USDA Natural Resources
Conservation Service

Ecological site R225XY302AK
Southern Alaska Sedge Organic Depressions

Last updated: 6/14/2025
Accessed: 12/19/2025

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): 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 amorphic 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) / Subarctic lowland sedge-bog meadow (level IV)
(Viereck et al., 1992)

Circumboreal Vegetation Map – Alaska-Yukon Region: Southern Alaska Sphagnum Bogs and Herbaceous Fens

(Jorgensen and Meidinger, 2015)

BioPhysical Settings: 7617020 – Alaska Arctic Wet Sedge-Sphagnum Peatland
(Landfire, 2009)
Kodiak Archipelago Land Cover Classification:
Class 50 – Sedge/moss wetlands
(Fleming and Spencer, 2007)

Ecological site concept

Ecological Site concept:
• Organic depressions near sea level
• Tidally influenced with frequent flooding
• Site-specific hydrology restricts vegetation to primarily facultative wet to obligate wetland species
• The reference plant community is stable and supports a wet graminoid herbaceous meadow (Viereck et al., 1992).
• Ecological site is resilient to low energy flooding and ponding. Vegetation is often thick and resilient to scouring.

Associated sites

R225XY301AK	**Southern Alaska Herbaceous Silty Coastal Plain** Flat areas and mineral depressions on the shore complex.

Similar sites

R225XY301AK	**Southern Alaska Herbaceous Silty Coastal Plain** R225XY301AK supports ponded mineral depressions. The organic soil in this ecological site is unique on the coastal plain.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Andromeda polifolia*
Herbaceous	(1) *Eriophorum* (2) *Carex*

Physiographic features

This ecological site is in organic depressions on the coastal plain. Flooding is frequent and very brief and is typically the result of a storm surge. Ponding is frequent and very long. Ponding depths may reach upwards of eight inches. A water table is present at the surface throughout the growing season (May through September).

Table 2. Representative physiographic features

Landforms	(1) Shore complex > Coastal plain
Runoff class	Negligible
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Frequent
Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	20–50 ft
Slope	0%
Ponding depth	2–8 in
Water table depth	0 in
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	10–80 ft
Slope	Not specified
Ponding depth	Not specified
Water table depth	Not specified

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)	29-76 in
Frost-free period (actual range)	121-167 days
Freeze-free period (actual range)	153-199 days
Precipitation total (actual range)	14-99 in
Frost-free period (average)	140 days
Freeze-free period (average)	173 days
Precipitation total (average)	53 in

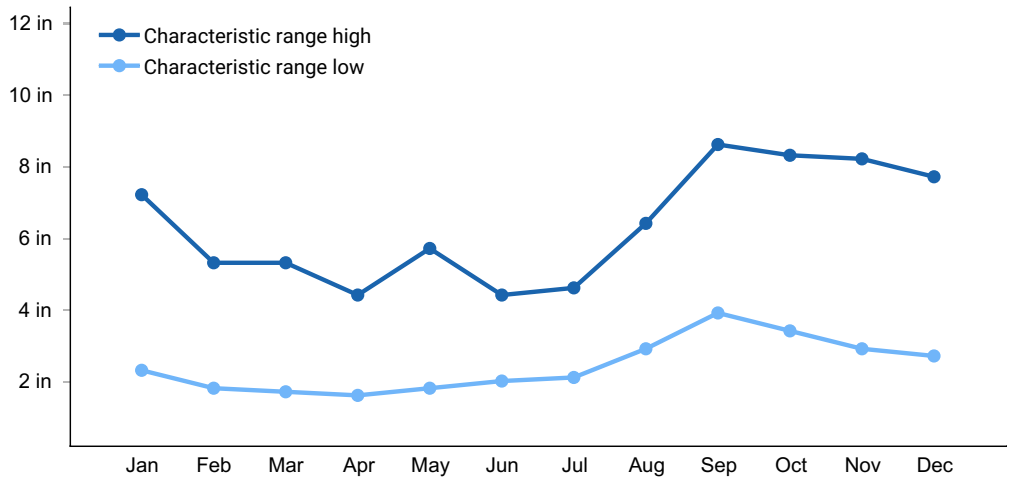

Figure 1. Monthly precipitation range

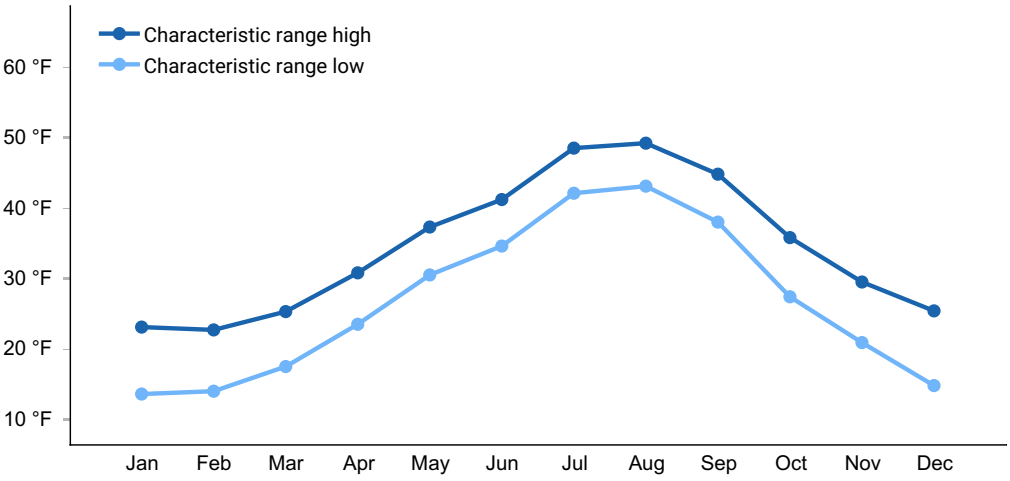

Figure 2. Monthly minimum temperature range

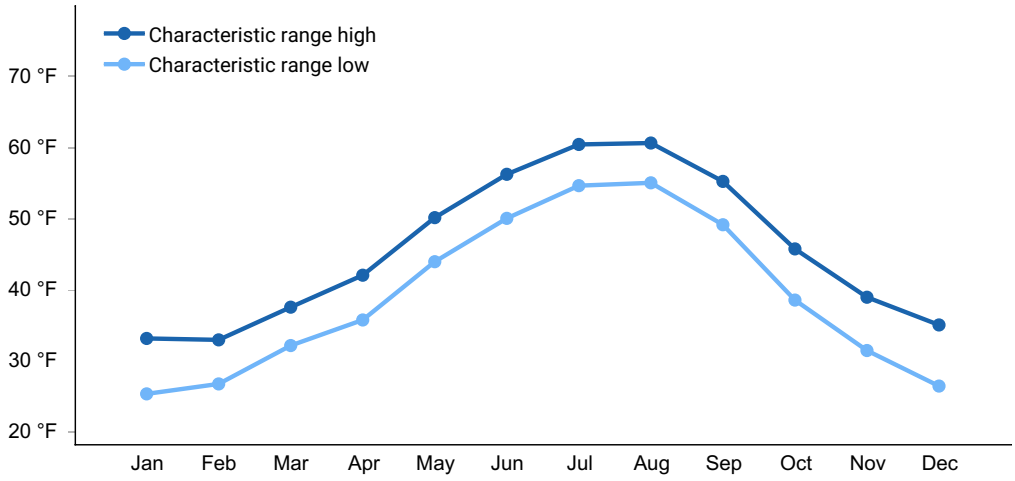

Figure 3. Monthly maximum temperature range

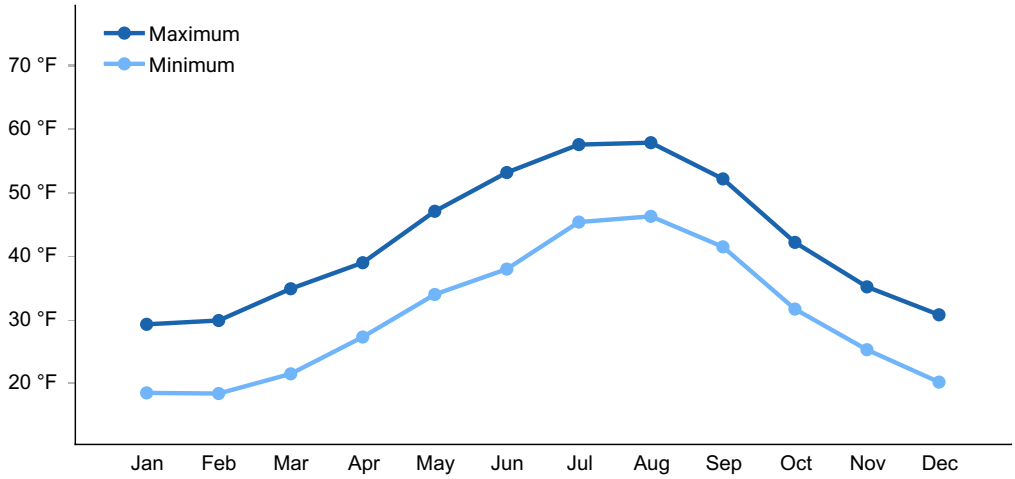

Figure 4. Monthly average minimum and maximum temperature

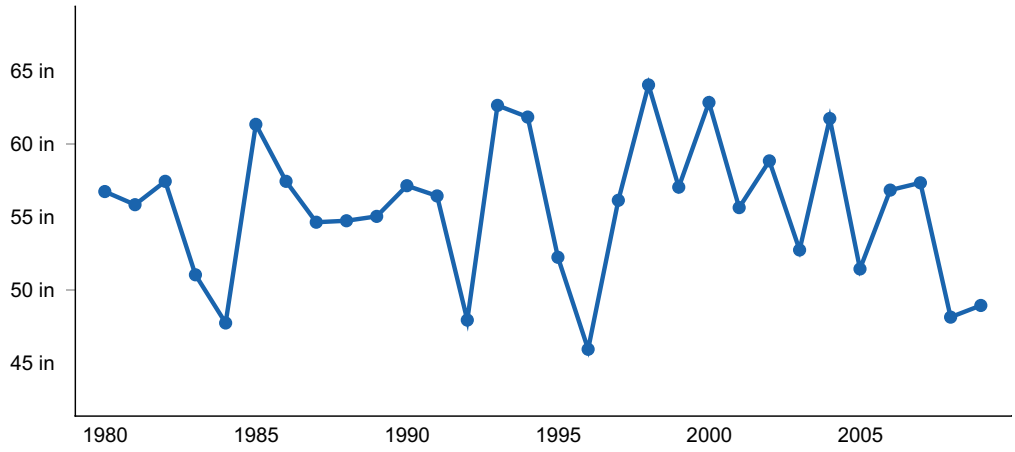

Figure 5. Annual precipitation pattern

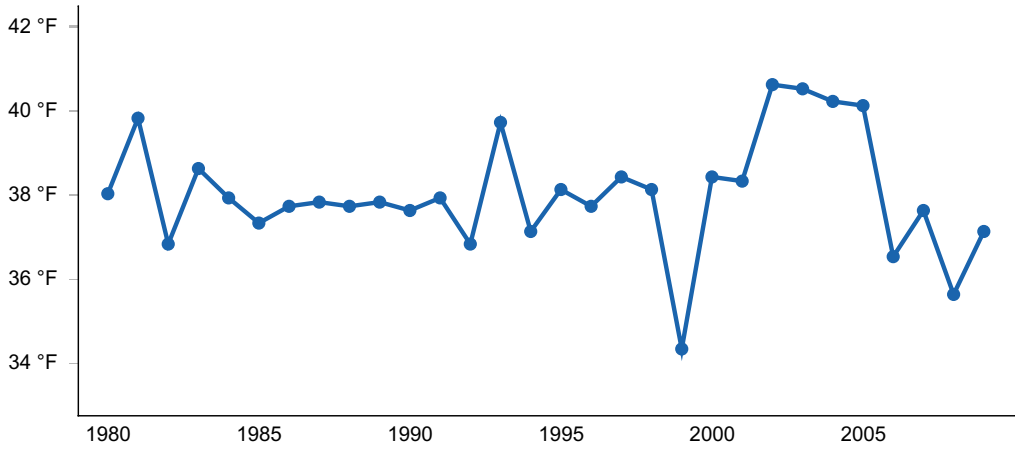

Figure 6. Annual average temperature pattern

Influencing water features

Open ponded areas are common in this ecological site. Flooding is frequent and very brief. This coincides with storm surges or extreme high tide events. Ponding is frequent and very long, contributing to surface ponding and a high-water table throughout the growing season.

Wetland description

This ecological site can be classified as an estuarine fringe wetland per the hydrogeomorphic classification system (USDA, 2008; Brinson, 1993). Vegetation is primarily facultative wet to obligate wetland species.

Soil features

Soils are Histosols, built up in thick organic matter parent material (Soil Survey Staff, 2013). Soils are aquic and very poorly drained. Soil pH is extremely to very strongly acidic. Parent material is primarily organic materials.

Soil hydrology is the main soil factor influencing vegetation. A water table is at the soil surface throughout the growing season. Frequent, very long ponding to depths of eight inches restricts vegetation to facultative wet to obligate wetland species.

Correlated soil components in MLRA 225X: E25 – Maritime sedge-sphagnum-organic depressions

Table 5. Representative soil features

Parent material	(1) Organic material
Surface texture	(1) Peat

Drainage class	Very poorly drained
Permeability class	Moderate
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	3–5.9 in
Soil reaction (1:1 water) (0-10in)	3.8–4.5
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This ecological site describes organic depressions on the coastal plain. Site and soil hydrology, especially the stress caused by ponding (Vartapetian and Jackson, 1997), shape the vegetative community. Vegetation is primarily restricted to facultative wet to obligate wetland species. Permanently ponded areas support emergent species.

Site and soil hydrology support a stable reference plant community. This site is wet throughout the growing season. Additional water inputs during the growing season do not affect the vegetation. Flooding is a frequent but very brief event, typically coinciding with storm surges or extreme high tide events. Large scale coastal plain successional processes, such as isostatic uplift and thaw pond cycles, are too long to capture at a human timescale or on a management plan (Landfire, 2009).

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 similar communities in Alaska (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

1. Reference State

State 1 submodel, plant communities

1.1. Bog rosemary / cottongrass – sedge / Sphagnum moss

State 1
Reference State

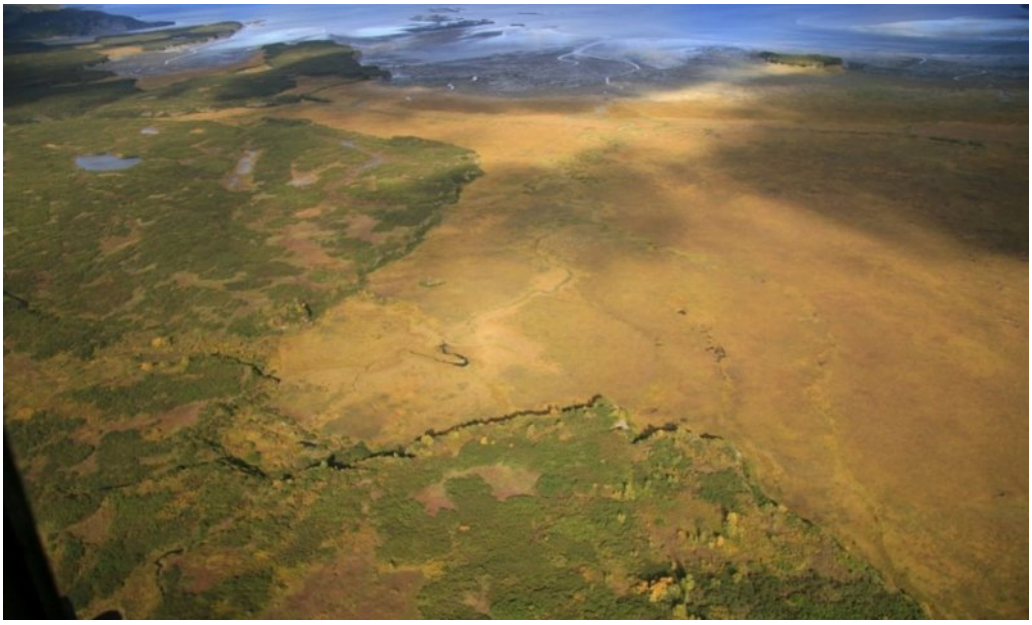

Figure 7. A coastal plain talf with tidal marsh in the background and the talf with organic depressions in the foreground (Landfire, 2007).

The reference state supports one stable community phase. The reference plant community is characterized by a sedge-bog meadow. Vegetation is influenced by site and soil drainage and is mostly restricted to facultative wet to obligate wetland species. This community is resilient to periods of very brief flooding and very long ponding. All community phases in this report are characterized using the Alaska vegetation classification system (Viereck et al., 1992).

Dominant plant species

- bog rosemary (*Andromeda polifolia*), shrub

- cottongrass (*Eriophorum*), grass
- sedge (*Carex*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous

Community 1.1
Bog rosemary / cottongrass – sedge / Sphagnum moss

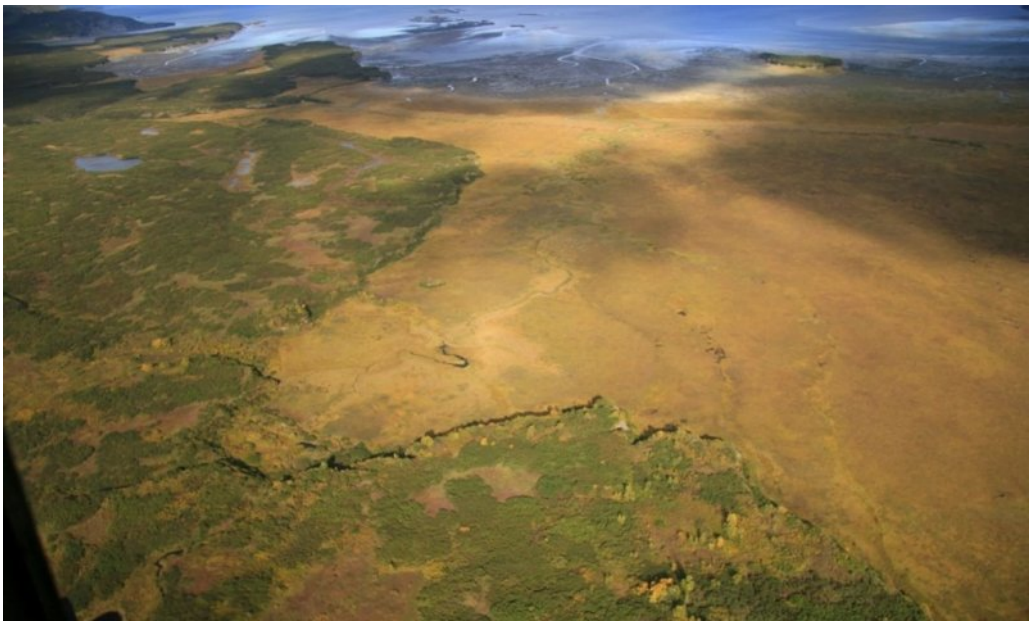

Figure 8. A coastal plain talf with tidal marsh in the background and the talf with organic depressions in the foreground (Landfire, 2007).

The reference plant community is a lowland sedge-bog meadow (Viereck et al., 1992). Vegetation is primarily facultative wet to obligate wetland species. Halophytic (salt-tolerant) species may be present near the shoreline. Major plant groups are tall and medium graminoids and dwarf shrubs. Common species are likely to include cottongrasses (Eriophorum ssp.), sedges (Carex ssp.), bog rosemary (*Andromeda polifolia*), and purple marshlocks (*Comarum palustre*). Ground cover is predominantly Sphagnum moss (Sphagnum ssp.), with herbaceous litter and surface water at the lowest areas in the depression.

Dominant plant species

- bog rosemary (*Andromeda polifolia*), shrub
- cottongrass (*Eriophorum*), grass
- sedge (*Carex*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous

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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Contributors

Phil Barber
Blaine Spellman
Marji Patz

Acknowledgments

This soil – 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	12/19/2025
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):**

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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):**

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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:**