

Ecological site VX226X00A107

Aleutian Steep Tundra Slopes

Last updated: 6/14/2025
Accessed: 03/07/2026

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): 226X–Aleutian Islands-Western Alaska Peninsula

MLRA 226X is the only MLRA in the Aleutian Alaska Region. It makes up about 5,190 square miles (13,450 square kilometers). The chain of islands includes west of Unimak Island to Attu Island, the Pribilof Islands, and the Sanak Islands. Characteristics and weather patterns of the far western end of the Alaska Peninsula is being included in this MLRA. It is bordered on the south by the Pacific Ocean and on the north by the Bering Sea (the Pribilof Islands are bordered on all sides by the Bering Sea). The coastline is complex, with many prominent headlands, sea cliffs, and narrow, steep-walled bays. Elevation ranges from sea level to more than 4,000 feet (1,220 meters) on many of the islands. Islands drain into the North Pacific and the Bering Sea by numerous short, steep-gradient rivers and streams. Lakes make up less than 2 percent of the area.

Geology

This MLRA includes more than 50 volcanoes, with an estimated 27 with activity since the 1950s. Volcanic rocks and unconsolidated deposits from the Quaternary and Tertiary period overlie a submarine ridge of Tertiary sedimentary rocks. Glacial ice once covered the eastern part of the area to approximately Umnak Island. West of Umnak, only the upper elevations were glaciated. Glaciers account for only 1.5 percent, occurring on the highest volcanoes. Volcanic activity has mantled most of the area with thick deposits of silty volcanic ash, sandy and gravelly cinders, and volcanic rubble. Lower elevations have areas of glacial influenced landforms. Recent coastal and fluvial deposits occur in scattered areas along the coast and on flood plains.

Water

Precipitation is adequate for crops generally. Permanent mountain streams feed most of

the MLRA. The surface water generally is suitable for all uses. The ground water used in this MLRA is primarily from unconsolidated river valley sediments and bedrock aquifers. Iron is commonly high in the ground water, causing staining and precipitate in pipes. Wells are shallow with constant recharge by freshwater (rainfall and runoff); and are highly susceptible to contamination from runoff. The intrusion of seawater can be a problem along the coast.

Soils

The dominant soil orders in this MLRA are Andisols and Histosols. Miscellaneous areas (cinder land, rock outcrop, water, riverwash, and beaches) make up about 45 percent of this MLRA. The main soils are: Cryofibrists are poorly drained or very poorly drained and formed in thick deposits of organic material, along the margins of streams and lakeshores. Tsammana series, Andic Dystrocryepts, Aquandic Dystrocryepts and Vitrandic Dystrocryepts are coarse marine sediments underlain by volcanic deposits. Zolotoi series and other Haplocryands are shallow to deep, well drained to excessively drained, and formed in moderately thick or thick deposits of silty to sandy volcanic ash and coarse sandy to gravelly cinders over basalt bedrock. Polovina series and other Vitricryands are shallow to deep, well drained to excessively drained, and formed in moderately thick or thick deposits of silty to sandy volcanic ash and coarse sandy to gravelly cinders over basalt bedrock.

Biological Resources

Higher elevation vegetation consists of a mosaic of dwarf shrub scrub and lower elevations are wet and dry grasslands. Peatland vegetation consists of low ericaceous shrub scrub. No naturally occurring forests occur on the islands. Aleutian shield fern, Steller sea lion, and the Aleutian Canada goose are currently listed as threatened or endangered. The area is an important winter habitat and nesting habitat for waterfowl and a variety of other birds. Some of the eastern islands support small herds of caribou.

Land Use

Commercial fishing is the primary enterprise, with fur seal harvesting for pelts and meat, Reindeer herding, and small cattle herds. Subsistence hunting, fishing, and gathering are critical for local residents. The major resource concerns are water erosion and mass wasting of soils. Overgrazing by reindeer has impacted vegetation and introduction of rats, dogs, cats, and foxes has severely impacted the nesting bird populations.

LRU notes

MLRA 226X, although very size-limited, contains a very complex and dynamic of weather patterns driven by the Pacific air currents on the southern exposure of the islands, and the Bering Sea to the north. The mixing or colliding of these two systems, creates very dramatic and intense storm systems that batter the islands. Weather variables from the Pacific to the Bering Sea, extent from west to east, as well as the extreme elevational gradient moving from sea level to Alpine life zone lends to a community diversity that is difficult to describe across an MLRA extent. Land Resource Units (LRUs) will need to be

developed for this MLRA, as more extensive soils survey mapping is completed.

Classification relationships

Alaska-Aleutian province of the Pacific Mountain System.

USFS Description of Ecoregions of the United States

100 Polar Domain

120 Tundra Division

126 Bering Tundra (Southern) Province

M120 Tundra Division - Mountain Province

M127 Aleutian Oceanic Meadow--Heath Province

(USFS, 1994)

United States National Vegetation Classification

C04. Polar & High Montane Scrub, Grassland & Barrens Class

S12. Temperate to Polar Alpine & Tundra Vegetation Subclass

F031. Polar Tundra & Barrens Formation

D044. Arctic Tundra & Barrens Division

(USNVC, 2019)

LandFire BpS Model/Description Version: Nov. 2024

17200 - Aleutian Ericaceous Dwarf-shrub, heath, and Fell-field

(Landfire, 2009)

Ecological site concept

- Soils occur on dip slopes and mountain side slopes.
- Soils are formed over residuum of weathered basalt with areas of tephra in the profile.
- Soils are moderately deep to deep, with areas of shallow soils intermixed.
- A water table occurs at moderate depths or not at all in the soil profile for this site.
- No flooding or ponding associated with this site.
- Rock fragments and isolated occurrences of rock outcrops are common across this ecological site.
- Vegetation is oval-leaf blueberry and black crowberry with heath and sedges and grasses intermixed.

Associated sites

VX226X00A109	Aleutian Shallow Cliffs and Slopes The Igneous slopes grade up to the shallow cliffs and slopes. The shallow summits and steep faces of the Shallow Cliffs and slopes have limited vegetative cover and has a stronger composition of mosses and lichen.
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Similar sites

VX226X00A113	<p>Aleutian Shrub Meadow Ashy Slopes</p> <p>Similar to the Organic Ashy slopes, the Igneous slopes provide for black crowberry and short shrubs, and will be more fragmented than the ashy slopes, however the slopes will occur in close proximity with the organics occurring in more protected pockets and are wetter soils.</p>
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Vaccinium vitis-idaea ssp. minus</i> (2) <i>Harrimanella stelleriana</i>
Herbaceous	(1) <i>Carex macrochaeta</i> (2) <i>Lupinus nootkatensis</i>

Legacy ID

R226XY107AK

Physiographic features

- ecological site occurs on hill-, mountain-, and dip-slopes.
- slope percent is reported as being between 1 to 8 percent but can be found on slopes of upwards of 35 percent.
- elevation ranges from 20 feet above sea level to 120 feet.
- runoff potential will vary with slope, percent of rock fragments, level of saturation, and vegetation cover. Expected runoff would be low to medium.

Table 2. Representative physiographic features

Landforms	(1) Island > Dip slope (2) Mountain slope
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	6–37 m
Slope	1–8%
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Very low to high
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Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	6–73 m
Slope	1–35%

Climatic features

The climate is similar to that on the arctic coastal plain, except Islands are impacted by the tides, air movement, and storms influenced by the Pacific Ocean and Bering Sea, and really no inland influence. Winters are less severe than those on the coastal plain, with temperature ranges of 18 to 27 degrees F (10 to 15C), as compared to a 54 degrees F (30C) range on the coastal plain. The climate is characterized by fog and rain, with the amount of precipitation varying little from month to month. Annual precipitation varies from 21 in (530 mm) to more than 78 in (2,000 mm) across all islands. The higher elevations average 46 to 58 inches per year, with smaller islands receiving less precipitation than larger islands. Winds are often severe on the islands. Pacific Ocean water moving northward through the straits between the islands produces complex mixing with Bering Sea water, including upwelling. The Pribilof Islands in the Bering Sea are the southern limit of the arctic ice pack in winter (USDA-NRCS 2022). Weather information below is captured by climate stations located at Dutch Harbor and Cold Bay. The location of these stations represents only a small segment of the dynamic climate across this chain of islands.

Table 4. Representative climatic features

Frost-free period (characteristic range)	78-92 days
Freeze-free period (characteristic range)	122-136 days
Precipitation total (characteristic range)	1,168-1,473 mm
Frost-free period (actual range)	75-95 days
Freeze-free period (actual range)	119-139 days
Precipitation total (actual range)	1,092-1,549 mm
Frost-free period (average)	85 days
Freeze-free period (average)	129 days
Precipitation total (average)	1,321 mm

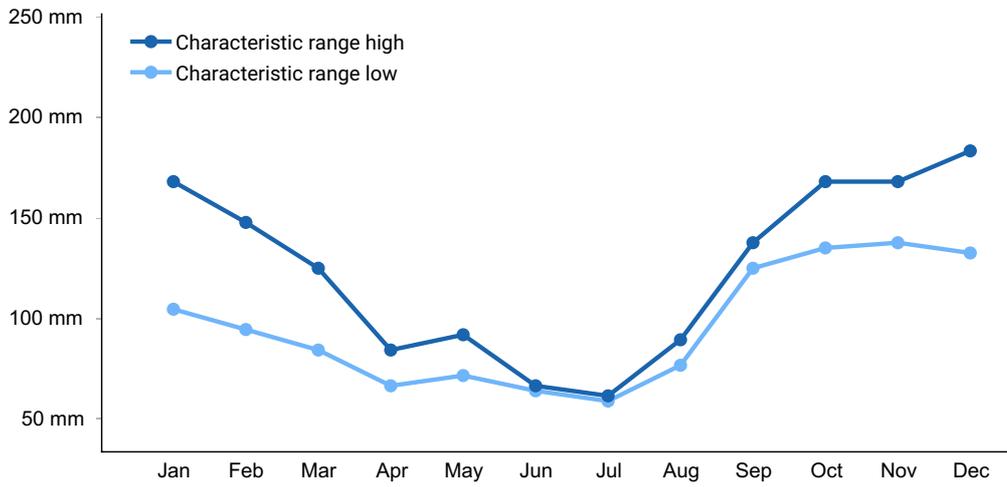


Figure 1. Monthly precipitation range

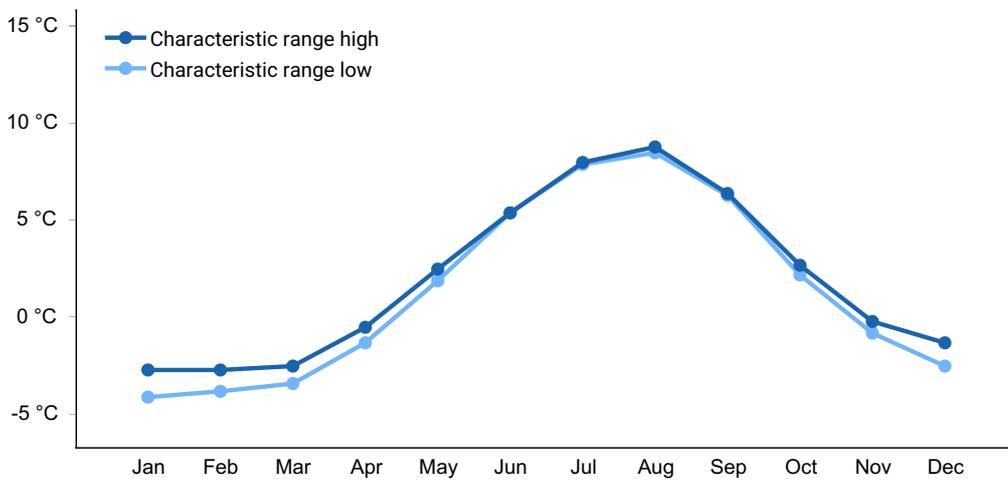


Figure 2. Monthly minimum temperature range

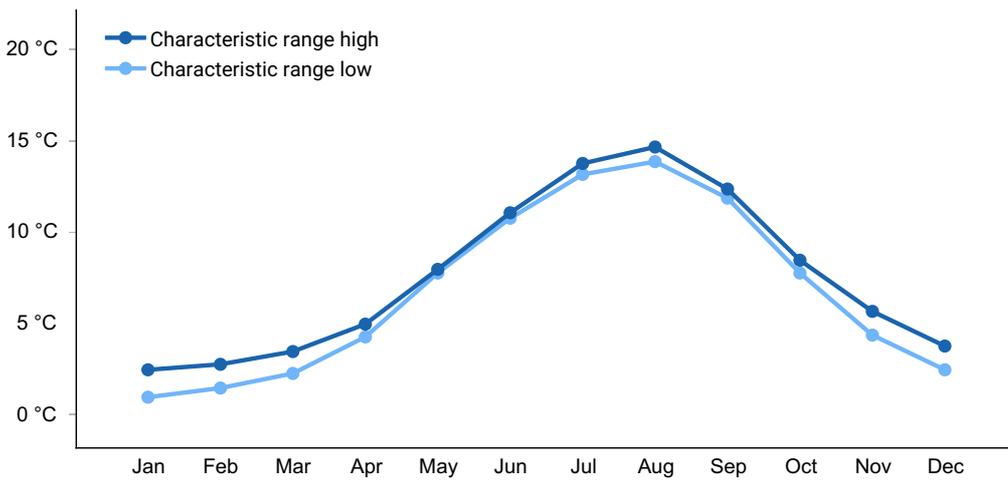


Figure 3. Monthly maximum temperature range

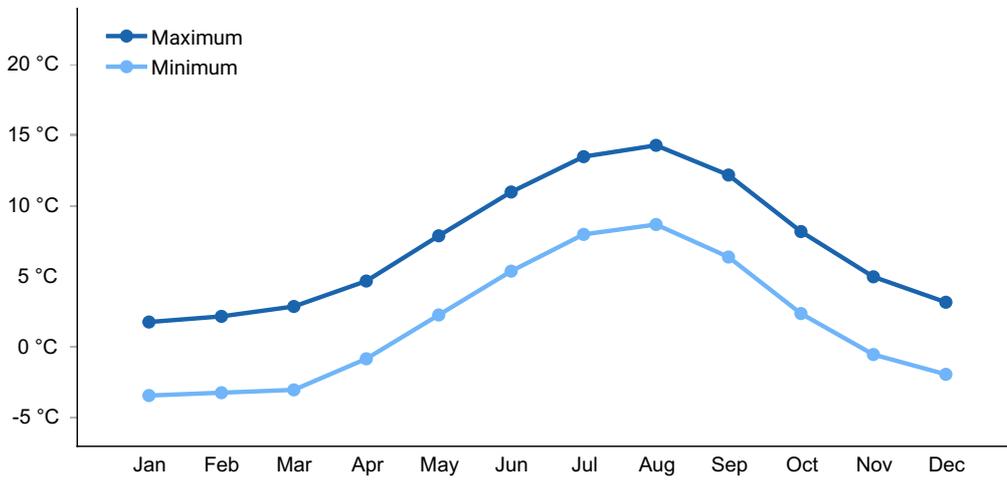


Figure 4. Monthly average minimum and maximum temperature

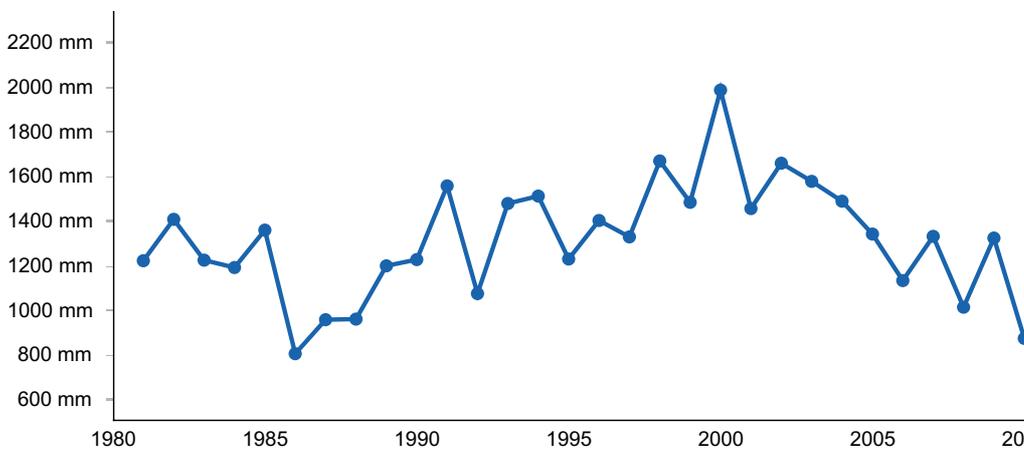


Figure 5. Annual precipitation pattern

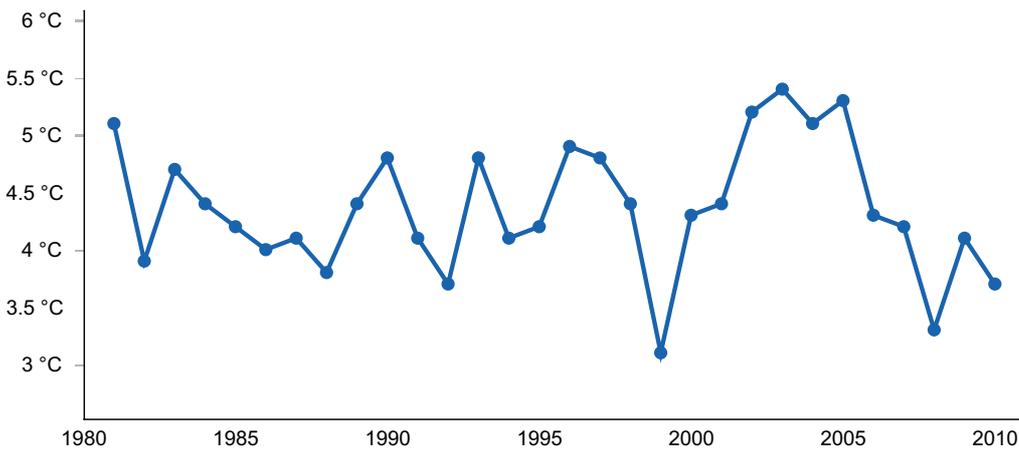


Figure 6. Annual average temperature pattern

Climate stations used

- (1) DUTCH HARBOR [USC00502587], Unalaska, AK
- (2) COLD BAY AP [USW00025624], Cold Bay, AK

Influencing water features

No water table is associated with this ecological site. Runoff from surrounding sites will influence hydrologic characteristics and does contribute to the vegetation on this site.

Wetland description

Seeps and depressions, or pockets may pond water for short periods, providing added benefit to vegetation. These isolated communities, if characteristic of a wetland are included in the Drainage Complex ecological site.

Soil features

- Soils are derived from residuum weathered from basalt and include areas with silty tephra deposits over residuum.
- Soils are silty loam and silty clay loam
- Soil surface fragments and subsurface rock fragments range from 0 up to 30 percent.
- Soil depth is moderately deep to deep and is restricted by bedrock with rock outcroppings common across the landscape.

Soil components correlated to this ecological site are Einahnuhto silty clay loam, Zolotoi silt loam, Zolotai family, Andic Haplocryods, and Aquic Haplocryands.

Table 5. Representative soil features

Parent material	(1) Tephra (2) Residuum–basalt
Surface texture	(1) Silty clay loam (2) Medial, very cobbly, stony silt loam
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow to moderate
Depth to restrictive layer	51–102 cm
Soil depth	51–102 cm
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	19.3–22.1 cm
Soil reaction (1:1 water) (0-25.4cm)	5.1–6
Subsurface fragment volume ≤3" (0-101.6cm)	0–15%

Subsurface fragment volume >3" (0-101.6cm)	0–15%
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Table 6. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Not specified
Depth to restrictive layer	51–150 cm
Soil depth	51–150 cm
Surface fragment cover ≤3"	Not specified
Surface fragment cover >3"	0–30%
Available water capacity (0-101.6cm)	11.68–23.11 cm
Soil reaction (1:1 water) (0-25.4cm)	5.1–6.5
Subsurface fragment volume ≤3" (0-101.6cm)	Not specified
Subsurface fragment volume >3" (0-101.6cm)	Not specified

Ecological dynamics

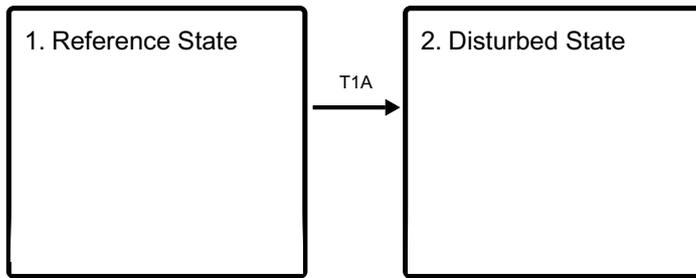
The Aleutian Igneous Slope Tundra reference plant community occurs on wind swept slopes, ridges, and mountains. Rock outcrops occur scattered across this site, creating diversity in cover. This ecological site usually grades into a dwarf alpine scrubland at higher elevations, and either a willow or alder shrubland at lower elevations. (Landfire, 2009).

The Aleutian Islands history during World War II and military development. The was extensive disturbance with construction and military operations. Although access to these sloped sites were more limited there were still roads, trails, and other extents of disturbance across this landscape.

The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on 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.

State and transition model

Ecosystem states

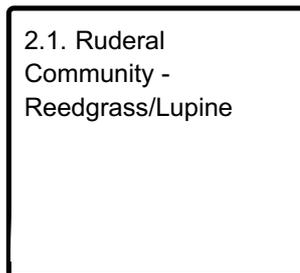


T1A - Military Operations historically, and Human development

State 1 submodel, plant communities



State 2 submodel, plant communities



State 1 Reference State

The Aleutian Igneous Slope Tundra is a dwarf shrub community. Unlike surrounding ecological site communities, this dwarf shrub community is comprised of northern mountain cranberry (*Vaccinium vitis-idaea* L. ssp. minus), alpine bearberry (*Arctostaphylos alpina*), Alaska bellheather (*Harrimanella stelleriana*), Aleutian mountainheath (*Phyllodoce aleutica*), arctic willow (*Salix arctica*), and least willow (*Salix rotundifolia*). A composition of grasses and sedges are intermixed with the dwarf shrubs and lichen and moss cover. Frost heaving plays a role in vegetative cover and stability. Sources referenced grazing by caribou, reindeer and small groups of cattle; however, no specific data was located on grazing effects on these communities.

Dominant plant species

- northern mountain cranberry (*Vaccinium vitis-idaea* ssp. minus), shrub
- alpine bearberry (*Arctostaphylos alpina*), shrub
- Alaska bellheather (*Harrimanella stelleriana*), shrub

- manyflower sedge (*Carex pluriflora*), grass
- longawn sedge (*Carex macrochaeta*), grass
- Pacific reindeer lichen (*Cladina portentosa* ssp. *pacifica*), other herbaceous
- globe ball lichen (*Sphaerophorus globosus*), other herbaceous

Community 1.1

Northern Mountain Cranberry- Alaska Bellheather/ Longawn Sedge - Tufted Hairgrass

The Aleutian Igneous Slope Tundra is a dwarf shrub dominated community with a major tone of herbaceous species. Unlike surrounding ecological site communities, this dwarf shrub community is comprised of northern mountain cranberry (*Vaccinium vitis-idaea* L. ssp. *minus*), alpine bearberry (*Arctostaphylos alpina*), Alaska bellheather (*Harrimanella stelleriana*), Aleutian mountainheath (*Phyllodoce aleutica*), arctic willow (*Salix arctica*), and least willow (*Salix rotundifolia*). Other dwarf shrub species that are common in this community are black crowberry (*Empetrum nigrum*), clubmoss mountain heather (*Cassiope lycopodioides*), alpine azalea (*Loiseleuria procumbens*), lingonberry (*Vaccinium vitis-idaea*), and bog blueberry (*Vaccinium uliginosum*). Black crowberry transitions into the community as the site shifts lower in the landscape as well as it gets higher into the upper reaches of the landscape but is not the dominant shrub in this community. Common herbaceous species include longawn sedge (*Carex macrochaeta*), Sitka sedge (*Carex aquatilis* var. *dives*), coiled sedge (*Carex circinata*), fireweed (*Chamerion angustifolium*), tufted hairgrass (*Deschampsia cespitosa*), American dunegrass (*Leymus mollis*), Nootka lupine (*Lupinus nootkatensis*), red fescue (*Festuca rubra*), calthaleaf avens (*Geum calthifolium*), tall Jacob's-ladder (*Polemonium acutiflorum*), alpine bistort (*Polygonum viviparum*), northern bentgrass (*Agrostis mertensii*), alpine heuchera (*Heuchera glabra*), villous cinquefoil (*Potentilla villosa*), yellowdot saxifrage (*Saxifraga bronchialis*), purple mountain saxifrage (*Saxifraga oppositifolia*), American alpine speedwell (*Veronica wormskjoldii*), and northern asphodel (*Tofieldia coccinea*) (Shacklette et al. 1969). Bryophytes are a significant cover in this community. There are a variety of species, but the most documented were common groups of fruticose lichens and racomitrium moss (*Racomitrium lanuginosum*). The disturbance regime, ecosystem drivers and transitional pathways were not defined in the research found. It was noted by multiple surveys, that across the slopes of this ecological, solifluction was a major feature. Some described it as a disturbance, but in the understanding of natural processes, solifluction is considered a natural regime within this ecological site. The change in the vegetation, increased bare ground, and increased byrophyte cover are included as part of the reference state. Across the landscape there is a matrix or patchwork of areas that are higher in herbaceous species and then areas that the herbaceous species are more of an undertone. This is speculated to be a factor of bird manure as is described in detail on the Eolian hills and plans ecological site as well as the terraces ecological site. Although to a much smaller degree, the abundant sea bird colonies are creating nutrient rich zones that encourage an increased response from grasses and sedges.

Dominant plant species

- northern mountain cranberry (*Vaccinium vitis-idaea* ssp. *minus*), shrub
- alpine bearberry (*Arctostaphylos alpina*), shrub
- Alaska bellheather (*Harrimanella stelleriana*), shrub
- manyflower sedge (*Carex pluriflora*), grass
- longawn sedge (*Carex macrochaeta*), grass
- tufted hairgrass (*Deschampsia cespitosa*), grass
- Pacific reindeer lichen (*Cladina portentosa* ssp. *pacifica*), other herbaceous
- globe ball lichen (*Sphaerophorus globosus*), other herbaceous
- racomitrium moss (*Racomitrium*), other herbaceous

State 2

Disturbed State

The events of World War II impacted much of the Alaska Coastline, including the Aleutian Islands and the villages. The establishment of Military installations, the roads and other infrastructure installed, and the equipment movement around these installations had a significant impact. Although this ecological site is not in the desired construction location, a few roads and other trails have extended into some of these communities, having an impact of site stability.

Dominant plant species

- Pacific reedgrass (*Calamagrostis nutkaensis*), grass
- Nootka lupine (*Lupinus nootkatensis*), other herbaceous
- Alaska arnica (*Arnica unalaschcensis*), other herbaceous
- field horsetail (*Equisetum arvense*), other herbaceous
- trailing pearlwort (*Sagina decumbens*), other herbaceous
- ceratodon moss (*Ceratodon purpureus*), other herbaceous

Community 2.1

Ruderal Community - Reedgrass/Lupine

These disturbance communities are highly variable. Research brought forward a few main communities with characteristic species; however, these communities were located on one of many islands. The list here provides only a partial list of potential species:

Characteristic species: Pacific reedgrass (*Calamagrostis nutkaensis*), Nootka lupine (*Lupinus nootkatensis*), Alaska arnica (*Arnica unalaschcensis*), field horsetail (*Equisetum arvense*), western pearlwort (*Sagina decumbens* ssp. *occidentalis*), and ceratodon moss (*Ceratodon purpureus*). Other species: boreal yarrow (*Achillea borealis*), western pearly everlasting (*Anaphalis margaritacea*), seacoast angelica (*Angelica lucida*), stoloniferous pussytoes (*Antennaria dioica*), umbel bittercress (*Cardamine oligosperma* var. *kamtschatica*), longawn sedge (*Carex macrochaeta*), big chickweed (*Cerastium fontanum* ssp. *Vulgare*), keyflower (*Dactylorhiza aristata*), tufted hairgrass (*Deschampsia*

cespitosa), black crowberry (*Empetrum nigrum*), Hornemann's willowherb (*Epilobium hornemannii* ssp. *behringianum*), fourpart dwarf gentian (*Gentianella propinqua* ssp. *aleutica*), autumn dwarf gentian (*Gentianella amarella* ssp. *acuta*), Alaska hawkweed (*Hieracium gracile* var. *alaskanum*), common cowparsnip (*Heracleum lanatum*), alpine azalea (*Loiseleuria procumbens*), common woodrush (*Luzula multiflora* ssp. *multiflora*), smallflowered woodrush (*Luzula parviflora*), Chimisso's orchid (*Platanthera chorisiana*), alpine bluegrass (*Poa alpina*), largeglume bluegrass (*Poa macrocalyx*), alpine bistort (*Polygonum viviparum*), Pacific silverweed (*Argentina egedii* ssp. *Egedii*), wedgeleaf primrose (*Primula cuneifolia* subsp. *Saxifragifolia*), arctic rattlebox (*Rhinanthus minor* L. ssp. *groenlandicus*), *Sagina intermedia*, heartleaf saxifrage (*Saxifraga nelsoniana* D. Don ssp. *Insularis*), creeping sibbaldia (*Sibbaldia procumbens*), northern starwort (*Stellaria calycantha*), and brightblue speedwell (*Veronica serpyllifolia* L. ssp. *humifusa*). Other common bryophytes are braehythecium and bryum mosses, pebble cup lichen (*Cladonia pyxidata*), Twotoothed Cephalozia (*Cephalozia bicuspidata*), dicranella moss (*Dicranella subulata*), ditrichum moss (*Ditrichum heteromallum*), sanionia moss (*Sanionia uncinata* var. *uncinata*), eurhynchium moss (*Eurhynchium praelongum*), splendid feather moss (*Hylocomium splendens*), porpidia lichen (*Porpidia macrocarpa*), fir clubmoss (*Huperzia selago* var. *selago*), umbrella liverwort (*Marchantia polymorpha*), rhizomnium moss (*Rhizomnium glabrescens*), ladder flapwort (*Nardia scalaris*), cold crabseye lichen (*Ochrolechia frigida*), American philonotis moss (*Philonotis fontana* var. *americana*), bullseye lichen (*Placopsis gelida*), pogonatum moss (*Pogonatum urnigerum*), polytrichum moss (*Polytrichum formosum*), pohlia moss (*Pohlia nutans*), racomitrium moss (*Racomitrium ericoides*), snow pearlwort (*Sagina nivalis*), intermediate snow lichen (*Stereocaulon intermedium*), and tomentose snow lichen (*Stereocaulon tomentosum*).

Dominant plant species

- Pacific reedgrass (*Calamagrostis nutkaensis*), grass
- Nootka lupine (*Lupinus nootkatensis*), other herbaceous
- Alaska arnica (*Arnica unalaschcensis*), other herbaceous
- field horsetail (*Equisetum arvense*), other herbaceous
- trailing pearlwort (*Sagina decumbens*), other herbaceous
- ceratodon moss (*Ceratodon purpureus*), other herbaceous

Transition T1A

State 1 to 2

Extensive military operations occurred several of the islands leading to significant disturbance. Road systems, base developments, housing, and military equipment movement removed vast areas of cover and altered the landscape. Most of these areas were left to recover naturally. Current development around villages and port access on the islands are expanding to a minor degree on these remote islands, providing a source for further disturbance.

Additional community tables

Animal community

The area provides nesting habitat for a variety of birds, including rock sandpiper, whiskered auklet, rock ptarmigan, song sparrow, rosy finch, and winter wren. Some of the eastern islands support small herds of caribou that may utilize ridgelines, and accessible slopes.

Recreational uses

Tourism and wildland recreation are becoming increasingly important. Subsistence hunting and gathering provide food and a variety of other resources to local residents and are a major component of the local economy.

Wood products

None

Inventory data references

Very limited data is available and resides more on the coastal zone than the higher volcanics. Information used to build this ecological site was obtained from existing land cover and vegetation maps, literature review, and vegetative summaries from partnering agencies.

References

Hansford T. Shacklette, L. W. Durrell, James A. Erdman, John R. Keith, William M. Klein, Hildur Krog, Herman Persson, H. Skuja, and William A. Weber. 1969. Vegetation of Amchitka Island, Aleutian Islands, Alaska. Geological Survey Professional Paper 648. United States Geological Survey, United States Government Printing Office, Washington : 1969.

Other references

Landfire National Vegetation Dynamics Models; USGS;
<http://www.LANDFIRE.gov/index.php>, 2009 (Date accessed)

USDA PLANTS Database; <http://plants.usda.gov>, 2021

USNVC [United States National Vegetation Classification]. 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. USNVC: <http://usnvc.org/>

AMUNDSEN, C.C. 1972. Amchitka Bioenvironmental Program: Plant ecology of Amchitka Island, Final Report. Batelle, Columbus Laboratories, under AEC Prime, Contract No. AT(26-I)-171. 27 p.

AMUNDSEN, c.c. and E.E.C. CLEBSCH. 1971. Dynamics of the terrestrial ecosystem vegetation of Amchitka Island, Alaska. *Bioscience* 21:619-623.

AMUNDSEN, C.C. 1977. Terrestrial plant ecology. Pages 203-226 in M.L. Merritt and R.G. Fuller, eds. *The environment of Amchitka Island, Alaska*. ERDA TID-26712.

Bailey, R.G. [in prep.] Description of the ecoregions of the United States. 2d ed. Misc. Publ. No. 1391 [rev.]. Washington, DC: U.S. Department of Agriculture, Forest Service.
Bailey, Robert G.; Avers, Peter E.; King, Thomas; McNab, W. Henry, eds. 1994. Ecoregions and subregions of the United States (map). Washington, DC: U.S. Geological Survey. Scale 1: 7,500,000; colored. Accompanied by a supplementary table of map unit descriptions compiled and edited by McNab, W. Henry, and Bailey, Robert G. Prepared for the U.S. Department of Agriculture, Forest Service.

BANK, T.B. II. 1951. Botanical and ethnobotanical studies in the Aleutian Islands. I. Aleutian vegetation and Aleut culture. *Mich. Acad. Sci., Arts, and Lett.* 37:13-30 + 6 plates.

BYRD, G.V. 1984. Vascular vegetation of Buldir Island, Aleutian Islands, Alaska compared to another Aleutian Island. *Arctic* 37(1):37-48.

Fosberg, Francis Raymond. "Succession and condition of ecosystems." (1967).

Hultén, Eric (1937) *Flora of the Aleutian Islands and westernmost Alaska Peninsula with notes on the flora of Commander islands*. Stockholm, Thule. 397 pp. 2nd ed. 1960 (series: *Flora et vegetation mundi*, vol. 1) Weinheim, Cramer. 376 pp.

SHACKLETTE, H.T., L.W. ERDMAN-J.R. KEITH, W.M. KLEIN, H. KROG, H. PERSSON, H. SKUJA, and W.A. WEBER. 1969. Vegetation of Amchitka Island, Aleutian Islands, Alaska. *U.S. Geol. Surv. Prof. Pap.* 648. 66p.

Swanson, D.J., Lehner, D., Zimmerman, J., and Pauling, D. Range survey of Nunivak Island, Alaska, 1986.

TATEWAKI, M. 1963. Phytogeography of the islands of the north Pacific Ocean. Pages 23-27 in J.L. Gressitt, ed. *Pacific Basin Biogeography*. 10th Pacific Science Congress. Bishop Museum Press, Honolulu.

TALBOT, S.S., S.L. TALBOT, and L.R. Walker. 2010. Post-eruption legacy effects and their implications for long-term recovery of the vegetation on Kasatochi Island, Alaska. *Arctic, Antarctic, and Alpine Research*, Vol. 42, No. 3, pp. 285-296

WALKER., H. 1945. Plants of the Aleutian Islands. Pages 63-;71 in Collins, H.B., Jr., A.H. Clark, and E.H. Walker, eds. The Aleutian Islands: Their people and natural history. Smithsonian Inst. War Background Studies 21, Publ. 3775.

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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	03/07/2026
Approved by	Blaine Spellman
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:**
-