Ecological site F225XY360AK
Southern Alaska Forest Loamy Hill Backslopes

Last updated: 6/14/2025
Accessed: 09/24/2026

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 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

Landfire BPS – 7616420 – Aleutian Kenai Birch-Cottonwood-Poplar Forest (Landfire, 2009) The Alaska Yukon Region of the Circumboreal Vegetation map (CBVM) – Southern Alaska Spruce-Birch-Herb Forests (Jorgensen and Meidinger, 2015) Viereck Community I.B.2.c – Open Balsam Poplar Forest (Viereck et al., 1992) Kodiak Archipelago Land Cover Classification: Class 8 – Mixed cottonwood, birch and alder forest (Fleming and Spencer, 2007)

Ecological site concept

Ecological site concept: • Supports an open broadleaf forest in the reference plant community • A scrubland community appears to be the result of natural forest senescence, tree windthrow, or an upslope avalanche event. • Occurs on low elevation hill backslopes • Well drained soils have a cryic temperature regime and an udic moisture regime • No ponding or flooding, and no water table during the growing season • Parent material is volcanic ash or loess over sandy and gravelly outwash.

Associated sites

F225XY310AK	**Southern Alaska Riparian Complex Flood Plains** Flood plain riparian complex in broad mountain valleys.
F225XY315AK	**Southern Alaska Forest Loamy Terraces** Forested terraces in broad mountain valleys.
R225XY363AK	**Southern Alaska Scrub Loamy Hill Backslope** Higher elevation scrublands on hill backslopes with bedrock-restricted soils.

Similar sites

F225XY310AK	**Southern Alaska Riparian Complex Flood Plains** R225XY310AK describes the riparian complex on flood plains, which are shaped by alluvial processes not associated with this ecological site. A post-flood community is not found in this ecological site.
F225XY315AK	**Southern Alaska Forest Loamy Terraces** R225XY315AK describes flat terraces on river valley bottoms. Understory vegetation is different, with alders common here. Terraces do not experience the avalanche disturbances described here.

Table 1. Dominant plant species

Tree	(1) *Populus balsamifera* (2) *Betula papyrifera var. kenaica*
Shrub	(1) *Alnus* (2) *Salix*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Chamerion angustifolium*

Physiographic features

This ecological site is on low elevation hill backslopes of glaciated plains. This ecological site is located between 100 and 500 feet above sea level but reaches higher elevations on south-facing slopes. Slope gradients are strong (12-15 percent). Flooding and ponding do not occur and there is no water table in the soil profile.

Table 2. Representative physiographic features

Hillslope profile	(1) Backslope
Slope shape across	(1) Linear
Slope shape up-down	(1) Convex
Landforms	(1) Hills > Hill (2) Plains > Hill
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	30 – 150 m
Slope	10 – 20 %
Water table depth	150 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	0 – 380 m
Slope	0 – 30 %
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 ecological site is not associated with or influenced by streams or wetlands. Precipitation and throughflow are the main source of water for this ecological site. Surface runoff and throughflow contribute water to downslope ecological sites.

Wetland description

This ecological site is not associated with wetlands.

Soil features

Soils formed in silt loess or ash over gravelly outwash or till. Soils are well drained and support a cryic temperature regime and an udic moisture regime. Soils are very deep and may have a textural stratification where ash or loess sits atop till. The organic horizon is around three inches thick. Surface rock fragments are minimal. Subsurface fragments are about 30percent by volume. Soil pH is extremely to moderately acidic (pH 3.6 – 6.0). Soils are dry during the growing season.

Table 5. Representative soil features

Parent material	(1) Outwash (2) Till – diorite (3) Volcanic ash (4) Eolian deposits
Surface texture	(1) Medial silt loam
Family particle size	(1) Medial over loamy-skeletal
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-25.4cm)	5.08 – 8.38 cm
Soil reaction (1:1 water) (0-25.4cm)	3.6 – 10
Subsurface fragment volume <=3" (0-152.4cm)	20 – 30 %
Subsurface fragment volume >3" (0-152.4cm)	10 %

Ecological dynamics

The open broadleaf forest reference plant community is shaped by climatic factors and soil moisture. Slopes are generally not exposed to scouring winds. Air and soil temperatures are warm enough to support deciduous trees. Natural die back of trees brings light to the understory, contributing to a mix of shade tolerant and intolerant species. Drier areas may support more lichens than shrubs in the understory (Viereck et al., 1992). Spruce trees may be present near the border with MLRA 220X on the northern half of the Kodiak Archipelago.

The reference plant community is relatively stable. Disturbance dynamics are poorly understood on this ecological site (Landfire, 2014;

Viereck et al., 1992; Innes, 2014). Under certain conditions, natural senescence of the forest overstory may shift the area to an open shrub-graminoid mosaic (Neiland and Viereck, 1977). Trees are susceptible to windthrow, which opens the overstory and allows light to penetrate to the ground. While these slopes are stable, upslope avalanches may cross this ecological site (Viereck et al., 1992), shifting it from a forest to a scrubland.

Post-fire studies are lacking. Lightning-initiated fires are uncommon in south-central Alaska and natural fire frequency is low on this ecological site (Innes, 2014; Jorgensen and Meidinger, 2015). Poplar with thick bark are resilient to all but the most severe fires (Innes, 2014). Paper birch is resilient to fire, with high moisture content in the canopy and an often lush understory (Uchytil, 1991).

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 (%)

Table 7. Community 1.2 plant community composition

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

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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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)	
Contact for lead author	
Date	09/24/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
