USDA Natural Resources
Conservation Service

Ecological site R225XY337AK
Southern Alaska Scrub Wet Ashy Backslopes

Last updated: 6/14/2025
Accessed: 12/05/2025

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 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:
Closed tall scrub (II.B.1 – level III) / Closed tall willow shrub (II.B.1.a - 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: 7616400 – Aleutian Mesic-Wet Willow Shrubland (Landfire, 2009)

Kodiak Archipelago Land Cover Classification:
Class 28 – Low willow
(Fleming and Spencer, 2007)

Ecological site concept

Ecological Site characteristics:
• Supports a stable closed tall willow scrubland in the reference plant community
• Soils are poorly drained with a shallow water table (4 – 10 inches) during the growing season
• Soils are derived from volcanic ash and/or loess over till parent material
• Site hydrology influences site vegetation, as trees are less competitive in poorly drained soils

Associated sites

F225XY360AK	**Southern Alaska Forest Loamy Hill Backslopes** Southern Alaska forest backslopes on drier slopes

Similar sites

R225XY333AK	**Southern Alaska Scrub Steep Backslopes** Birch-ericaceous shrub scrubland on dry backslopes
R225XY334AK	**Southern Alaska Scrub Shallow Ashy Backslopes** Ericaceous heath scrubland on shallow soil on mountain slopes

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix pulchra* (2) *Salix*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Equisetum*

Physiographic features

This site occurs on poorly drained hill footslopes. It is found at elevation between 200 and 1,000 feet. Slopes are strongly sloping to moderately steep slopes ranging between five and fifteen percent. Throughflow is prevalent during the growing season and a water table is present between four and ten inches from June through August. Flooding and ponding

do not occur. This site generates very low to moderate amounts of runoff to adjacent, downslope sites.

Table 2. Representative physiographic features

Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Hillslope profile	(1) Backslope (2) Footslope
Geomorphic position, mountains	(1) Mountainbase
Landforms	(1) Hills > Hillslope (2) Mountains > Mountain slope
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	61–305 m
Slope	5–15%
Water table depth	10–25 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	3–610 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

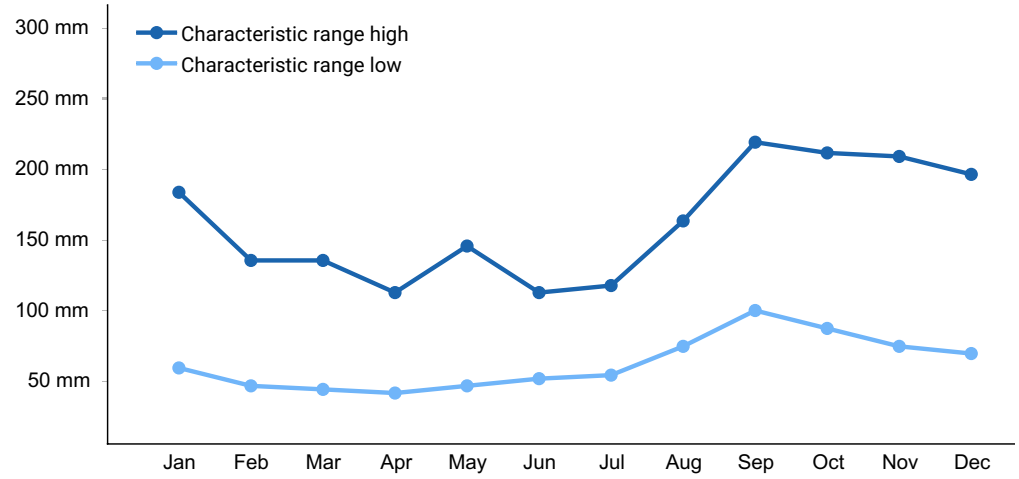

Figure 1. Monthly precipitation range

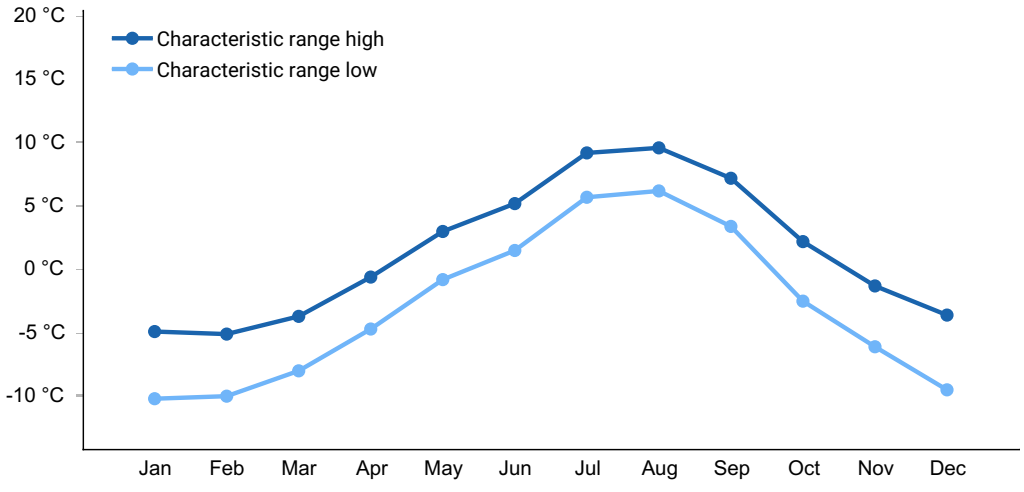

Figure 2. Monthly minimum temperature range

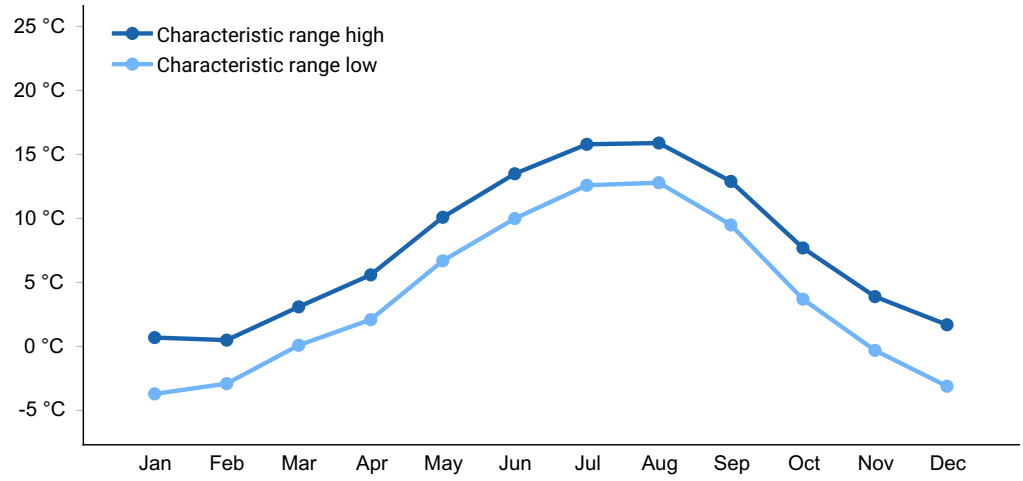

Figure 3. Monthly maximum temperature range

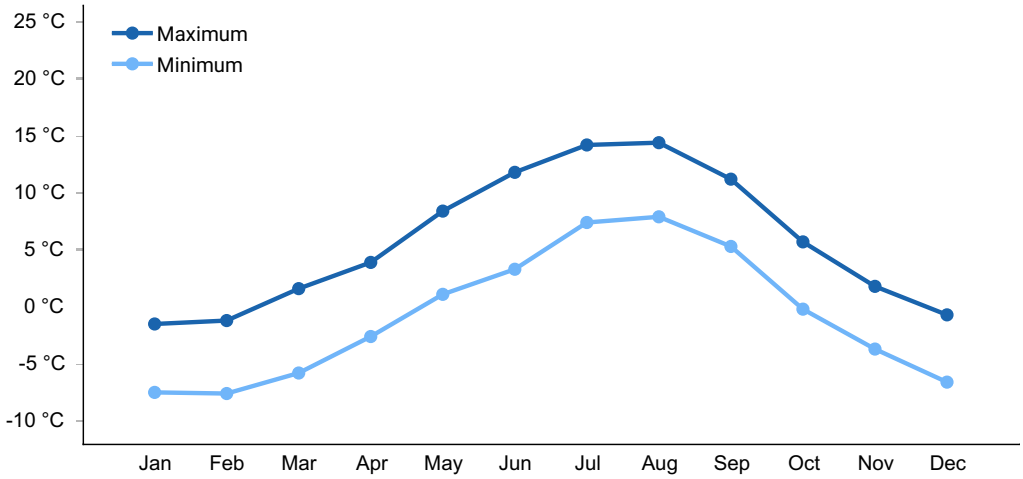

Figure 4. Monthly average minimum and maximum temperature

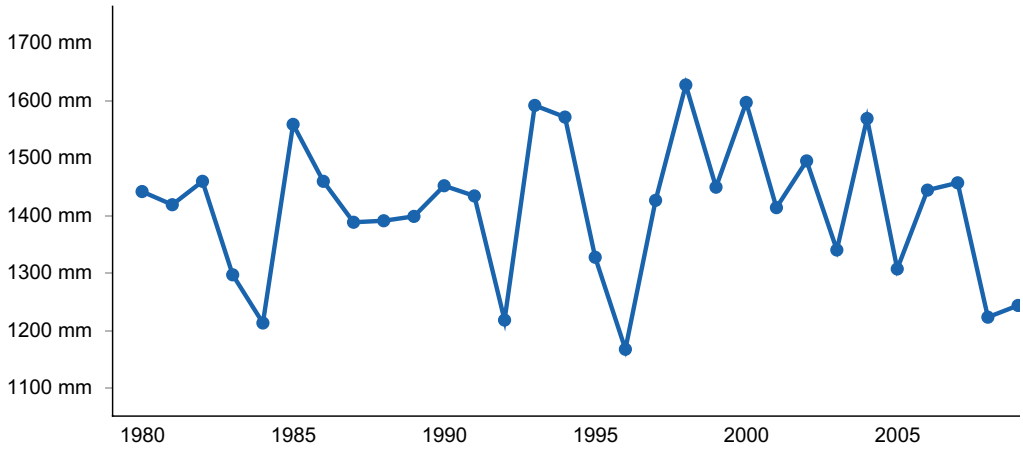

Figure 5. Annual precipitation pattern

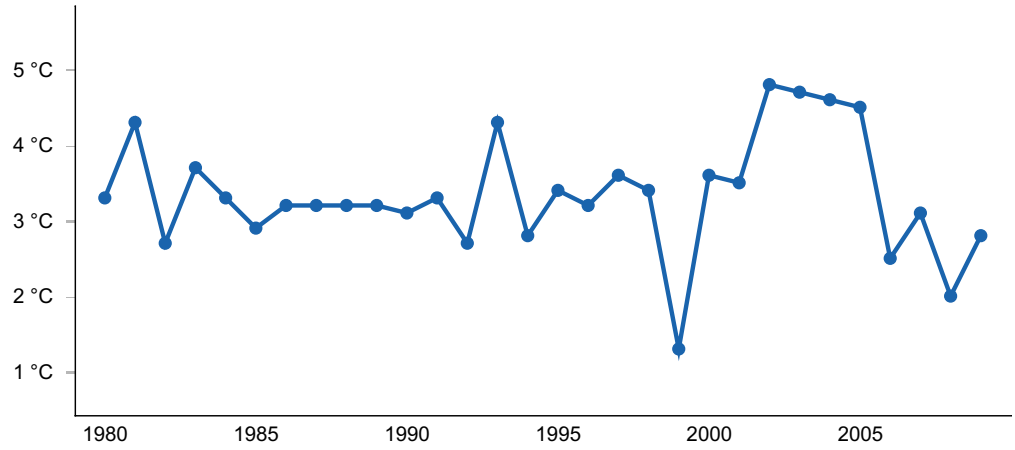

Figure 6. Annual average temperature pattern

Influencing water features

This site is classified as a slope wetland under the Hydrogeomorphic (HGM) classification system (Brinson, 1993). This wetland type is not closed, allowing the throughflow of water (USDA, 2008). There are typically no surface water features on this ecological site. Groundwater seepage, supplied from upslope precipitation and seasonal snow melt, are the main sources of water.

Wetland description

This site is classified as a slope wetland under the Hydrogeomorphic (HGM) classification system (Brinson, 1993).

Soil features

Soils are wet Andisols derived from till and are identified by the presence of andic soil properties (Soil Survey Staff, 2013). The organic surface is up to 3 inches, which contributes to an ashy, mucky silt loam surface. There are no surface rock fragments. Subsurface fragments may comprise up to 30 percent of soil volume. These are very deep, unfrozen soils. A densic layer of till occurs at very shallow to moderate depths (8 to 25 inches), creating a perched water table from June through August. Soils are poorly drained with an aquic moisture regime. Soil pH is very strongly to moderately acidic.

Correlated soil components in MLRA 225X: E25 – Maritime scrub-silty wet slopes

Table 5. Representative soil features

Parent material	(1) Till (2) Volcanic ash
Surface texture	(1) Medial, mucky silt loam
Drainage class	Poorly drained

Permeability class	Moderate
Depth to restrictive layer	20–64 cm
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-25.4cm)	6.6–8.38 cm
Soil reaction (1:1 water) (0-25.4cm)	4.5–5.5
Subsurface fragment volume <=3" (Depth not specified)	24–25%
Subsurface fragment volume >3" (Depth not specified)	4–6%

Ecological dynamics

The closed tall willow scrubland reference plant community occurs on wet soils of hillslopes and lower mountain footslopes. These poorly drained soils favor hydrophytic vegetation in the canopy and understory. Dense willow typically comprises the overstory. Alder and balsam poplar may be present but at low cover. This site grades into a deciduous forest in the treed boreal zone as the densic till layer deepens and soils dry.

The reference plant community is stable without any known disturbance related plant communities (Landfire, 2009; Viereck et al., 1992). Fire is unlikely on this wet site. In the instance of a fire, several willow species are fire adapted (Uchytil, 1991), and the reference plant community would quickly reestablish. Willows are susceptible to diseases and insect damage and may result dieback and community patchiness.

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. Tealeaf willow – grayleaf willow / blue joint / woolly geranium

State 1
Reference State

Figure 7. Dense willow scrubland on mountain slope.

Figure 8. Willow height classes range from low to tall.

The reference state supports one stable community. The reference plant community is a closed tall willow shrubland. Multiple willow species are often present. The understory is typically comprised of shade tolerant, hydrophytic graminoids and forbs. All plant communities in this report are characterized using the Alaska vegetation classification system (Viereck et al., 1992).

Dominant plant species

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

Community 1.1
Tealeaf willow – grayleaf willow / blue joint / woolly geranium

Figure 9. Dense willow scrubland on mountain slope.

The reference plant community is a closed tall willow shrubland. Dominant plant strata are tall shrubs, medium shrubs, tall graminoids, and tall forbs. Multiple willow species are commonly present. Common willows include *Salix pulchra*, *S. glauca*, *S. barclayi*, and *S. alaxensis*. The understory is typically comprised of shade tolerant, hydrophytic graminoids and forbs.

Dominant plant species

- tealeaf willow (*Salix pulchra*), shrub
- grayleaf willow (*Salix glauca*), shrub
- Barclay's willow (*Salix barclayi*), shrub
- 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)

References

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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 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	12/05/2025
Approved by	Blaine Spellman
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):**

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:**
