

Ecological site R225XY301AK

Southern Alaska Herbaceous Silty Coastal Plain

Last updated: 6/14/2025
Accessed: 03/10/2026

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): 225X–Southern Alaska Peninsula Mountains

Major Land Resource Area 225X (Southern Alaska Peninsula Mountains), herein called area, is in the Southern Alaska Land Resource Region (LRR). MLRA 225X covers approximately 23,935 square miles of the southern parts of the Kodiak Archipelago and the slopes of the southern Aleutian Mountains on the Alaska Peninsula. The landscape is comprised of rugged mountains separated by narrow valleys, with outwash plains and low hills towards the coast. Glaciers and ice fields cover the highest mountains. Flood plains are predominantly restricted to broad river valleys. Elevations range from sea level to 9,372 feet at the summit of Shishaldin Volcano. The soils and vegetation in this MLRA have been influenced by ash deposits from nearby Mount Katmai and surrounding volcanoes. This MLRA is primarily comprised of wilderness, with towns and villages primarily located along rivers, lakes, and the coast. Small villages are scattered along the coastline and include King Cove, Old Harbor, Karluk, and Larsen Bay among others. There is no road access to MLRA 225X from Anchorage, AK, and access is primarily via plane or boat.

MLRA 225X, excluding high peaks and steep upper backslopes, was glaciated during the Late Pleistocene. Glacial deposits were eroded or covered by colluvium or alluvium during the Holocene, which comprises 60 percent of the current landscape. Modified glacial moraines and outwash landforms are prevalent. Volcanic activity continues through the present day, and ash deposits are represented in many of the soils of this MLRA.

The dominant soil orders are Andisols, Histosols, and Inceptisols. Soils have a cryic temperature regime or subgelic soil temperature class, an aquic or udic soil moisture regime, and primarily amorphous mineralogy. Permafrost is sporadic in the Southern Alaska

LRR. The primary soils in this MLRA developed from volcanic ash over colluvium or from thick organic material. Miscellaneous (non-soil) areas comprise greater than 50 percent of all acreage in this MLRA and includes “rock outcrops, rubble land, glaciers, riverwash, and beaches” (USDA-NRCS, 2022).

The climate in this MLRA is shaped by maritime influences from Bristol Bay to the west and the Pacific Ocean to the south. Mountains effect local patterns in temperature and precipitation. Temperatures are typically cool throughout the year. The mean annual temperature at sea level is 37 to 43 degrees Fahrenheit. Precipitation ranges from 30 inches along the coast to over 100 inches at high elevations. Snowfall ranges from 50 to 200 inches and glaciers and icefields are present at higher elevations.

This MLRA is dominated by tall alder and willow shrubs at lower elevations. Vegetation shifts to low and then dwarf shrubs at increased elevations. Herbaceous communities are on exposed plains and hills, and sedges dominate wet depressions. Balsam poplar forests are restricted to flood plains and warm, low mountain slopes in the northern parts of the MLRA (USDA-NRCS, 2022).

LRU notes

MLRA 225X supports three life zones delineated by the physiological limits of plant communities along longitudinal and elevational gradients: Aleutian, South Alaska maritime, and South Alaska alpine. The Aleutian climate covers hills of the southern Kodiak archipelago and on the extended Alaska Peninsula. These regions are low-lying, exposed and are scoured by winter winds. Vegetation is primarily low shrublands, heathlands and often diverse herbaceous meadows. The South Alaska maritime climate is common in mountainous areas where local site conditions delineate alpine and lowland areas. Certain vascular plant species are common in the lowlands and much less common in the alpine (i.e. *Populus balsamifera*, *Alnus* spp., *Salix pulchra*, *Betula nana*, *Ledum palustre* ssp. *decumbens*, and *Calamagrostis canadensis*). The alpine generally occurs at elevations above 1,500 feet, though may extend higher on warm, north-facing slopes, and lower on cooler slopes. Vascular plants are restricted in height and often exclude common lowland species. The transition between South Alaska maritime and alpine vegetation can occur within a range of elevations, and is highly dependent on latitude, slope, aspect, and shading from adjacent mountains.

Classification relationships

Alaska Vegetation Classification:

Wet graminoid herbaceous (III.A.3 – level III) / Halophytic sedge wet meadow (level IV) (Vioreck et al., 1992)

Circumboreal Vegetation Map – Alaska-Yukon Region:

Southern Alaska Coastal Meadows

Southern Alaska Sphagnum Bogs and Herbaceous Fens

(Jorgensen and Meidinger, 2015)

BioPhysical Settings: 7617260 – Aleutian Tidal Marsh; 7616680 – Temperate Pacific Tidal Salt and Brackish Marsh
(Landfire, 2009)

Kodiak Archipelago Land Cover Classification:
Class 49 – Sedge marsh
Class 21 – Graminoid wetland
(Fleming and Spencer, 2007)

Ecological site concept

Ecological Site concept:

- Flats and mineral depressions on the shore complex near sea level
- Tidally influenced with frequent flooding
- The reference plant community is a wet graminoid herbaceous meadow (Vioreck et al., 1992).
- Facultative wet to obligate wetland species dominate this ecological site.
- Soil and site hydrology, microtopography, and salt inundation shape vegetation on this landform.

Associated sites

R225XY302AK	Southern Alaska Sedge Organic Depressions Organic depressions on the coastal plain.
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Similar sites

R225XY302AK	Southern Alaska Sedge Organic Depressions R225XY302AK develops on organic soils with very long ponding periods
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Salix</i> (2) <i>Myrica gale</i>
Herbaceous	(1) <i>Carex lyngbyei</i>

Physiographic features

This ecological site occurs on flat coastal plains and associated mineral depressions. Flooding is frequent and brief. Flood water may be saltwater or freshwater, depending on local hydrology patterns. Ponding only occurs in depressions and is frequent and brief. A

water table is present near the surface (0 – 2 inches) throughout the growing season months of June, July and August.

Table 2. Representative physiographic features

Landforms	(1) Shore complex > Coastal plain (2) Shore complex > Coastal plain
Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to frequent
Elevation	0–6 m
Slope	0–2%
Ponding depth	0–10 cm
Water table depth	0–5 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding duration	Not specified
Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	0–15 m
Slope	0–3%
Ponding depth	0–10 cm
Water table depth	0–5 cm

Climatic features

The climate in this MLRA is shaped by the maritime influences of Bristol Bay to the west and the Pacific Ocean to the south. Cloudy days are the norm. Temperature and precipitation are patterned around mountainous effects. Temperatures are typically cool throughout the year. The mean annual temperature at sea level is between 37 and 43 degrees Fahrenheit and generally decreases as elevation increases. Precipitation ranges from 30 inches along the coast to over 100 inches at high elevations. Snowfall ranges from

50 to 200 inches and supports glaciers and icefields at higher elevations (USDA-NRCS, 2022). Frost-free and freeze-free periods in the city of Kodiak are presented in the table below (WRCC, 2024). These periods shorten as elevation increases, culminating in the shortest frost-free and freeze-free periods in the alpine.

Table 4. Representative climatic features

Frost-free period (characteristic range)	124-156 days
Freeze-free period (characteristic range)	164-195 days
Precipitation total (characteristic range)	737-1,930 mm
Frost-free period (actual range)	121-167 days
Freeze-free period (actual range)	153-199 days
Precipitation total (actual range)	356-2,515 mm
Frost-free period (average)	140 days
Freeze-free period (average)	173 days
Precipitation total (average)	1,346 mm

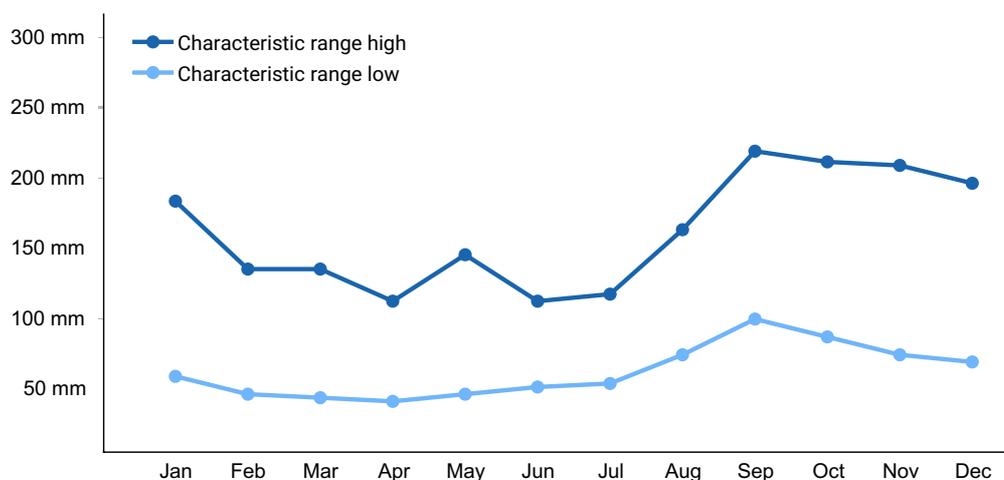


Figure 1. Monthly precipitation range

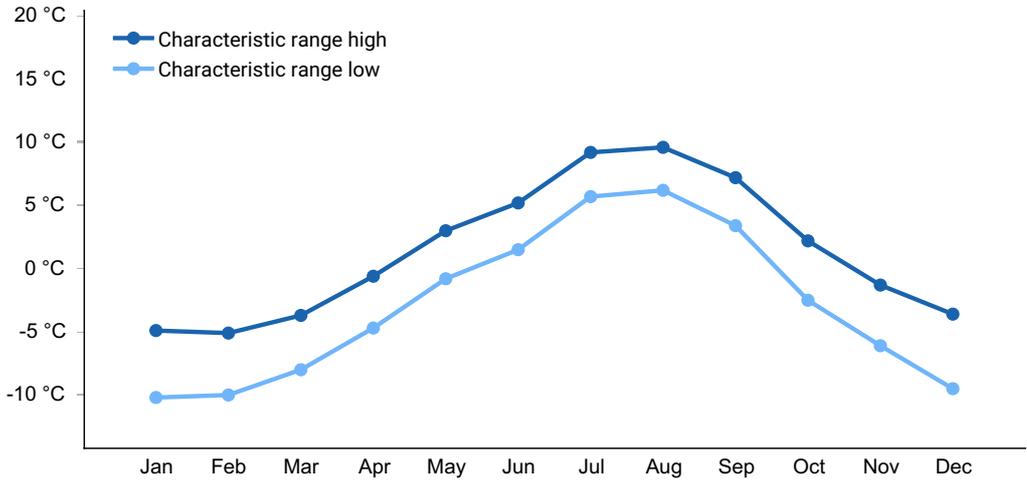


Figure 2. Monthly minimum temperature range

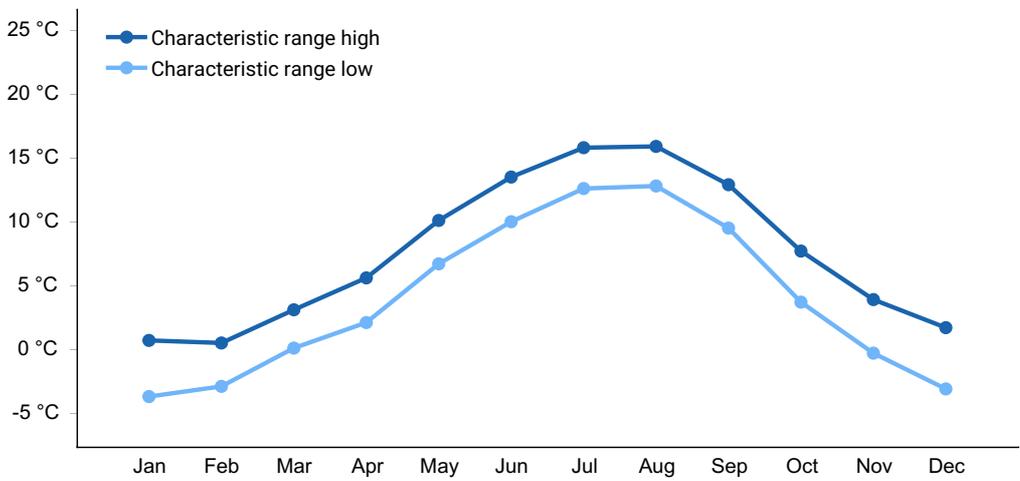


Figure 3. Monthly maximum temperature range

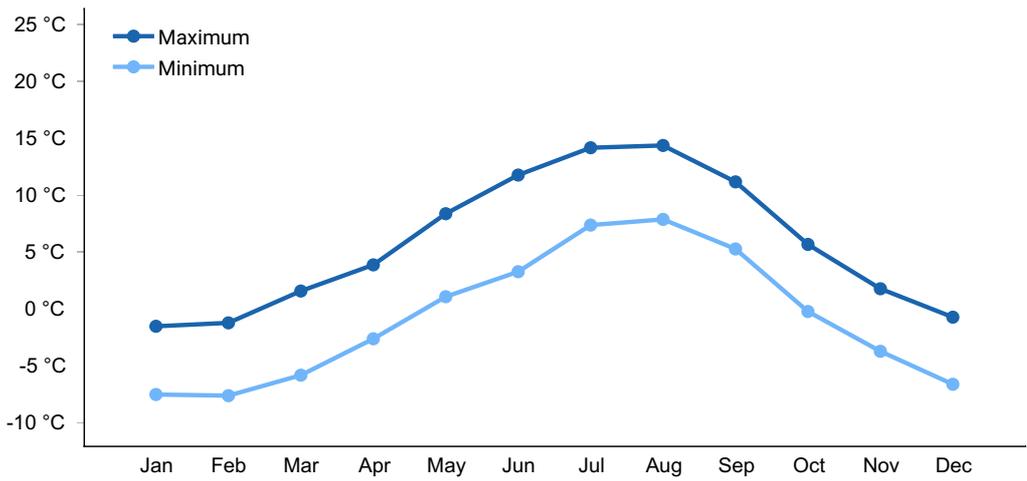


Figure 4. Monthly average minimum and maximum temperature

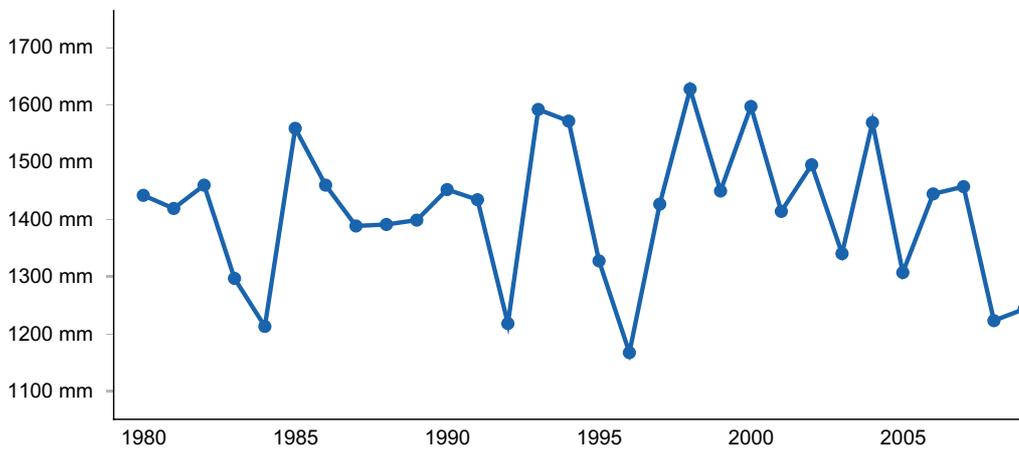


Figure 5. Annual precipitation pattern

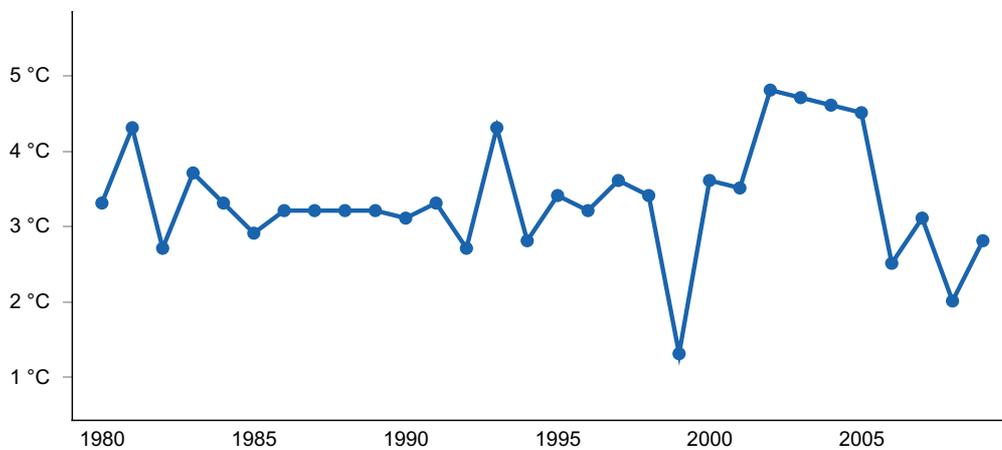


Figure 6. Annual average temperature pattern

Influencing water features

Ponded depressions are recognized water features of this ecological site. Open water supports emergent vegetation. Flooding across this ecological site is frequent and brief, and can be salt water, freshwater or a mix (brackish water).

Wetland description

This wetland is described as an estuarine fringe wetland with a matrix of depressional wetland inclusions (USDA, 2008; Brinson, 1993). Hydrology is influenced by the sea level, and water sources include tidal flooding, ground water discharge and precipitation. Vegetation is facultative wet to obligate throughout this site.

Soil features

Soils are Entisols with little to no soil development (Soil Survey Staff, 2013). Parent material is marine deposits, and soil may contain silts and clays mixed with or overlaying sands (Viereck et al., 1992).

Hydrology and saltwater inundation influence vegetation. Soils are aquic and poorly to very poorly drained. A water table is present near or at the soil surface from June through August. Depressions support a water table at the surface throughout the year, and pond to depths of four inches. Saltwater inundation selects for halophytic vegetation, particularly close to the ocean.

Correlated soil components in MLRA 225X: E25-Maritime wet meadow-silty coastal plains, E25-Maritime wet meadow-sandy coastal plain depressions

Table 5. Representative soil features

Parent material	(1) Marine deposits (2) Alluvium
Surface texture	(1) Silty clay loam (2) Very fine sand (3) Sand
Drainage class	Very poorly drained to poorly drained
Permeability class	Slow to very rapid
Soil depth	152 cm
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-25.4cm)	1.02–3.56 cm
Soil reaction (1:1 water) (0-25.4cm)	5.6–7.3
Subsurface fragment volume ≤3" (Depth not specified)	0–9%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This ecological site describes flat coastal plain and associated mineral depressions. Factors that shape the vegetative community include flooding, ponding, and salt inundation. Vegetation is primarily restricted to facultative to obligate wetland species, and saltwater incursion and salt spray select for salt-tolerant (halophytic) species. Permanently ponded areas support emergent species.

Flooding, ponding and soil hydrology are the major influencing factors supporting two communities on this ecological site. Flooding is usually the result of storm surge or extreme high tides (Landfire, 2009). Freshwater flooding occurs near river mouths during

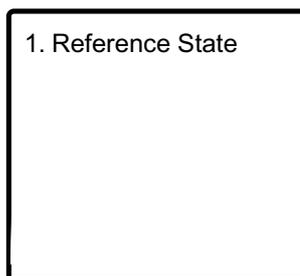
periods of high snow melt. Lower areas are more prone to flood and support wetter soils with higher water tables. Similarly, closed depressions also support higher water tables and additionally undergo surface ponding. Wetter areas support community 1.2. Sediment deposition (Landfire, 2009) can lower the relative water table, which will cause a shift in vegetation towards the reference plant community.

There is no evidence of historical fire in this ecological site. To date, no alternative states have been documented on this site. Human activity currently has little impact on this site due to its remote location/inaccessibility. There is no known browse or grazing by mammals on this site. Waterfowl use this site for nesting and browse in other areas of the state (pers. obs.).

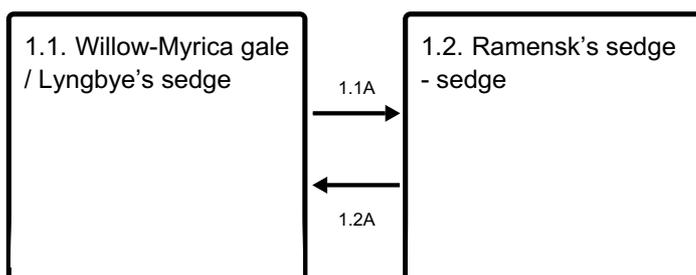
The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant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

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1A - Increased hydrologic pressures (decreased drainage, increased ponding influences)

1.2A - Decreased hydrologic pressures (increased drainages, decreased ponding)

State 1 Reference State



Figure 7. A coastal sedge meadow in the foreground.



Figure 8. A mix of herbaceous graminoids and forbs dominate the community, with low and dwarf shrubs intermixed.

The reference state supports two community phases, grouped by the structure and dominance of the vegetation (e.g., shrubs, forbs, and graminoids) and their ecological function and stability. The reference plant community is characterized by a sedge-scrub wet meadow often comprised of salt-tolerant facultative to obligate wetland species. The presence of this and related communities are dictated temporally and spatially by local site topography responsible for shifts in hydric influences such as ponding and water table perseverance. All community phases in this report are characterized using the Alaska vegetation classification system (Viereck et al., 1992).

Dominant plant species

- willow (*Salix*), shrub
- sweetgale (*Myrica gale*), shrub
- Lyngbye's sedge (*Carex lyngbyei*), grass

- Ramensk's sedge (*Carex ramenskii*), grass
- beach pea (*Lathyrus japonicus var. maritimus*), other herbaceous

Community 1.1

Willow-Myrica gale / Lyngbye's sedge



Figure 9. Coastal meadow in the foreground.

The reference plant community is a sedge-scrub herbaceous meadow (Viereck et al., 1992). Vegetation is facultative to obligate wetland species. Halophytic (salt-tolerant) species are present. Major plant groups are tall and medium graminoids and low shrubs. Common species are likely to include Lyngbye's sedge, Ramensk's sedge, willow, sweetgale and various forbs. Ground cover is typically comprised of herbaceous litter and bare soil.

Dominant plant species

- willow (*Salix*), shrub
- sweetgale (*Myrica gale*), shrub
- Lyngbye's sedge (*Carex lyngbyei*), grass
- Ramensk's sedge (*Carex ramenskii*), grass
- beach pea (*Lathyrus japonicus var. maritimus*), other herbaceous

Community 1.2

Ramensk's sedge - sedge

Community 1.2 described low-lying depressions. They pond frequently and support a water table throughout the year. The community is characterized as a sedge wet meadow (Viereck et al., 1992). Obligate species are prevalent, and emergent vegetation is common. Species may include alkaligrass (*Puccinellia* ssp.), arrowgrass (*Triglochin* ssp.), and sedges, as well as other emergent forbs and graminoids. Ground cover is typically water, bare soil, and herbaceous litter.

Dominant plant species

- Lyngbye's sedge (*Carex lyngbyei*), grass
- sedge (*Carex*), grass
- alkaligrass (*Puccinellia*), grass
- arrowgrass (*Triglochin*), other herbaceous

Pathway 1.1A

Community 1.1 to 1.2

Increased hydrologic pressures on the reference plant community causes a shift to community 1.2. This shift is due to an increase in the water table throughout the year or increase periods of ponding. This can occur several ways. Increased flooding due to more frequent storms will create wetter conditions. Erosion can create a depression that lowers the soil level and raises the relative water table. Vegetation will shift to more obligate and emergent species.

Pathway 1.2A

Community 1.2 to 1.1

Decreased hydrologic pressures causes a vegetative shift to the reference plant community. Coastal plain talfs that flood less frequently will undergo this shift. Alternatively, depressions that fill in with soil and vegetation will lower the relative water table, excluding emergent vegetation.

Additional community tables

Inventory data references

Vegetative communities and transitions are described using existing models and expert knowledge. There are no vegetation inventory data points in NASIS associated with this ecological site.

External data sources:

The Alaska Vegetation Classification (Viereck et al., 1992)

The Alaska-Yukon Region of the Circumboreal Vegetation Map (CBVM) (Jorgensen and Meidinger, 2015)

LANDFIRE Biophysical Settings Models (Landfire, 2009)

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Western Regional Climate Center. 2024. "Kodiak WSO Airport, Alaska 'Freeze Free' Season Probabilities." <https://wrcc.dri.edu/cgi-bin/cliTFrezD.pl?akkodi>. Accessed Sept 19, 2024.

Contributors

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Acknowledgments

This soils – ecological site correlation was reviewed by a workshop team during a February 2024 PES workshop in Wasilla, AK.

This ecological site description (ESD) fulfills the requirements of the Provisional Ecological Site (PES) national initiative. This ESD is published to fit current site-soil correlations as they are currently mapped and understood. Further data collection may provide the information to update this ESD from the provisional level to the approved level.

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	03/10/2026
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:**
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17. **Perennial plant reproductive capability:**
-