Ecological site R220XY425AK
Maritime Shrub Drainageway

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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): 220X–Alexander Archipelago-Gulf of Alaska Coast

The Alexander Archipelago-Gulf of Alaska Coast area consists of a narrow arc of islands and lower elevation coastal mountains in the Southern Alaska Region. This area spans from the Alexander Archipelago in southeastern Alaska, north and west along the coast of the Gulf of Alaska and Prince William Sound, and further west to the southern tip of the Kenai Peninsula and the northeastern islands of the Kodiak Archipelago. The area makes up about 27,435 square miles (USDA 2006). The terrain primarily consists of low to moderate relief mountains that are deeply incised. Throughout the area glaciers, rivers, and streams have cut deep, narrow to broad valleys. The broader valleys have nearly level to strongly sloping flood plains and stream terraces. Alluvial and colluvial fans and short footslopes are common in the valleys along the base of the mountains. Rocky headlands, sea cliffs, estuaries, and beaches are common along the coast.

During the late Pleistocene epoch, the entire area was covered with glacial ice. The numerous fjords of the Alexander Archipelago and Prince William Sound were formed chiefly as a result of glacial scouring and deepening of preglacial river valleys. Most glacial deposits have been eroded away or buried by mountain colluvium and alluvium, which cover about 90 percent of the present landscape. The remaining glacial and glaciofluvial deposits are generally restricted to coastal areas. During the Holocene epoch, volcanic activity within and adjacent to this area deposited a layer of volcanic ash of varying thickness on much of the landscape in the southeastern and northwestern parts of the area. Paleozoic, Mesozoic, and Lower Tertiary stratified sedimentary rocks and Cretaceous and Tertiary intrusive rocks underlie much of the area and are exposed on steep mountain slopes and ridges (USDA 2006).

The dominant soil orders in this MLRA are Spodosols, Histosols, and Entisols. Soils in the area typically have a cryic soil temperature regime, an udic moisture regime, and have mixed minerology. Spodosols are common on mountains and hills having been formed in gravelly or cobbly colluvium, glacial till, and varying amounts of silty volcanic ash. These Spodosols commonly range from shallow to deep, are well to somewhat poorly drained, and typically classify as Humicryods or Haplocryods. Histosols that are poorly to very poorly drained occur on footslopes, discharge slopes, and valley floors. These wet histosols commonly classify as Cryosaprists, Cryohemists, and Cryofibrists. Histosols that are well drained occur on steep mountainsides. These dry Histosols commonly classify as Cryofolists. Entisols are common on flood plains, stream terraces, and outwash plains having been formed in silty, sandy, and gravelly to cobbly alluvium. These Entisols are generally deep, range from well to somewhat poorly drained, and commonly classify as Cryaquents and Cryofluvents. Miscellaneous (nonsoil) areas make up about 23 percent of this MLRA. The most common miscellaneous areas are chutes, rock outcrop, rubble land, beaches, riverwash, and water.

This area represents the Northern extent of the Pacific temperature rainforest and is characterized by productive stands of conifers. Western hemlock and Sitka spruce are the dominant trees on mountains and hills at lower elevations. Due to warmer temperatures, western red cedar and Alaska cedar are more prevalent in the southern portion of this area. Black cottonwood and mixed forest types occur on flood plains. Areas of peat and other sites that are too wet for forest growth support sedge-grass meadows and low scrub. As elevation increases, mountain

hemlock becomes the dominant tree in forested stands, which marks the transition to subalpine vegetation. The subalpine life zone typically occurs at elevations between 1500 to 3000 feet (Boggs et al. 2010, Carstensen 2007, Martin et al. 1995). Other common subalpine plant communities include tall alder scrub and bluejoint-forb meadows. Alpine vegetation occurs at even higher elevations, which marks the transition to the Southern Alaska Coastal Mountains Area (MLRA 222).

This area includes the Municipality of Juneau, Alaska's capital, and a number of smaller coastal towns and villages. Federally administered lands within this MLRA include Admiralty Island National Monument and part of Misty Fjords National Monument, Tongass National Forest, Chugach National Forest, and Glacier Bay, Wrangell-St. Elias, and Kenai Fjords National Parks and Preserves. The southern terminus of the Trans-Alaska Pipeline is in Valdez.

For many decades, logging, commercial fishing, and mining have been the primary industrial land uses throughout much of the area. In recent years, changes in public interests, land use policies, and timber economics have contributed to a significant decline in the timber industry. Commercial fishing continues to be an important industry and most communities support a fleet of boats and fishing related facilities. A number of mines operate in the area and others have been prospected and proposed. Tourism and wildland recreation are becoming increasingly important within the area. Subsistence hunting, fishing, and gathering provide food and a variety of other resources to local residents and remain the principal economy for residents of remote villages.

Ecological site concept

This site occurs on drainageways in alluvium and glacial outwash along the coastal plains. Site hydrology is characterized by small stream channels that flood regularly. The site has a water table within 30 inches of the soil surface throughout the growing season, and is poorly to somewhat poorly drained. Soil textures are fine sandy loams to loamy sands, often stratified with lenses of gravel and coarser textures in deeper soil horizons and have a thin organic layer on the soil surface.
This site supports a closed tall shrub reference plant community dominated by Sitka alder, Sitka willow, salmonberry, and feltleaf willow. Diverse forbs make up a small proportion of the community. Ground cover is largely composed of litter and various moss species with minimal bare ground. Other plant communities have yet to be observed on this site.

Associated sites

F220XY430AK	**Maritime Forest Sandy Plain Alluvial Fan** This site is associated with ecological site F220XY430AK. Both sites occur on alluvial deposits in very deep soils with similar plant communities. Site R220XY425AK occurs in drainages, while F220XY430AK occurs outside of drainages on alluvial fans and is well-drained. This site may intersect site F220XY430AK where drainageways meet alluvial fans.
F220XY432AK	**Maritime Forest Gravelly Plain** Ecological site R220XY425AK is associated with site F220XY432AK on outwash plains. Site F220XY430AK does not have a seasonal water table influencing vegetation, and occurs in upland positions, while R220XY425AK occurs in drainages and is influenced by a shallow water throughout the growing season.
F220XY455AK	**Maritime Forest Sandy Coastal Plain** This site may occur in association with site F220XY455AK on outwash plains. Both sites are poorly-drained with a year-round water table, however, site F220XY455AK is more productive and supports open Sitka spruce and lodgepole pine forests.
F220XY460AK	**Maritime Forest Gravelly Alluvial Plains** This site is associated with ecological site F220XY460AK on alluvial plains. Site R220XY425AK occurs in drainageways on alluvial plains while site F220XY460AK occurs on stream terraces, in higher topographic positions above these drainages. Site F220XY460AK is moderately well- to well-drained and supports a more productive plant community.

Similar sites

R220XY426AK	**Maritime Shrub Low Flood Plain** R220XY426AK is associated with larger streams and larger floodplains, resulting in more a complex plant community that varies with increased distance from and elevation above the stream channel.

R220XY444AK	**Maritime Scrub Gravelly Steep Drainageways** F220XY444AK occurs on steeper drainageways with better drainage and less flooding.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Alnus viridis ssp. sinuata* (2) *Salix sitchensis*
Herbaceous	Not specified

Physiographic features

This site occurs on drainageways associated with glacial outwash and alluvium on coastal plains. The site has small stream channels that flood occasionally . Small, closed depressions may pond with water on the surface for brief periods following flood events. The water table is typically within 30 inches of the soil surface throughout the growing season. Slopes range from 0 - 8% with elevations from 0 - 430 feet above sea level.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Dip
Landforms	(1) Coastal plain > Drainageway (2) Outwash plain > Drainageway
Runoff class	Medium
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	0–430 ft
Slope	0–5%
Water table depth	0–30 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Medium
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	0–430 ft
Slope	0–8%
Water table depth	0–30 in

Climatic features

Cloudy skies, moderate temperatures, and abundant rainfall characterize the temperate maritime climate of this area. Winter storms, accompanied by heavy rainfall at lower elevations and snow at higher elevations, are frequent. Moderate to strong, south and southeast winds are common before and during storms. The average annual precipitation is approximately 60 to 140 inches. The average annual snowfall ranges from about 30 to 70 inches along the coast, to as much as 200 inches at higher elevations (USDA 2006). Average annual temperatures are considerably warmer in the Southern portion of this area. The average annual temperature at lower elevations

ranges from about 37 degrees F (2.7 degrees C) in the northwest, to 46 degrees F (7.7 degrees C) in the southeast (USDA 2006). The average annual temperatures associated with lower elevation maritime vegetation is considerably warmer compared to higher elevation subalpine vegetation. The average frost-free period is about 105 to 140 days.

Table 4. Representative climatic features

Frost-free period (characteristic range)	95-142 days
Freeze-free period (characteristic range)	147-183 days
Precipitation total (characteristic range)	55-145 in
Frost-free period (actual range)	84-170 days
Freeze-free period (actual range)	119-218 days
Precipitation total (actual range)	35-172 in
Frost-free period (average)	120 days
Freeze-free period (average)	168 days
Precipitation total (average)	97 in

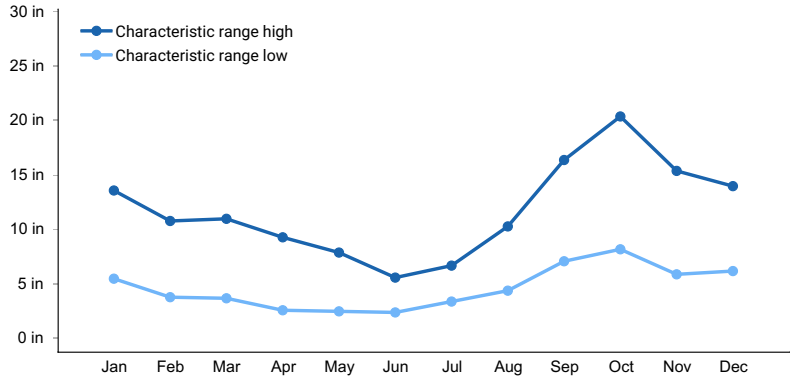


Figure 1. Monthly precipitation range

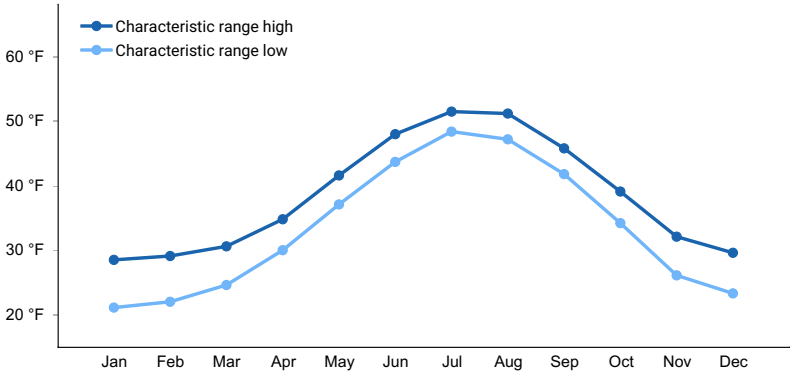


Figure 2. Monthly minimum temperature range

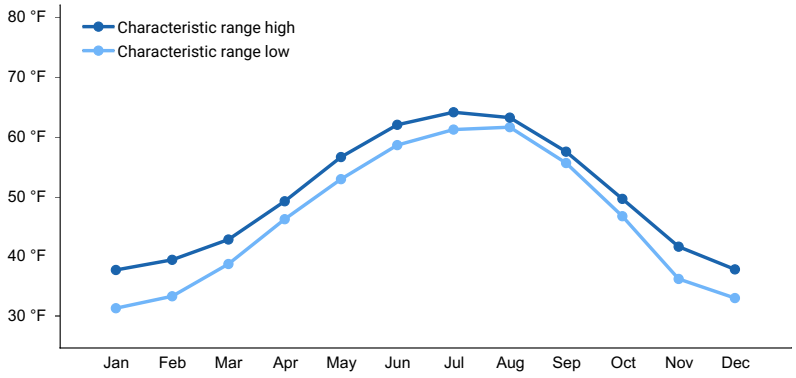


Figure 3. Monthly maximum temperature range

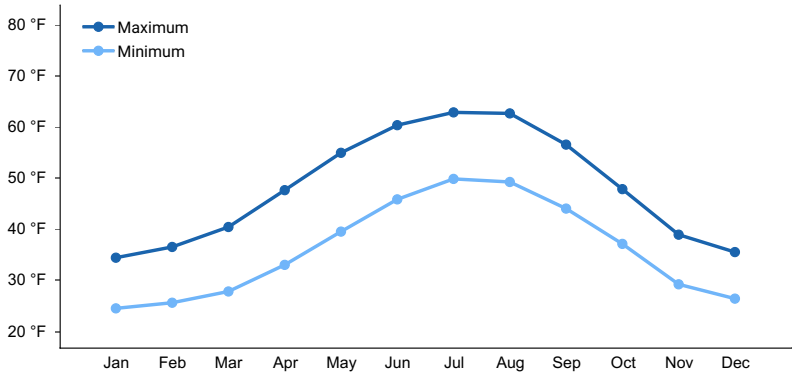


Figure 4. Monthly average minimum and maximum temperature

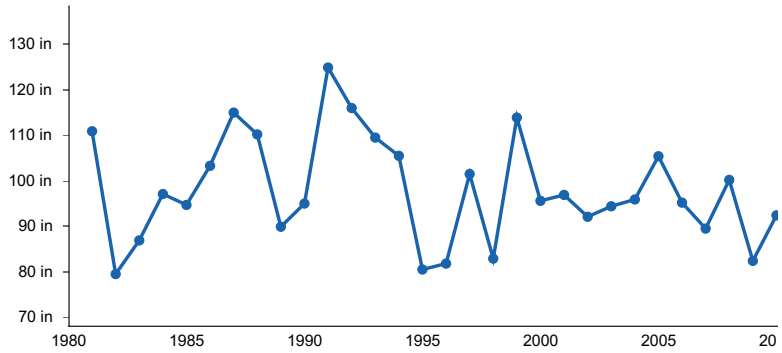


Figure 5. Annual precipitation pattern

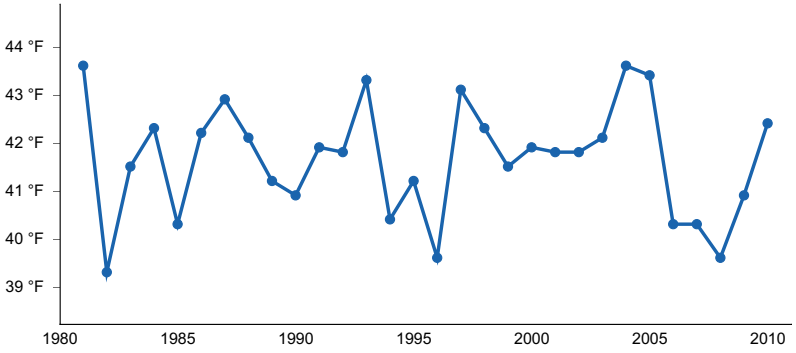


Figure 6. Annual average temperature pattern

Climate stations used

- (1) HAINES AP [USW00025323], Haines, AK
- (2) SELDOVIA AP [USW00025516], Homer, AK
- (3) MAIN BAY [USC00505604], Valdez, AK

- (4) CORDOVA M K SMITH AP [USW00026410], Cordova, AK
- (5) SITKA AIRPORT [USW00025333], Sitka, AK
- (6) JUNEAU INTL AP [USW00025309], Juneau, AK
- (7) ANNETTE ISLAND AP [USW00025308], Metlakatla, AK
- (8) PETERSBURG 1 [USW00025329], Petersburg, AK
- (9) KETCHIKAN INTL AP [USW00025325], Ketchikan, AK
- (10) PELICAN [USC00507141], Hoonah, AK
- (11) GUSTAVUS [USW00025322], Gustavus, AK
- (12) GLACIER BAY [USC00503294], Gustavus, AK
- (13) YAKUTAT STATE AP [USW00025339], Yakutat, AK
- (14) SKAGWAY AP [USW00025335], Skagway, AK

Influencing water features

The hydrology of this site is characterized by occasional freshwater flooding during spring runoff and other large storm events. High-intensity flooding events periodically remove vegetation, resulting in high cover of alder and willow with very low tree cover. Closed depressions are occasionally ponded for long durations.

Soil features

The soils of this site formed in deep alluvial or outwash deposits on small drainageways. Soil textures are stratified fine sandy loams to loamy sands, often with lenses of gravel and coarser textures in deeper soil horizons. A thin organic layer is common on the soil surface. Relatively small, closed depressions occur on this site and often have thick peat or mucky peat deposits as a result of long duration ponding. Drainage class ranges from poorly-drained to somewhat poorly-drained. This site has an aquic or aquic udic soil moisture regime.

Figure 7. Typical soil profile for Fingers soil component.

Table 5. Representative soil features

Parent material	(1) Alluvium (2) Outwash
Surface texture	(1) Fine sandy loam (2) Gravelly loamy coarse sand (3) Mucky peat (4) Peat
Family particle size	(1) Sandy-skeletal
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Moderately rapid to rapid
Depth to restrictive layer	60 in
Soil depth	60 in

Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	0.1–3 in
Calcium carbonate equivalent (0-40in)	0–3%
Clay content (0-20in)	3–5%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-10in)	3.2–8.3
Subsurface fragment volume <=3" (0-60in)	0–70%
Subsurface fragment volume >3" (0-60in)	0–15%

Table 6. Representative soil features (actual values)

Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Moderately rapid to very rapid
Depth to restrictive layer	60 in
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-10in)	0.1–3.5 in
Calcium carbonate equivalent (0-40in)	0–3%
Clay content (0-20in)	3–5%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-10in)	3.2–8.3
Subsurface fragment volume <=3" (0-60in)	0–70%
Subsurface fragment volume >3" (0-60in)	0–15%

Ecological dynamics

This site is associated with drainageways on lowland plains along the Gulf of Alaska. Until about 10,000 years ago, this area had many continental-scale ice sheets that advanced and retreated many times over millennia (Chapin 1994). The final advance of these glaciers occurred during the Little Ice Age, which peaked about 1750 AD. Since then, many glaciers have thinned and retreated inland, while numerous tidewater glaciers still exist in the area (Lawson 2015). The 250-year glacial retreat is attributed to less regional snowfall in the mountains, rising winter

temperatures, and decreased cloud cover and lower precipitation during the growing season in summer (Hall et al. 2003).

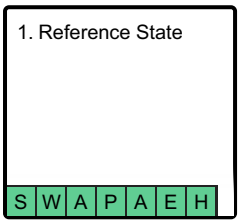
During the past 250 years of glacial retreat, meltwater transported and deposited a large amount of silt and sediment via numerous short, high-gradient rivers. Alluvial and colluvial fans and long footslopes are common in the valleys along the base of the mountains. This ecological site is found along the drainageways that dissect these fans and flats, which ultimately feed into the streams, rivers, and estuaries along the coastal plain.

Ecological site R220XY425AK supports a reference state composed of one community and occurs in small, closed depressions. This community is maintained by regular flood events that favor Sitka alder and hinder tree establishment and persistence. The reference community phase is a closed tall scrub community characterized by a dense assemblage of shrubs. Sitka alder (*Alnus viridis* ssp. sinuata), Sitka willow (*Salix sitchensis*), and salmonberry (*Rubus spectabilis*) are the dominant shrubs.

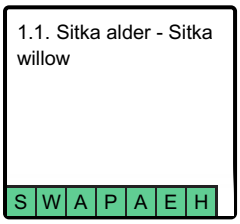
Browsing by moose on willow species was observed on this ecological site, but it does not appear to affect the ecological processes enough to alter the communities described.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference State

The reference state supports one community phase represented by a closed tall scrub community. This community is maintained by regular flooding, which favors alder and willow species.

Resilience management. This state has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

Dominant plant species

- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- salmonberry (*Rubus spectabilis*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- stink currant (*Ribes bracteosum*), shrub
- feltleaf willow (*Salix alaxensis*), shrub

Community 1.1
Sitka alder - Sitka willow

Figure 8. Typical plant community associated with community 1.1.

Community 1.1 is characterized by a closed tall scrub community. It is primarily composed of Sitka alder, salmonberry, Sitka willow, and feltleaf willow in the medium shrub stratum (3 to 10 feet in height). Stink currant, blueberries, and other shrubs may be abundant but not dominant. Diverse forbs make up a small proportion of the community. The ground cover is largely composed of litter and various moss species with minimal bare ground. Common moss species include Rhizomnium moss, splendid feathermoss, and Schreber's big red stem moss.

Resilience management. This community has been observed to be resilient and/or resistant to existing disturbance drivers, having no alternative states observed.

Dominant plant species

- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- feltleaf willow (*Salix alaxensis*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- salmonberry (*Rubus spectabilis*), shrub
- stink currant (*Ribes bracteosum*), shrub
- rhizomnium moss (*Rhizomnium glabrescens*), other herbaceous

Table 7. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0-2%
Grass/grasslike foliar cover	0%
Forb foliar cover	0%
Non-vascular plants	3-20%
Biological crusts	0%
Litter	3-85%
Surface fragments >0.25" and <=3"	0-30%
Surface fragments >3"	0-35%

Bedrock	0%
Water	0-80%
Bare ground	0-5%

Additional community tables

Table 8. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
bluejoint	CACA4	*Calamagrostis canadensis*	–	–	0–1
sedge	CAREX	*Carex*	–	–	0–1
Forb/Herb					
largeleaf avens	GEMA4	*Geum macrophyllum*	–	–	0–10
Aleutian violet	VILA6	*Viola langsdorffii*	–	–	0–10
deercabbage	NECR2	*Nephrophyllidium crista-galli*	–	–	0–3
bride's feathers	ARDI8	*Aruncus dioicus*	–	–	0–2
pioneer violet	VIGL	*Viola glabella*	–	–	0–2
twistedstalk	STREP3	*Streptopus*	–	–	0–2
threeleaf foamflower	TITR	*Tiarella trifoliata*	–	–	0–2
fireweed	CHAN9	*Chamerion angustifolium*	–	–	0–1
small enchanter's nightshade	CIAL	*Circaea alpina*	–	–	0–1
water parsely	OESA	*Oenanthe sarmentosa*	–	–	0–1
fragrant bedstraw	GATR3	*Galium triflorum*	–	–	0–1
Fern/fern ally					
spreading woodfern	DREX2	*Dryopteris expansa*	–	–	0–1
field horsetail	EQAR	*Equisetum arvense*	–	–	0–1
common ladyfern	ATFI	*Athyrium filix-femina*	–	–	0–1
Shrub/Subshrub					
Sitka willow	SASI2	*Salix sitchensis*	–	–	5–75
Sitka alder	ALVIS	*Alnus viridis ssp. sinuata*	–	–	25–65
stink currant	RIBR	*Ribes bracteosum*	–	–	0–45
salmonberry	RUSP	*Rubus spectabilis*	–	–	0–40
feltleaf willow	SAAL	*Salix alaxensis*	–	–	0–15
Menzies' burnet	SAME6	*Sanguisorba menziesii*	–	–	0–15
thimbleberry	RUPA	*Rubus parviflorus*	–	–	0–10
strawberryleaf raspberry	RUPE	*Rubus pedatus*	–	–	0–10
red huckleberry	VAPA	*Vaccinium parvifolium*	–	–	0–10
devilsclub	OPHO	*Oplopanax horridus*	–	–	0–5
oval-leaf blueberry	VAOV	*Vaccinium ovalifolium*	–	–	0–2
Tree					
balsam poplar	POBA2	*Populus balsamifera*	–	–	0–10
Nonvascular					
Schreber's big red stem moss	PLSC70	*Pleurozium schreberi*	–	–	0–10
splendid feather moss	HYSP70	*Hylocomium splendens*	–	–	0–10
rhizomnium moss	RHGL70	*Rhizomnium glabrescens*	–	–	0–7
goose neck moss	RHYTI2	*Rhytidiadelphus*	–	–	0–7
polytrichum moss	POLYT5	*Polytrichum*	–	–	0–5
sphagnum	SPHAG2	*Sphagnum*	–	–	0–5
calliergon moss	CALLI10	*Calliergon*	–	–	0–5

Inventory data references

All data currently reside in NASIS under the User Site IDs in the following table:

Other references

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Approval

Marji Patz, 3/10/2025

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	05/11/2025
Approved by	Marji Patz
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:

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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:**
