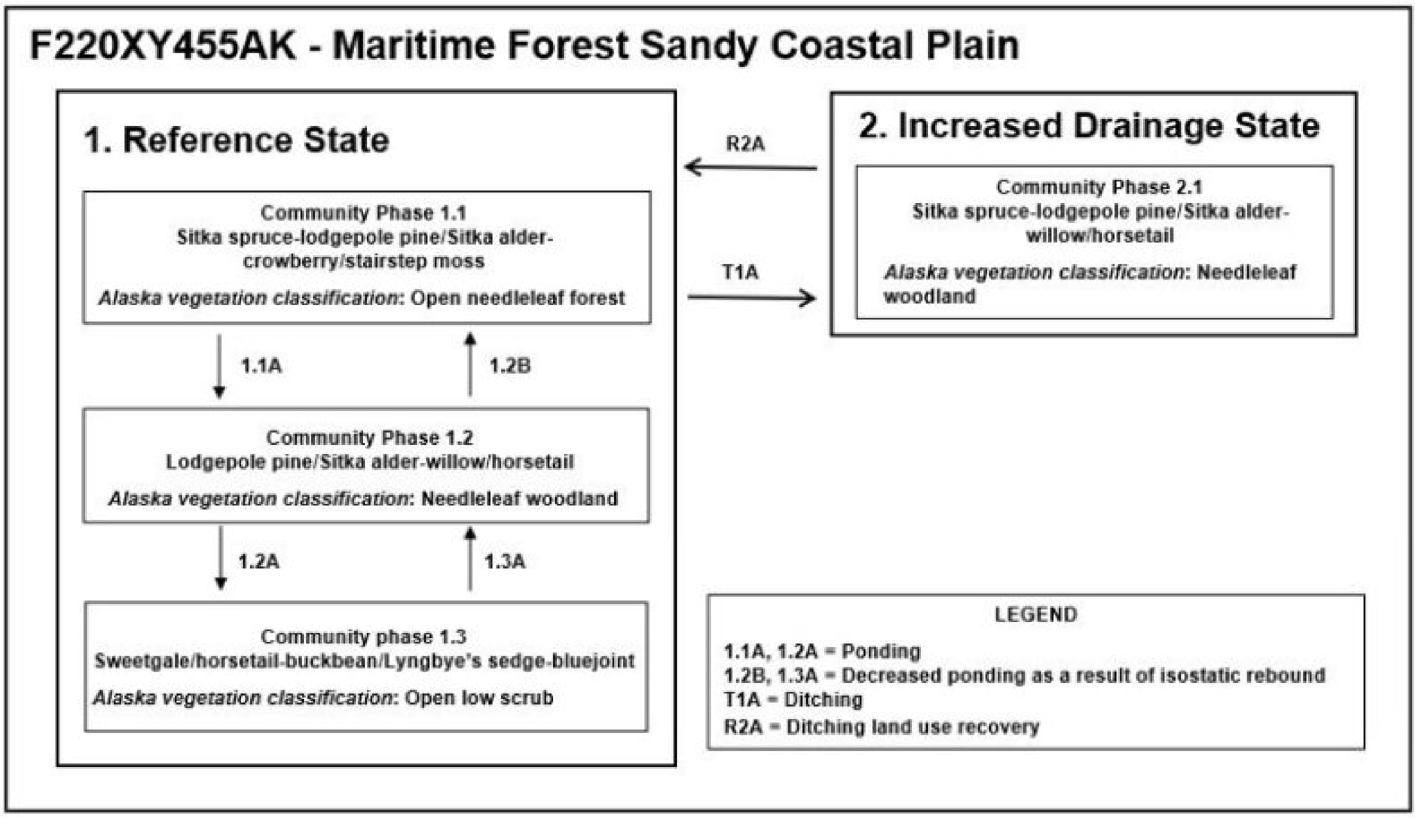
Ecological dynamics

This site is associated with alluvial outwash plains and deltas on coastal plains. Until about 10,000 years ago, this area had many large continental-scale glacial ice sheets that advanced and retreated many times over the millennia (Chapin 1994). In Glacier Bay, glaciers reached maximum extent about 1750 AD when the glaciers terminated into the Icy Strait (Hall et al. 1994). Since then, glaciers of Glacier Bay have thinned and retreated nearly 65 miles up the bay. Numerous tidewater glaciers still exist in this area, 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).

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 of Glacier Bay advanced and subsequently retreated from Glacier Bay Inlet into these mountain ranges, a large amount of silt and sediment from eroded underlying rock was transported and deposited by meltwater, creating the broad alluvial outwash plains. These alluvial outwash plains are older landscapes that were glaciated during the Little Ice Age. They exhibit a variety of broad, shallow areas of fine-silty material in which drainage water accumulates, or wetland discharge areas. These areas commonly are nearly level; thus, subsurface hydrological inputs and seasonal precipitation accumulate, facilitating organic material development. A persistent water table is just below the surface or at the surface in these areas. This site occurs in these broad, shallow areas of wetland discharge.

This ecological site supports a reference state composed of three community phases. Community phase 1.3 is subject to ponding and is associated with a persistent water table close to the surface or at the surface. It consists of an open low scrub community composed of many hydrophilic plant species. As a result of isostatic rebound over time, ponding will decrease and the persistent water table will lower. The community will transition to needleleaf woodland (community phase 1.2). The soils may pond periodically for shorter durations and exhibit a less persistent, lower water table. Continued time with shorter durations of ponding and continued isostatic rebound will result in a transition from community phase 1.2 to community phase 1.1 (reference community phase). It is characterized as an open needleleaf forest composed of Sitka spruce and lodgepole pine.
This ecological site has an alternative state related to anthropogenic ditching. Ditching is common in developed areas. It is used to increase water drainage and soil aeration in areas with a high water table. Ditching commonly is used in areas associated with community phases 1.2 and 1.3, and it results in a rapid transition to community phase 2.1

State and transition model



State 1
Reference State

The reference state supports three community phases. The reference community phase is represented by an open needleleaf forest. The presence of these and related communities are dictated temporally and spatially by ponding on the alluvial outwash plains. All community phases in this report are characterized using the Alaska Vegetation Classification System (Viereck et al. 1992).

Dominant plant species

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

Community 1.1

Sitka spruce - lodgepole pine / Sitka alder - crowberry / stairstep moss

Figure 11. Typical plant community associated with community 1.1.

Community phase 1.1 is characterized by an open needleleaf forest. Mature Sitka spruce is most common and occurs in the tall tree stratum. Lodgepole pine and western hemlock are common, although cover is generally low and densities are variable. The understory is variable. Common shrub species include Sitka alder, oval-leaf blueberry, and crowberry. Forb species include sidebells wintergreen, heartleaf twayblade, and bunchberry dogwood. The ground cover can be variable; stairstep moss and Schreber’s big red stem moss are common.

Dominant plant species

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

Table 7. Soil surface cover

Tree basal cover	0-15%
Shrub/vine/liana basal cover	0-5%
Grass/grasslike basal cover	0-15%
Forb basal cover	0-45%
Non-vascular plants	0-80%
Biological crusts	0%
Litter	15%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Community 1.2
Lodgepole pine / Sitka alder - willow / horsetail

Figure 12. Typical plant community associated with community 1.2.

Community phase 1.2 is characterized by open needleleaf woodland. Low productivity lodgepole pine is most common and occurs in the medium stratum. Sitka spruce may be present, but cover is minimal and individuals are generally saplings to younger trees. Common understory species include Sitka alder, undergreen willow, Barclay's willow, and sweetgale, field horsetail, variegated scouringrush, sticky false asphodel, yarrow, bluejoint, and longawn sedge. The ground cover is a mixture of herbaceous litter and bryophytes.

Dominant plant species

- lodgepole pine (*Pinus contorta*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- willow (*Salix*), shrub
- horsetail (*Equisetum*), other herbaceous

Table 8. Soil surface cover

Tree basal cover	0-45%
Shrub/vine/liana basal cover	0-55%
Grass/grasslike basal cover	0-50%
Forb basal cover	5-25%
Non-vascular plants	5-85%
Biological crusts	0%
Litter	5-65%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0-40%
Bare ground	0-20%

Community 1.3
Sweetgale / horsetail - buckbean / Lyngbye's sedge - bluejoint

Figure 13. Typical plant community associated with community 1.3.

Community phase 1.3 is characterized as an open low scrubland that includes patchy, dense shrubs within a mosaic hydrophilic graminoids and forbs. Sweetgale is the dominant shrub with some Barclay's willow and undergreen willow. Various water-tolerant forbs, including variegated scouringrush, water horsetail, and buckbean are present. Common water-tolerant graminoids include Lyngbye's sedge, bluejoint, and little green sedge. Some areas are covered with standing water and others with saturated moss, commonly goose neck moss.

Dominant plant species

- sweetgale (*Myrica gale*), shrub
- willow (*Salix*), shrub
- sedge (*Carex*), grass
- horsetail (*Equisetum*), other herbaceous

Table 9. Soil surface cover

Tree basal cover	0-5%
Shrub/vine/liana basal cover	0-65%
Grass/grasslike basal cover	0-90%
Forb basal cover	0-70%
Non-vascular plants	0-95%
Biological crusts	0%
Litter	5-100%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0-10%
Water	0-90%
Bare ground	0-45%

Pathway 1.1a
Community 1.1 to 1.2

Sitka spruce - lodgepole pine / Sitka alder - crowberry / stairstep moss

Lodgepole pine / Sitka alder - willow / horsetail

Persistent ponding due to a higher seasonal water table may lead to less productive forest stands, reducing cover of Sitka spruce.

Pathway 1.2b
Community 1.2 to 1.1

Lodgepole pine / Sitka alder - willow / horsetail

Sitka spruce - lodgepole pine / Sitka alder - crowberry / stairstep moss

Isostatic rebound may lead to decreased ponding and a deeper seasonal water table over time.

Pathway 1.2a
Community 1.2 to 1.3

Lodgepole pine / Sitka alder - willow / horsetail

Sweetgale / horsetail - buckbean / Lyngbye's sedge - bluejoint

Persistent ponding due to a higher seasonal water table may lead to less productive forest stands, reducing cover of Sitka spruce and Lodgepole pine.

Pathway 1.3a
Community 1.3 to 1.2

Sweetgale / horsetail - buckbean / Lyngbye's sedge - bluejoint

Lodgepole pine / Sitka alder - willow / horsetail

Decreased ponding as a result of isostatic rebound.

State 2
Increased Drainage State

This alternative state is associated with historical and active anthropogenic ditching. This practice is used for development in the Gustavus area, and results in substantial changes to the hydrological processes. Ditching rapidly lowers the water table, increases drainage and runoff potential, and reduces the frequency and duration of ponding. Ditching associated with this ecological site results in a rapid transition to different plant communities from that normally found in the reference state. The ditching state commonly includes resilient individuals and species extant from the reference state. Whether the alternative state can naturally transition back to the reference state remains unknown. If the overstory is not cleared for development, community phase 2.1 may transition back to the reference state and exhibit similar vegetative communities as those in community phase 1.1.

Dominant plant species

- lodgepole pine (*Pinus contorta*), tree
- Sitka spruce (*Picea sitchensis*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- willow (*Salix*), shrub
- sedge (*Carex*), grass
- horsetail (*Equisetum*), other herbaceous

Community 2.1
Lodgepole pine -Sitka spruce / Sitka alder -willow / horsetail

Figure 14. Typical plant community associated with community 2.1

This ditching community phase is characterized by open woodland that includes patchy, dense shrubs interspersed with moisture-tolerant forbs and graminoids. Typically, this community consists of colonizing and maturing lodgepole pine and Sitka spruce. A variety of extant shrubs, forbs, and graminoid species are present, including sweetgale, Barclay's willow, water horsetail, field horsetail, and beach strawberry. Other minor extant species may include various sedges and cottongrasses. Common bryophytes include splendid feathermoss and goose neck moss.

Dominant plant species

- lodgepole pine (*Pinus contorta*), tree
- Sitka spruce (*Picea sitchensis*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- willow (*Salix*), shrub
- sedge (*Carex*), grass
- horsetail (*Equisetum*), other herbaceous

Table 10. Soil surface cover

Tree basal cover	0-25%
Shrub/vine/liana basal cover	0-15%
Grass/grasslike basal cover	0-85%

Forb basal cover	0-80%
Non-vascular plants	0-95%
Biological crusts	0%
Litter	5-100%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Transition T1A
State 1 to 2

Reference State

Increased Drainage State

This transition is caused by anthropogenic ditching. Areas surrounding the ditches have a lower water table and associated hydrological processes that support plant assemblages and soil characteristics distinctly different from those of the reference state. The plant community consists largely of extant hydrophilic species that are water-tolerant and various trees and shrubs with greater overall production. Over time, these areas become less susceptible to flooding and ponding after rainfall and snowmelt due to the hydrological effects of ditching. As a result of ditching and isostatic rebound, this transition is rapid as compared to natural succession and it is dependent on land management decisions.

Restoration pathway R2A
State 2 to 1

Increased Drainage State

Reference State

The restorative pathway to the reference state may occur in areas where anthropogenic efforts are implemented. Dikes and ditch plugs commonly are used, and they can potentially restore historic reference state hydrologic processes. Once these techniques are properly implemented, it is hypothesized that the community can transition to the reference state. Further research and in situ documentation is required to fully understand this transition.

Additional community tables

Table 11. Community 1.1 forest overstory composition

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

Table 12. Community 1.1 forest understory composition

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

Table 13. Community 1.2 forest overstory composition

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

Table 14. Community 1.2 forest understory composition

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

Table 15. Community 1.3 forest understory composition

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

Table 16. Community 2.1 forest overstory composition

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

Table 17. Community 2.1 forest understory composition

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

Inventory data references

NASIS ID Plant community
14DM01404 Community 1.1
2015AK105013 Community 1.1
2015AK105129 Community 1.1
14DM01501 Community 1.2
14DM01502 Community 1.2
2015AK105115 Community 1.2
2015AK105116 Community 1.2
13DM01205 Community 1.2
14NP01901 Community 1.2
14JP01601 Community 1.2
14JP01602 Community 1.2
14JP01604 Community 1.2
2015AK105105 Community 1.3
2015AK105108 Community 1.3
2015AK105113 Community 1.3
2015AK105114 Community 1.3
13DM02002 Community 1.3
14JP01501 Community 1.3
14NP01802 Community 1.3
14NP01902 Community 1.3
14NP02301 Community 1.3
14NP02302 Community 1.3
14NP02402 Community 1.3
14JP02206 Community 1.3
13DM02001 Community 1.3
2015AK105111 Community 2.1
2015AK105112 Community 2.1
13DM02003 Community 2.1
2015AK105128 Community 2.1

Other references

Chapin, F.S., L.R. Walker, C.L. Fastie, and L.C. Sharman. 1994. Mechanisms of primary succession following deglaciation at Glacier Bay, Alaska. Ecological Monographs 64: 149-175.

Clarke, J.A. 1977. An inverse problem in glacial geology: The reconstruction of glacier thinning in Glacier Bay, Alaska, between AD 1910 and 1960 from relative sea level data. Journal of Glaciology 80: 481-503.

Fastie, C.L. 1995. Causes and ecosystem consequences of multiple pathways of primary succession at Glacier Bay, Alaska. Ecology 76: 1899-1916. DOI: 10.2307/1940722.

Hall, D.K., C.S. Benton, and W.O. Field, 1994. Changes of glaciers in Glacier Bay, Alaska, using ground and satellite measurements. Physical Geography 16(1): 27-41.

Hall, M.H.P., and D. Fagre. 2003. Modeled climate-induced glacier change in Glacier National Park 1850–2100. BioScience 53:131–140.

Hicks, S.D., and W. Shofnos. 1965. The documentation of land emergence from sea-level observations in southeast Alaska. Journal of Geophysical Research 70: 3315–3320.

Hook, D., and R.M.M. Crawford. 1978. Plant life in anaerobic environments. Ann Arbor Science Publisher, Inc.

Johnson, H.A., N.E. Michaelson, and G.A. Woodruff. 1954. Agricultural reconnaissance report, Gustavus Area, Alaska.

Larsen, C.F., K.A. Echelmeyer, J.T. Freymueller, and R.J. Motyka. 2003. Tide gauge records of uplift along the northern Pacific-North American plate boundary, 1937 to 2001. Journal of Geophysical Research. Volume 108, number B4. DOI: 10.1029/2001JB001685.

Lawson, D.E. 2015. An overview of selected glaciers in Glacier Bay. National Park Service. Retrieved August 15, 2010.

Milne, G.A., and I. Shennan. 2013. Isostasy: Glaciation-induced sea-level change. In Encyclopedia of Quaternary Science. Volume 3, Elsevier, Oxford, pp. 452-459.

Schoeneberger, P.J., and D.A. Wysocki. 2012. Geomorphic Description System, Version 4.2. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Thom, R.M., A.B. Borde, K.O. Richter, and L.F. Hibler. 2001. Influence of urbanization on ecological processes in wetlands. In Land Use and Watersheds: Human Influence on Hydrology and Geomorphology in Urban and Forest Areas. M.S. Wigmosta and S.J. Burges, editors. American Geophysical Union, Washington, D.C. DOI: 10.1029/WS002p0005

Vartapetian, Boris B., and Michael B. Jackson. 1996. Plant adaptations to anaerobic stress. Annals of Botany. Volume 79 (Supplement A): 3-20.

Soil Survey Division Staff. 2017. Soil survey manual. U.S. Department of Agriculture Handbook 18.

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 Forest and Range Experiment Station General Technical Report PNW-GTR-286.

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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	05/12/2025
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:**

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:**

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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:**
