

Ecological site F225XY310AK

Southern Alaska Riparian Complex Flood Plains

Last updated: 6/14/2025
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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): 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

Landfire Biophysical Settings – 7617280 – Aleutian Floodplain Forest and Shrubland (Landfire, 2009) The Alaska Yukon Region of the Circumboreal Vegetation map (CBVM) – Southern Alaska Floodplain Spruce-Cottonwood Forests and Scrub (Jorgensen and Meidinger, 2015) Viereck Communities: Forested RPC: Level III - Closed broadleaf forest (I.B.1) / Level IV – Balsam poplar closed forest (I.B.1.c) Post-flood scrubland: Level III – Closed tall scrub (II.B.1) / Level IV – Willow scrubland (II.B.1.a) (Viereck et al., 1992) Kodiak Archipelago

Ecological site concept

Ecological Site concept: • Occurs on the flood plain riparian complex including low and high flood plains • Supports a closed broadleaf forest in the reference plant community (Viereck et al., 1992) • Soils derived from alluvial parent material • Higher flood plain soils are well drained with an udic moisture regime. Low flood plains are poorly drained with an aquic moisture regime. • Flooding is frequent in low areas and occasional in high areas. Areas proximal to the flood source experience higher energy flooding • More frequently flooded areas are associated with low flood plains that support a scrubland community. Less frequently flooded areas are associated with high flood plains that support a forest

Associated sites

R225XY313AK	Southern Alaska Scrub Loamy Oxbows Oxbows on flood plains.
F225XY315AK	Southern Alaska Forest Loamy Terraces Forested terraces in broad mountain valleys.
F225XY360AK	Southern Alaska Forest Loamy Hill Backslopes Forests on low elevation mountain slopes.

Similar sites

F225XY315AK	Southern Alaska Forest Loamy Terraces R225XY315AK describes stream terraces that do not flood. There is no post-flood scrubland on terraces as found on flood plains.
F225XY360AK	Southern Alaska Forest Loamy Hill Backslopes R225XY360AK describes deciduous forests on lower mountain slopes that do not flood.

Table 1. Dominant plant species

Tree	(1) <i>Populus balsamifera</i> (2) <i>Populus balsamifera</i> ssp. <i>trichocarpa</i>
Shrub	(1) <i>Salix</i> (2) <i>Alnus</i>
Herbaceous	(1) <i>Calamagrostis canadensis</i>

Physiographic features

This site occurs on river valley flood plains. Elevation typically ranges between 50 to 750 feet above sea level. Slope gradients are nearly level (zero to two percent), and this site occurs at all aspects. In general, areas proximal to the river flood more frequently and with greater energy than distal locations. Cut banks are the exception, as they are typically high above the flood source, and are more susceptible to erosion than flooding. Ponding does not occur. A water table is present during the growing season in lower areas. This site collects run-in from upslope ecological sites and transports it downslope to lakes and coast.

Table 2. Representative physiographic features

Geomorphic position, terraces	(1) Tread
Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Landforms	(1) River valley > Flood plain (2) River valley > Flood plain
Runoff class	Negligible to low
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	20 – 230 m
Slope	0 %
Water table depth	0 – 150 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 frequency	Not specified
Elevation	0 – 450 m

Slope	0 %
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)	120-160 days
Freeze-free period (characteristic range)	160-200 days
Precipitation total (characteristic range)	740-1,930 mm
Frost-free period (actual range)	120-170 days
Freeze-free period (actual range)	150-200 days
Precipitation total (actual range)	360-2,520 mm
Frost-free period (average)	140 days
Freeze-free period (average)	170 days
Precipitation total (average)	1,350 mm

Influencing water features

This site is classified as a riverine wetland under the Hydrogeomorphic (HGM) classification system. Flow is unidirectional and slope is the main influence on whether river sediment is deposited or eroded (Brinson, 1993). Precipitation and seasonal snow melt are the main sources of water. This site is usually unbraided but may braid in the high energy areas.

Soil features

Soils are derived from alluvium. High flood plain soils are well drained with an udic moisture regime. Low flood plains range from moderately well to poorly drained, aquic soils. All soils support a cryic temperature regime. Soils are very deep without restriction. Surface rock fragments are minimal in the reference plant community but are present in high coverage on the low flood plain. Subsurface fragments are about 10 to 30 percent of the soil profile by volume. Soil pH is very strongly to moderately acidic (pH 4.5 – 6.0).

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam (2) Ashy silt loam
Family particle size	(1) Coarse-loamy (2) Loamy over sandy or sandy-skeletal
Drainage class	Poorly drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	150 cm
Surface fragment cover $\leq 3"$	0 – 10 %
Surface fragment cover $> 3"$	Not specified
Available water capacity (0-25.4cm)	2.54 – 5.33 cm
Soil reaction (1:1 water) (0-25.4cm)	4.5 – 10
Subsurface fragment volume $\leq 3"$ (0-152.4cm)	10 – 30 %
Subsurface fragment volume $> 3"$ (0-152.4cm)	Not specified

Ecological dynamics

This ecological site describes the floodplain riparian complex. Local site factors including relative site elevation, and flood frequency, duration and energy result in three communities. The reference plant community is a deciduous forest. Areas proximal to the river channel flood more frequently for longer durations of time. These areas typically support community 1.3. Communities 1.2 and 1.1 typically develop as one moves away from the flood source. Increases in elevation above sea level coincides with a drop in tree coverage. Above treeline, the flood plain will not develop a forest, and the dominant community is comprised of alder and/or willow.

Spatial and temporal patterns in soil and site hydrology create three flood plain communities. Low flood plains along water channels usually have experienced scouring flooding. These areas are susceptible to either further erosion or deposition, depending on river

characteristics at any given location (Brinson, 1993). These areas typically have a water table during the growing season, which helps shape the vegetative community.

River channels move over time, affecting site hydrology and eventually can shift one community to the another. This change is generally slow. Channel movement cuts and erodes existing banks while simultaneously depositing sediments on new bars.

High energy flood disturbances most commonly occur during the spring snow melt, where water is released from ice jams. High energy floods can scour all parts of a flood plain, eroding upper soil horizons and exposing alluvial parent material. Flood dynamics are site-specific, but large flood events can remove all vegetation and create areas of primary succession.

Lightning-initiated fires are uncommon in south-central Alaska and natural fire frequency is low on this site (Innes, 2014; Jorgensen and Meidinger, 2015). It appears to be relatively unimportant when compared with the effects of flooding, channel movement and sediment deposition (Innes, 2014). Windthrow occurs in the reference plant community. It may contribute to keeping the forest canopy open and promoting plant diversity and shrub growth in the understory. Willows are browsed by moose, particularly in community 1.2. This does not appear to affect the ecological processes of the site.

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

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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

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Approval

Blaine Spellman, 6/14/2025

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)	
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Approved by	
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production
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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:
