USDA Natural Resources
Conservation Service

Ecological site R225XY364AK
Southern Alaska Scrub Loamy Plain Depressions

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 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 begin at higher elevations 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:
Open low Closed tall scrub (II.B.1 – level III) / Open low willow-graminoid shrub bog (II.C.2.i - level IV)
(Viereck et al., 1992)

Circumboreal Vegetation Map – Alaska-Yukon Region: Southern Alaska Alder-Willow-Dwarf Birch Scrub

(Jorgensen and Meidinger, 2015)

LANDFIRE BioPhysical Settings: 7616390 – Arctic Mesic-Wet Willow Shrubland
(Landfire, 2009)

Kodiak Archipelago Land Cover Classification:
Class 29 – Wet low willow
(Fleming and Spencer, 2007)

Ecological site concept

Ecological Site characteristics:
• Supports a stable open low willow scrubland in the reference plant community
• Located in low and high elevation plain depressions
• Soils derived from volcanic ash and/or loess over loamy till parent material
• Soils are poorly drained
• A shallow to moderately deep (2 - 14 inches) water table is present during the growing season (June through August)
• Soil wetness during the growing season is the major influencer of vegetation

Associated sites

R225XY335AK	**Southern Alaska Tall Scrub Loamy Backslopes** Alder scrublands on plains

Similar sites

R225XY337AK	**Southern Alaska Scrub Wet Ashy Backslopes** Mountain willow scrublands on wet slopes

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix barclayi* (2) *Salix*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Carex*

Physiographic features

This ecological site occurs in poorly drained plain depressions. Slopes are undulating to rolling. A water table is present between six and fourteen inches from June through August and restricts vegetation to primarily facultative to facultative wet wetland species. This ecological site collects run in and transports it downslope via overflow and throughflow.

Table 2. Representative physiographic features

Slope shape across	(1) Concave
Slope shape up-down	(1) Concave
Geomorphic position, flats	(1) Dip
Geomorphic position, hills	(1) Base Slope
Landforms	(1) Plains > Plain (2) Plains > Depression
Runoff class	Low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	30–305 m
Slope	0–10%
Water table depth	15–36 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	30–457 m
Slope	0–20%
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)	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

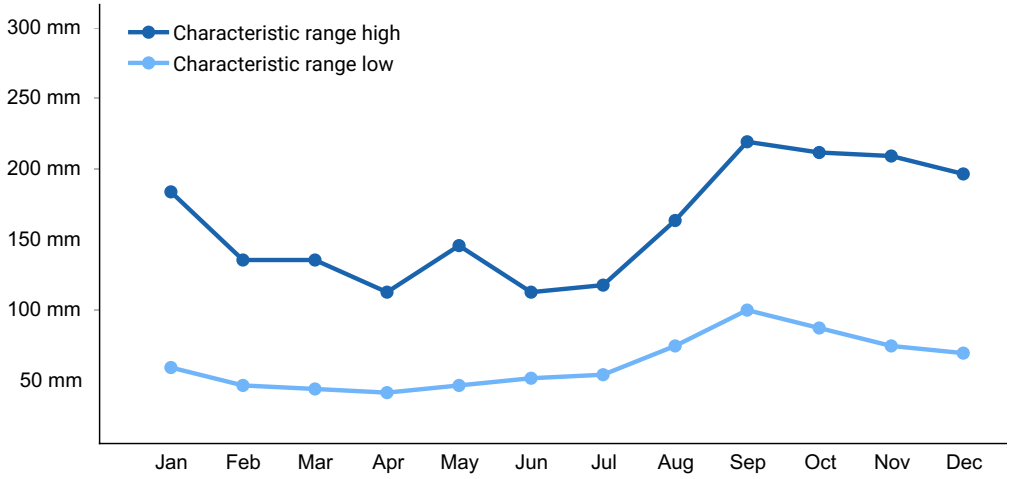

Figure 1. Monthly precipitation range

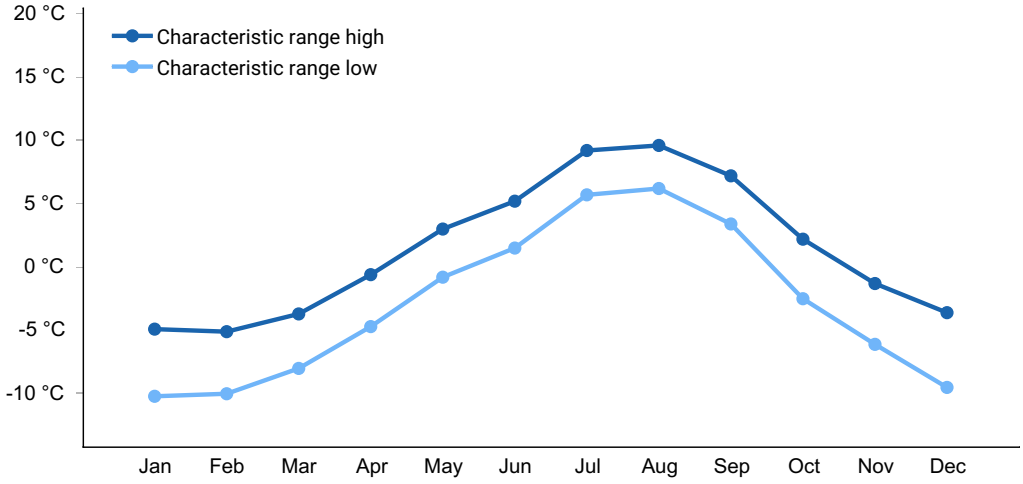

Figure 2. Monthly minimum temperature range

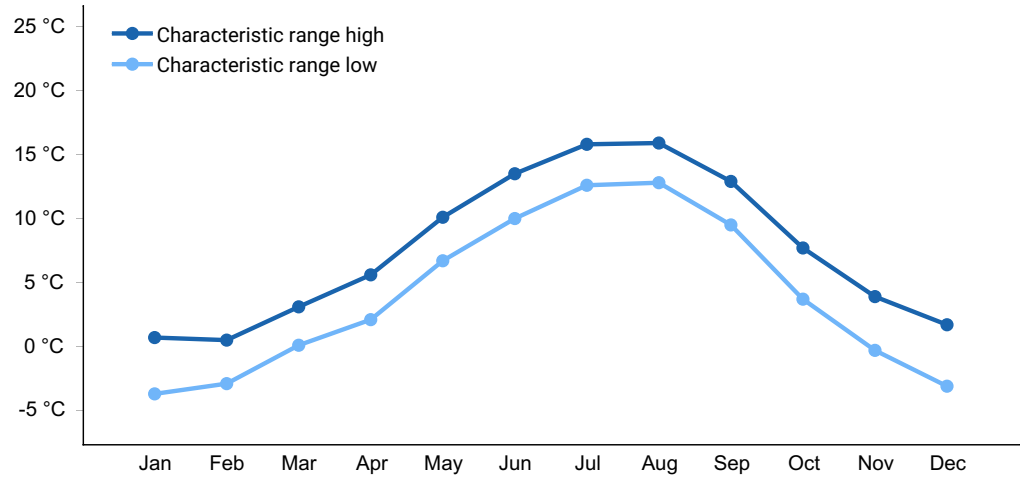

Figure 3. Monthly maximum temperature range

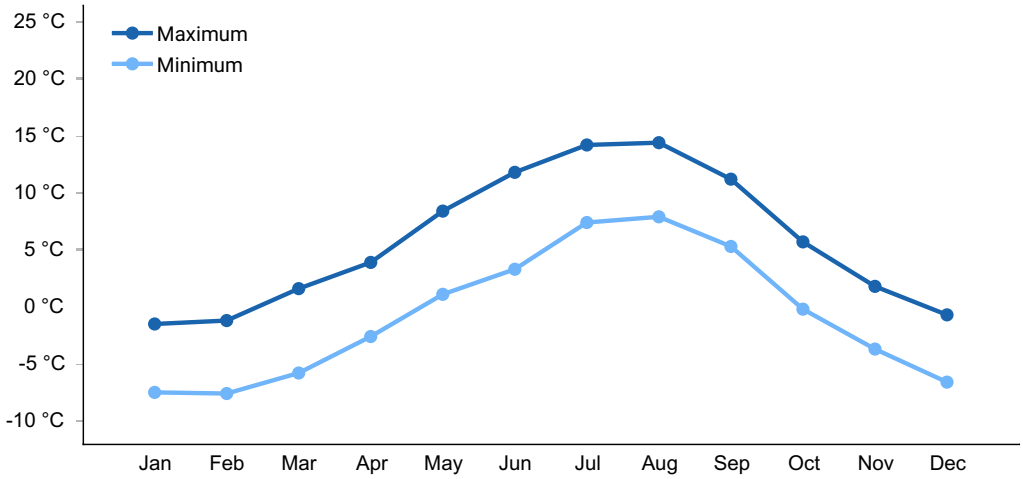

Figure 4. Monthly average minimum and maximum temperature

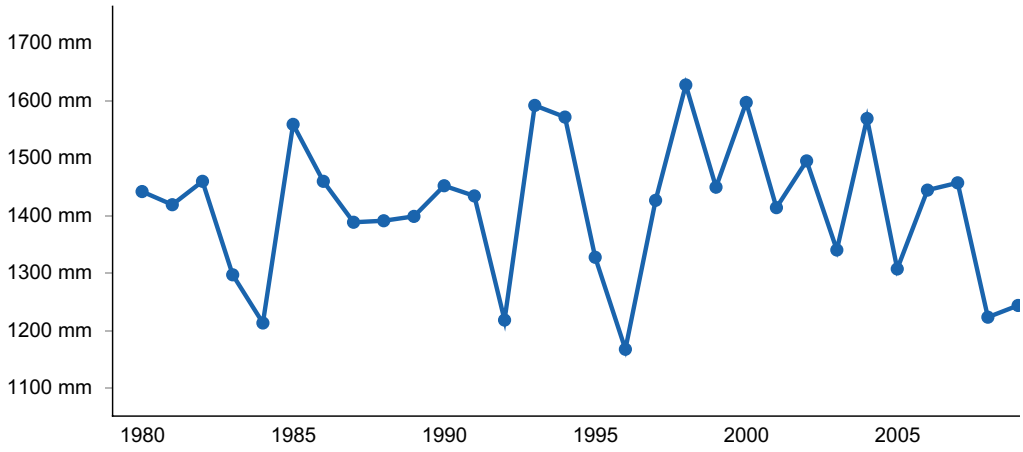

Figure 5. Annual precipitation pattern

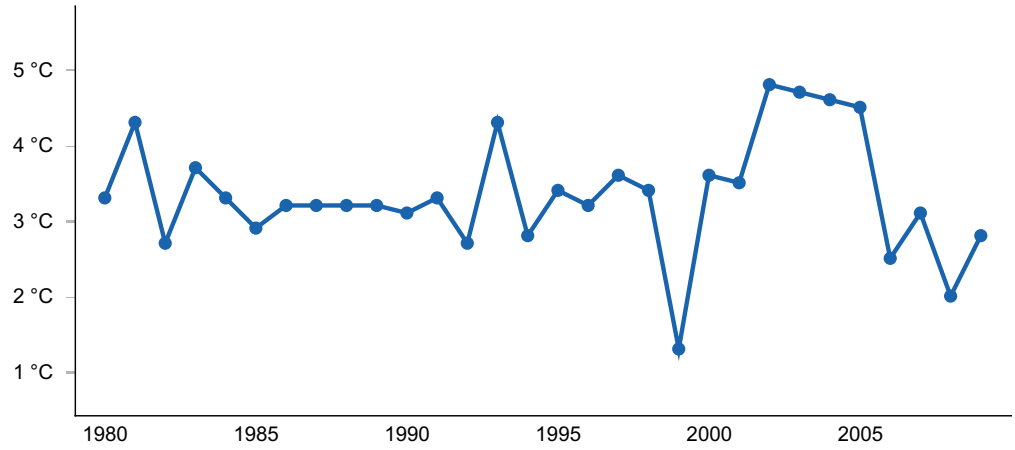

Figure 6. Annual average temperature pattern

Influencing water features

This ecological site may support small areas of ponding early in the growing season, when snow melt is at its maximum. Surface water collects in these depressions and enters the soil.

Wetland description

This ecological site is classified as a depressional wetland under the Hydrogeomorphic (HGM) classification system (Brinson, 1993; USDA 2008). These types of wetlands are marked by multiple water sources (precipitation, discharge, and flow through), and allow the accumulation of water. Common species are facultative to obligate wetland species.

Soil features

Soils are wet Andisols identified by the presence of andic soil properties (Soil Survey Staff, 2013). Soils are poorly drained and support an aquic moisture regime. Parent material is organic material over volcanic ash and/or loess over till. A three-inch-thick organic horizon is common. A water table is present from June through August. Subsurface fragments usually comprise ten to thirty percent of subsurface soil volume. Soil pH is very strongly to moderately acidic.

Correlated soil components in MLRA 225X: E25-Maritime scrub/herbaceous-ashy wet depressions

Table 5. Representative soil features

Parent material	(1) Till
Surface texture	(1) Medial, mucky silt loam
Drainage class	Poorly drained

Permeability class	Moderate
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-25.4cm)	6.1–8.38 cm
Soil reaction (1:1 water) (0-25.4cm)	4.5–5.5
Subsurface fragment volume <=3" (Depth not specified)	16–22%
Subsurface fragment volume >3" (Depth not specified)	10–23%

Ecological dynamics

This ecological site is associated with poorly drained soil in plain depressions. Soil conditions favor hydrophytic species in the canopy and understory. One or more willow species generally make up the low shrub canopy.

The reference plant community is stable and does not shift due to any known disturbance (Landfire, 2009). Fire is unlikely on this wet ecological site, as the canopy contributes to a cool, moist understory unlikely to catch fire (Landfire, 2009). Willows are susceptible to diseases and insect damage and may result dieback and community patchiness. The reference plant community is likely a good source of moose browse, but a unique post-browse community is unlikely to develop.

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. Barclay’s willow – Undergreen willow / bluejoint - sedge

State 1
Reference State

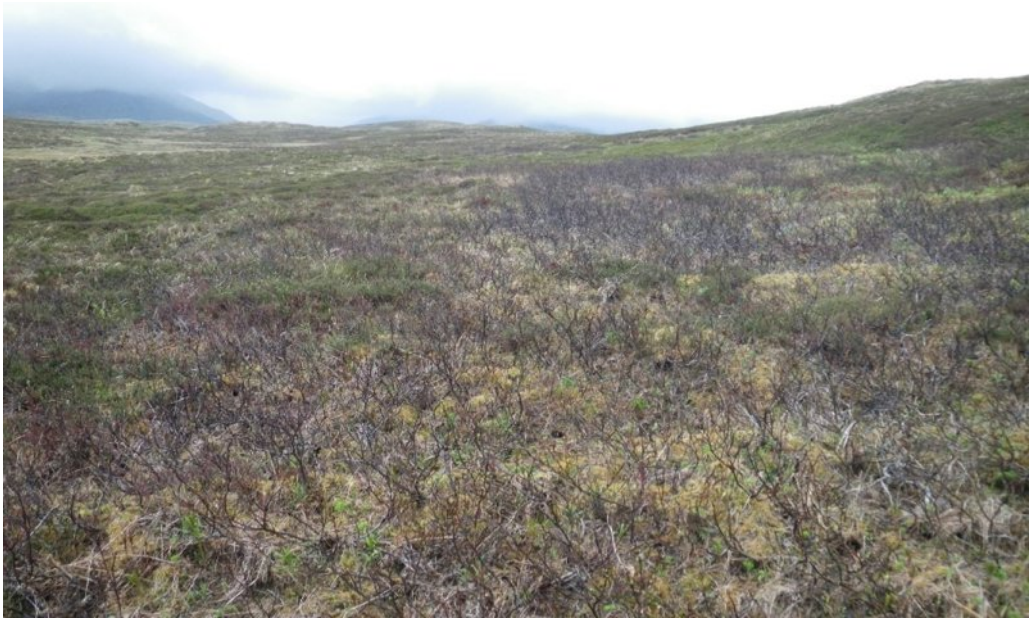

Figure 7. Early summer foliage is absent from the willow, allowing a view of the underlying dense moss groundcover.

The reference state supports one stable community phase. The reference plant community is an open low willow shrubland. One or more willow species may be present. Open areas are a mix of bluejoint and sedges, as well as various hydrophytic forbs. All community phases in this report are characterized using the Alaska vegetation classification system (Viereck et al., 1992).

Dominant plant species

- Barclay's willow (*Salix barclayi*), shrub
- undergreen willow (*Salix commutata*), shrub
- tealeaf willow (*Salix pulchra*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- sedge (*Carex*), grass
- field horsetail (*Equisetum arvense*), other herbaceous
- woolly geranium (*Geranium erianthum*), other herbaceous

Community 1.1
Barclay’s willow – Undergreen willow / bluejoint - sedge

Figure 8. Early summer foliage is absent from the willow, allowing a view of the underlying dense moss groundcover.

The reference plant community is an open low willow shrubland. Major plant groups include low shrubs, medium shrubs, tall graminoids, and tall forbs. More than one willow is typically present. Common willows include *Salix barclayi*, S. commutate, *S. pulchra*, and *S. glauca*. The understory is typically comprised of a mix of hydrophytic graminoids and forbs, including *Calamagrostis canadensis*, Carex ssp., *Geranium erianthum*, and Equisetum ssp. Ground cover is a mix of herbaceous litter, mosses, and sporadic lichens.

Dominant plant species

- Barclay's willow (*Salix barclayi*), shrub
- undergreen willow (*Salix commutata*), shrub
- tealeaf willow (*Salix pulchra*), shrub
- sedge (*Carex*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- field horsetail (*Equisetum arvense*), other herbaceous
- woolly geranium (*Geranium erianthum*), 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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Other references

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Contributors

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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	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:**

17. **Perennial plant reproductive capability:**