Ecological site F220XY432AK
Maritime Forest Gravelly Plain

Last updated: 3/10/2025
Accessed: 05/11/2025

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): 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.

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.

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 (non-soil) areas make up about 23 percent of the MLRA. The most common miscellaneous areas are avalanche chutes, rock outcrop, rubble land, beaches, river wash, 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 the lower elevations. Due to warmer temperatures, western red cedar and Alaska cedar are more prevalent in the southern part of the 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. The transition to subalpine and alpine communities typically occurs at elevations between 1500 to 3000 feet (Boggs et al. 2010, Carstensen 2007, Martin et al. 1995), which characterize the vegetation of the Southern Alaska Coastal Mountains area.

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. 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 outwash plains, outwash deltas, and glacial valley floors. Flooding is very rare and ponding is not known to occur on these well drained soils. The soil texture is sandy to loamy-skeletal and a water table is typically greater than 20 inches year-round. This site occurs at elevations from sea level to 330 feet, and slopes are typically 0-20%.

Five plant communities occur on this site and are a function of primary succession coupled with disturbance dynamics driven by windthrow events. The reference plant community phase is characterized as open needleleaf spruce forest. It is composed primarily of mature Sitka spruce and western hemlock with an extensive feathermoss understory. Common understory species include Sitka alder, oval-leaf blueberry, strawberryleaf raspberry, sidebells wintergreen, heartleaf twayblade, western rattlesnake plantain, stairstep moss, Schreber's big red stem moss, and goose neck moss.

Associated sites

F220XY435AK	**Maritime Forest Loamy Wet Plains** This ecological site occurs in close proximity to F220XY432AK on glacial till plains, however F220XY435AK occurs on poorly-drained soils with a high water table, resulting in unfavorable growing conditions.
R220XY436AK	**Maritime Graminoid Loamy Wet Plain** This ecological site occurs in close proximity to F220XY432AK on glacial valley floors. The water table on site R220XY436AK occurs within 4 inches of the surface throughout the growing season resulting in ponded conditions and is dominated by sedges.

Similar sites

F220XY427AK	**Maritime Forest Gravelly High Floodplain** Ecological site F220XY427AK also supports a Sitka spruce forest, but is subject to a flood regime associated with active flood plains.
W1220X433	**Maritime Forest Loamy Slopes** Ecological sites F220XY433AK occurs on mountain slopes.
F220XY435AK	**Maritime Forest Loamy Wet Plains** Ecological site F220XY435AK supports a similar plant community, but occurs on wetter soils and exhibits lower levels of biomass production.
F220XY460AK	**Maritime Forest Gravelly Alluvial Plains** Ecological site F220XY460AK also supports a closed Sitka spruce forest that is controlled by windthrow events, but occurs on alluvial plains and terraces.
F220XY466AK	**Maritime Forest Sandy Plains Eolian** Ecological site F220XY466AK supports a closed Sitka spruce forest but soils are of eolian origin.

F220XY468AK	**Maritime Forest Loamy Slopes Warm** Ecological site F220XY468AK supports a similar plant community but occurs on steep slopes with paralithic contact around 20-40 inches.

Table 1. Dominant plant species

Tree	(1) *Picea sitchensis* (2) *Tsuga heterophylla*
Shrub	(1) *Vaccinium*
Herbaceous	(1) *Listera cordata* (2) *Hylocomium splendens*

Physiographic features

This site occurs on outwash plains, outwash deltas, and glacial valley floors. Flooding is very rare and ponding does not occur. The water table occurs at more than 20 inches year-round and soil textures are sandy to loamy-skeletal. Slopes commonly range from 0-15% but can reach upwards of 45%. Elevation typically ranges from sea level to 325 feet.

Table 2. Representative physiographic features

Landforms	(1) Outwash plain > Outwash plain (2) Mountain valleys or canyons > Glacial-valley floor (3) Outwash plain > Outwash delta
Runoff class	Medium
Flooding frequency	Very rare
Ponding frequency	None
Elevation	0–325 ft
Slope	0–15%
Water table depth	0–20 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Medium
Flooding frequency	None to very rare
Ponding frequency	None
Elevation	0–330 ft
Slope	0–45%
Water table depth	0–20 in

Climatic features

Cloudy skies, moderate temperatures, and abundant rainfall characterize the temperate maritime climate of this site. Frequent winter storms may consist of snow or heavy rainfall. Moderate to strong winds from the south and southeast are common before and during storms throughout the year. Annual precipitation ranges from 44-94 inches, and annual snowfall ranges from 30-70 inches along the coast and up to 200 inches at higher elevations (USDA 2006). The average annual temperature at lower elevations ranges from about 38-43 degrees F (3-6 degrees C). The frost-free period ranges from about 90-140 days, and the freeze-free period ranges from about 125-180 days.

Table 4. Representative climatic features

Frost-free period (characteristic range)	89-139 days
Freeze-free period (characteristic range)	126-181 days
Precipitation total (characteristic range)	44-94 in
Frost-free period (actual range)	77-147 days
Freeze-free period (actual range)	116-184 days
Precipitation total (actual range)	31-140 in
Frost-free period (average)	110 days
Freeze-free period (average)	153 days
Precipitation total (average)	74 in

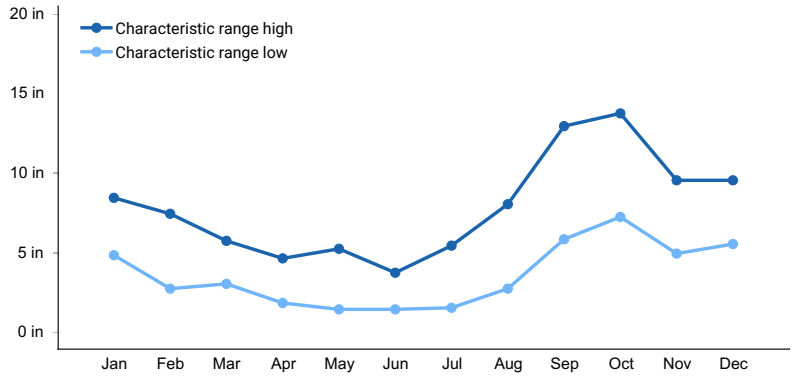


Figure 1. Monthly precipitation range

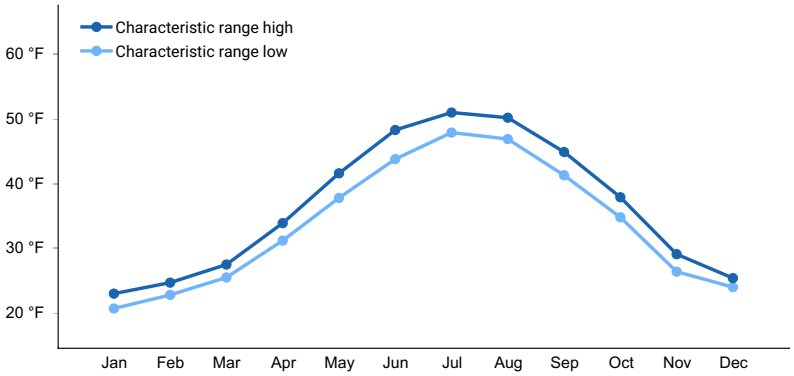


Figure 2. Monthly minimum temperature range

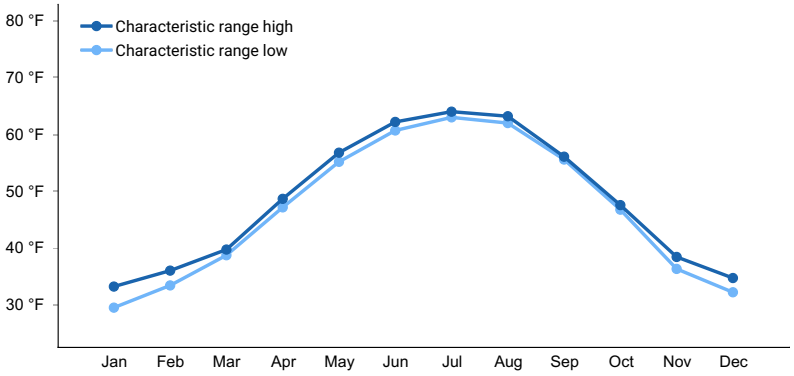


Figure 3. Monthly maximum temperature range

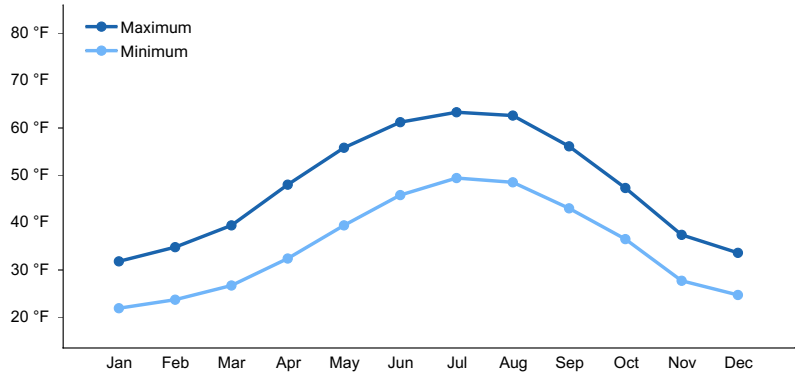


Figure 4. Monthly average minimum and maximum temperature

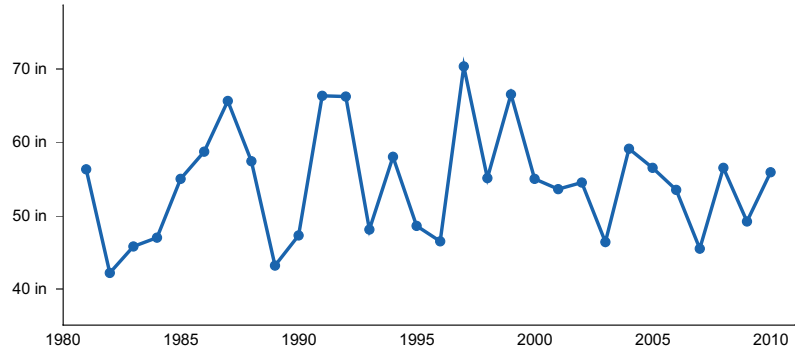


Figure 5. Annual precipitation pattern

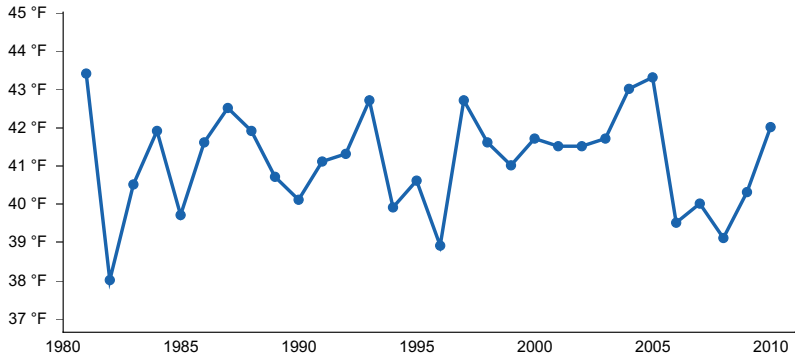


Figure 6. Annual average temperature pattern

Climate stations used

- (1) GUSTAVUS [USW00025322], Gustavus, AK
- (2) GLACIER BAY [USC00503294], Gustavus, AK
- (3) YAKUTAT STATE AP [USW00025339], Yakutat, AK
- (4) SKAGWAY AP [USW00025335], Skagway, AK
- (5) HAINES AP [USW00025323], Haines, AK
- (6) SELDOVIA AP [USW00025516], Homer, AK
- (7) MAIN BAY [USC00505604], Valdez, AK
- (8) CORDOVA M K SMITH AP [USW00026410], Cordova, AK
- (9) SITKA AIRPORT [USW00025333], Sitka, AK
- (10) JUNEAU INTL AP [USW00025309], Juneau, AK
- (11) ANNETTE ISLAND AP [USW00025308], Metlakatla, AK
- (12) PETERSBURG 1 [USW00025329], Petersburg, AK
- (13) KETCHIKAN INTL AP [USW00025325], Ketchikan, AK
- (14) PELICAN [USC00507141], Hoonah, AK

Influencing water features

This site occurs on outwash plains and deltas where flooding is very rare. Most of the plant-available soil moisture enters the system as precipitation.

Soil features

Soils are formed in very deep glacial outwash and gravelly till occurring on glacial-outwash coastal plains directly adjacent to mountainous terrain. Soil textures are sandy to coarse-loamy or loamy-skeletal. The soil moisture regime is udic to aquic udic. Flooding very rarely occurs and ponding is not known to occur on these well drained soils.

Figure 7. Typical soil profile associated with Fossil soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 8. Typical soil profile associated with Geikie soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 9. Typical soil profile associated with Gustavus soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 10. Typical soil profile associated with Ibach soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 11. Typical soil profile associated with Tyeen soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Figure 12. Typical soil profile associated with Scidmore soils in Glacier Bay National Park and Preserve-Gustavus Area, Alaska.

Table 5. Representative soil features

Parent material	(1) Outwash (2) Till
Surface texture	(1) Fine sandy loam (2) Medium gravelly coarse sand (3) Gravelly sandy clay (4) Very gravelly sandy loam
Family particle size	(1) Sandy (2) Loamy-skeletal

Drainage class	Well drained
Permeability class	Moderate to moderately 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)	0.2–0.5 in
Calcium carbonate equivalent (0-40in)	0%
Clay content (0-20in)	1–15%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	3.8–8.7
Subsurface fragment volume <=3" (0-60in)	31–69%
Subsurface fragment volume >3" (0-60in)	0–17%

Table 6. Representative soil features (actual values)

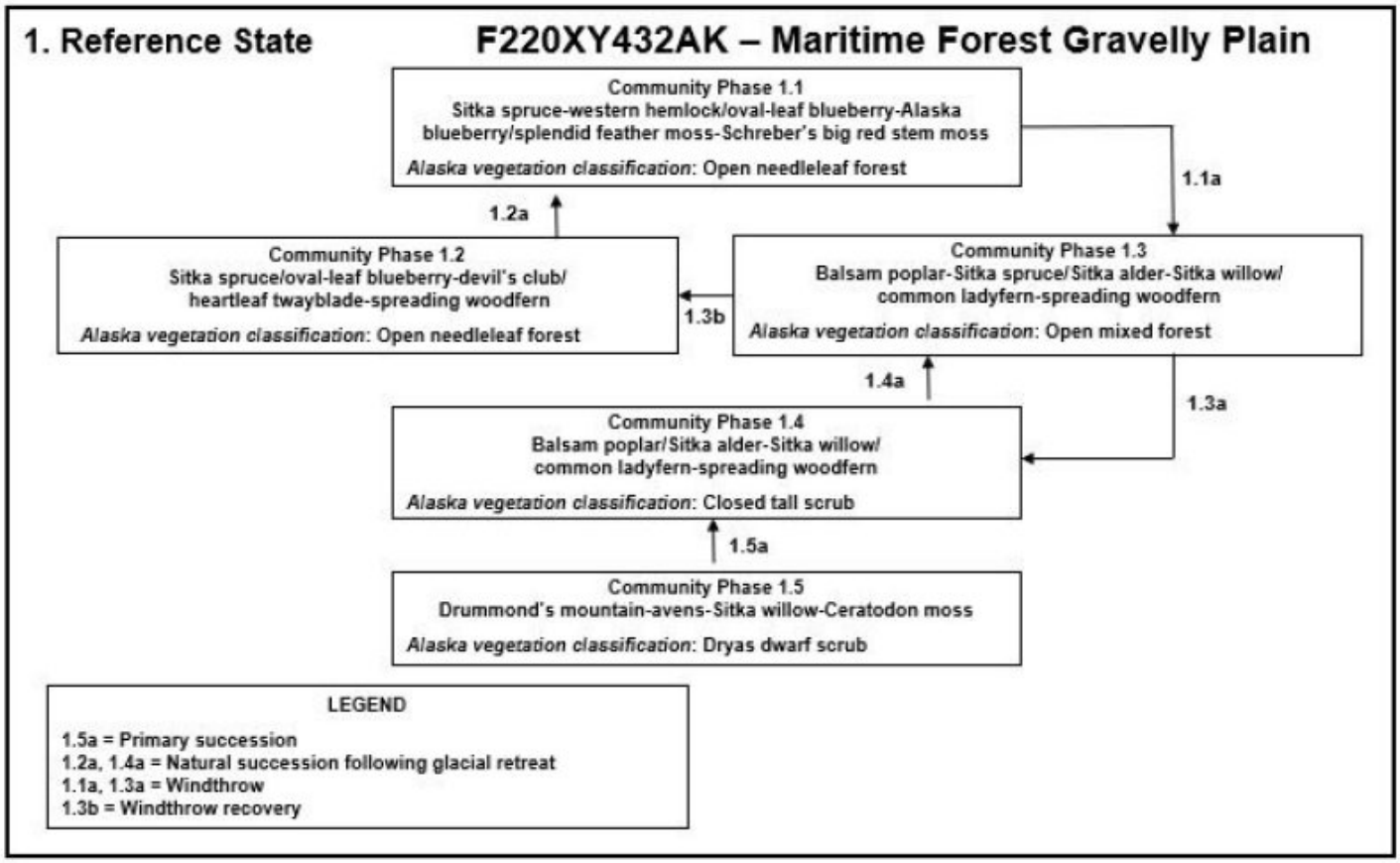
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	39–60 in
Soil depth	60 in
Surface fragment cover <=3"	0–27%
Surface fragment cover >3"	0–5%
Available water capacity (0-10in)	0.1–1.6 in
Calcium carbonate equivalent (0-40in)	0–5%
Clay content (0-20in)	1–15%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	3.7–8.7
Subsurface fragment volume <=3" (0-60in)	0–69%
Subsurface fragment volume >3" (0-60in)	0–28%

Ecological dynamics

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. Drainageways dissect these fans and flats, which ultimately feed into the streams, rivers, and estuaries along the coastal plain.

The reference plant community phase for ecological site F220XY432AK is characterized as open needleleaf spruce forest. It is composed primarily of mature Sitka spruce and western hemlock with an extensive feathermoss understory. Common understory species include Sitka alder, oval-leaf blueberry, strawberryleaf raspberry, sidebells wintergreen, heartleaf twayblade, western rattlesnake plantain, stairstep moss, Schreber's big red stem moss, and goose neck moss. Windthrow is common in certain areas throughout Glacier Bay. High wind events create naturally occurring gaps in the canopy by uprooting or snapping off mature trees. Windthrow facilitates a community phase transition from community phase 1.1 to community phase 1.3 or 1.4.

State and transition model



State 1
Reference State

The reference state supports five community phases, in which the reference community phase is represented by an open needleleaf forest. The presence of these and related communities are dictated temporally and spatially by the amount of time passed since the outwash plains were subject to glaciation and windthrow. All community phases in this report are characterized using the Alaska Vegetation Classification System (Viereck et al. 1992).

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 spruce (*Picea sitchensis*), tree
- western hemlock (*Tsuga heterophylla*), tree
- oval-leaf blueberry (*Vaccinium ovalifolium*), shrub
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous

Community 1.1
Sitka spruce-western hemlock/oval-leaf blueberry-Alaska blueberry/splendid feather moss-Schreber’s big red stem moss

Figure 13. Typical plant community associated with community 1.1

The reference plant community phase is characterized as open needleleaf spruce forest (Viereck et al. 1992). It is composed primarily of mature Sitka spruce and western hemlock with extensive feathermoss coverage. Common understory species include Sitka alder, oval-leaf blueberry, Alaska blueberry, strawberryleaf raspberry, sidebells wintergreen, heartleaf twayblade, western rattlesnake plantain, splendid feather moss, Schreber’s big red stem, and goose neck moss. The vegetative stratum that characterized this community phase are tall trees, medium shrubs, and medium forb.

Dominant plant species

- Sitka spruce (*Picea sitchensis*), tree
- western hemlock (*Tsuga heterophylla*), tree
- oval-leaf blueberry (*Vaccinium ovalifolium*), shrub
- Alaska blueberry (*Vaccinium alaskaense*), shrub
- heartleaf twayblade (*Listera cordata*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous

Table 7. Soil surface cover

Tree basal cover	0-80%
Shrub/vine/liana basal cover	0-77%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-50%

Non-vascular plants	10-100%
Biological crusts	0-100%
Litter	5-30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Community 1.2
Sitka spruce / oval-leaf blueberry - devil’s club / heartleaf twayblade-spreading woodfern

Figure 14. Typical plant community associated with community 1.2.

Community 1.2 is characterized by an open needleleaf forest (Viereck et al. 1992) that is primarily composed of mature Sitka spruce. Balsam poplar and western hemlock are present but in low densities. In this phase, balsam poplar is fading out due to stem exclusion while western hemlock is slowly establishing codominance with Sitka spruce. Common understory species include Sitka alder, oval-leaf blueberry, devil’s club, heartleaf twayblade, and spreading woodfern. The vegetative stratum that characterized this community phase is tall trees, medium shrubs, and medium forbs. The ground cover consists of feathermoss species, large downed woody debris, and litter. Common feathermoss species include stairstep moss and Schreber’s big red stem.

Dominant plant species

- Sitka spruce (*Picea sitchensis*), tree
- oval-leaf blueberry (*Vaccinium ovalifolium*), shrub
- devilsclub (*Oplopanax horridus*), shrub

Table 8. Soil surface cover

Tree basal cover	0-85%
Shrub/vine/liana basal cover	0-80%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-50%
Non-vascular plants	10-100%
Biological crusts	0%
Litter	5-75%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%

Bedrock	0%
Water	0%
Bare ground	0%

Community 1.3
Balsam poplar-Sitka spruce/Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Figure 15. Typical plant community associated with community 1.3

Community phase 1.3 is characterized by an open mixed forest with balsam poplar the most common overstory species. Sitka spruce is common, but generally as young, regenerating trees. Common understory species include Sitka alder, Sitka willow, salmonberry, devil's club, common ladyfern, and spreading woodfern. The vegetative stratum that characterizes this community phase is medium trees, medium shrubs, and medium forbs. The ground cover is largely herbaceous litter with low coverages of feathermoss.

Dominant plant species

- balsam poplar (*Populus balsamifera*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- Schreber's big red stem moss (*Pleurozium schreberi*), other herbaceous

Table 9. Soil surface cover

Tree basal cover	0-65%
Shrub/vine/liana basal cover	32-90%
Grass/grasslike basal cover	0-2%
Forb basal cover	10-38%
Non-vascular plants	0-90%
Biological crusts	0%
Litter	15-95%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Community 1.4

Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Community phase 1.4 is characterized as closed tall scrub (Viereck et al. 1992). It consists of a canopy of dense shrubs with a mosaic of forb species and significant litter coverage. Common species include Sitka alder, Sitka willow, salmonberry, Barclay's willow, common ladyfern, and spreading woodfern. The vegetative stratum that characterizes this community is tall shrub and medium forb. The ground cover is largely herbaceous litter with some feathermoss species.

Dominant plant species

- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- spreading woodfern (*Dryopteris expansa*), other herbaceous
- common ladyfern (*Athyrium filix-femina*), other herbaceous

Table 10. Soil surface cover

Tree basal cover	0-40%
Shrub/vine/liana basal cover	0-100%
Grass/grasslike basal cover	0-15%
Forb basal cover	0-2%
Non-vascular plants	0-60%
Biological crusts	0%
Litter	45-85%
Surface fragments >0.25" and <=3"	0-10%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Community 1.5
Drummond's mountain-avens–Sitka willow / Ceratodon moss

Figure 16. Typical plant community associated with community 1.5

Community 1.5 is in the pioneering stage following deglaciation and is characterized as Dryas dwarf scrub (Viereck et al. 1992). Drummond's mountain-avens is most common. Other species include Sitka willow, Sitka alder, western pearly everlasting, and alpine milkvetch. The vegetative stratum for this community phase is low shrubs. The ground cover is rock and litter. Some areas are bare.

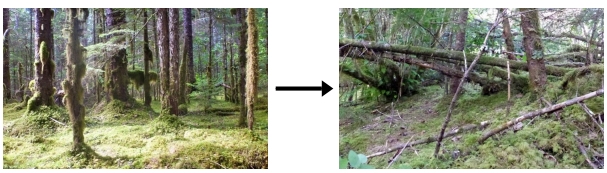
Dominant plant species

- Drummond's mountain-avens (*Dryas drummondii*), shrub
- Sitka willow (*Salix sitchensis*), shrub
- ceratodon moss (*Ceratodon purpureus*), other herbaceous

Table 11. Soil surface cover

Tree basal cover	0-10%
Shrub/vine/liana basal cover	0-60%
Grass/grasslike basal cover	0%
Forb basal cover	0-25%
Non-vascular plants	1-75%
Biological crusts	0%
Litter	5-50%
Surface fragments >0.25" and <=3"	0-75%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-10%

Pathway 1.1a
Community 1.1 to 1.3



Sitka spruce-western hemlock/oval-leaf blueberry-Alaska blueberry/splendid feather moss-Schreber's big red stem moss

Balsam poplar-Sitka spruce/Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Windthrow event damages or removes overstory species.

Pathway 1.2a
Community 1.2 to 1.1

Sitka spruce / oval-leaf blueberry - devil's club / heartleaf twayblade-spreading woodfern

Sitka spruce-western hemlock/oval-leaf blueberry-Alaska blueberry/splendid feather moss-Schreber's big red stem moss

Succession following glacial retreat or windthrow event

Pathway 1.3b
Community 1.3 to 1.2

Balsam poplar-Sitka spruce/Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Sitka spruce / oval-leaf blueberry - devil's club / heartleaf twayblade-spreading woodfern

Windthrow recovery. Sitka spruce regenerates and becomes a dominant component of the overstory community.

Pathway 1.3a
Community 1.3 to 1.4

Balsam poplar-Sitka spruce/Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Windthrow event damages or removes overstory species.

Pathway 1.4a
Community 1.4 to 1.3

Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Balsam poplar-Sitka spruce/Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Natural succession following glacial retreat or windthrow event

Pathway 1.5a
Community 1.5 to 1.4

Drummond's mountain-avens–Sitka willow / Ceratodon moss

Sitka alder-Sitka willow/common ladyfern-spreading woodfern

Primary succession following glacial retreat

Additional community tables

Table 12. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 13. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
Piper's woodrush	LUPI2	*Luzula piperi*	–	–	0–1
bluegrass	POA	*Poa*	–	–	0–1
longawn sedge	CAMA11	*Carex macrochaeta*	–	–	0–1
sedge	CAREX	*Carex*	–	–	0–1
bluebell bellflower	CARO2	*Campanula rotundifolia*	–	–	0–1
tufted hairgrass	DECE	*Deschampsia cespitosa*	–	–	0–1
Forb/Herb					
western rattlesnake plantain	GOOB2	*Goodyera oblongifolia*	–	–	0–35
false lily of the valley	MADI	*Maianthemum dilatatum*	–	–	0–20
heartleaf twayblade	LICO6	*Listera cordata*	–	–	0–20
single delight	MOUN2	*Moneses uniflora*	–	–	0–10
sidebells wintergreen	ORSE	*Orthilia secunda*	–	–	0–10
twistedstalk	STREP3	*Streptopus*	–	–	0–10
liverleaf wintergreen	PYAS	*Pyrola asarifolia*	–	–	0–5
stiff clubmoss	LYAN2	*Lycopodium annotinum*	–	–	0–5
field horsetail	EQAR	*Equisetum arvense*	–	–	0–5
horsetail	EQUIS	*Equisetum*	–	–	0–5
fernleaf goldthread	COAS	*Coptis aspleniifolia*	–	–	0–5
northwestern twayblade	LICA10	*Listera caurina*	–	–	0–2
claspleaf twistedstalk	STAM2	*Streptopus amplexifolius*	–	–	0–2
threeleaf foamflower	TITR	*Tiarella trifoliata*	–	–	0–2
small twistedstalk	STST3	*Streptopus streptopoides*	–	–	0–1
foamflower	TIARE	*Tiarella*	–	–	0–1
Canadian burnet	SACA14	*Sanguisorba canadensis*	–	–	0–1
wintergreen	PYROL	*Pyrola*	–	–	0–1
western rattlesnakeroot	PRAL	*Prenanthes alata*	–	–	0–1
American skunkcabbage	LYAM3	*Lysichiton americanus*	–	–	0–1
clubmoss	LYCOP2	*Lycopodium*	–	–	0–1
Scottish licorice-root	LISC3	*Ligusticum scoticum*	–	–	0–1

sweetcicely	OSBE	*Osmorhiza berteroi*	–	–	0–1
sweetroot	OSMOR	*Osmorhiza*	–	–	0–1
pinesap	MOHY3	*Monotropa hypopitys*	–	–	0–1
threeleaf goldthread	COTR2	*Coptis trifolia*	–	–	0–1
northern groundcone	BORO	*Boschniakia rossica*	–	–	0–1
fireweed	CHAN9	*Chamerion angustifolium*	–	–	0–1
bride's feathers	ARDI8	*Aruncus dioicus*	–	–	0–1
variegated scouringrush	EQVA	*Equisetum variegatum*	–	–	0–1
beach strawberry	FRCH	*Fragaria chiloensis*	–	–	0–1
water horsetail	EQFL	*Equisetum fluviatile*	–	–	0–1
common cowparsnip	HEMA80	*Heracleum maximum*	–	–	0–1
fringed willowherb	EPCI	*Epilobium ciliatum*	–	–	0–1
saxifrage	SAXIF	*Saxifraga*	–	–	–
Fern/fern ally					
western oakfern	GYDR	*Gymnocarpium dryopteris*	–	–	0–6
spreading woodfern	DREX2	*Dryopteris expansa*	–	–	0–6
common ladyfern	ATFI	*Athyrium filix-femina*	–	–	0–5
ladyfern	ATHYR	*Athyrium*	–	–	0–1
deer fern	BLSP	*Blechnum spicant*	–	–	0–1
brittle bladderfern	CYFR2	*Cystopteris fragilis*	–	–	0–1
northern hollyfern	POLO4	*Polystichum lonchitis*	–	–	0–1
Shrub/Subshrub					
oval-leaf blueberry	VAOV	*Vaccinium ovalifolium*	–	–	0–70
devilsclub	OPHO	*Oplopanax horridus*	–	–	0–30
strawberryleaf raspberry	RUPE	*Rubus pedatus*	–	–	0–25
salmonberry	RUSP	*Rubus spectabilis*	–	–	0–20
Sitka alder	ALVIS	*Alnus viridis ssp. sinuata*	–	–	0–20
bunchberry dogwood	COCA13	*Cornus canadensis*	–	–	0–20
green alder	ALVI5	*Alnus viridis*	–	–	0–17
blueberry	VACCI	*Vaccinium*	–	–	0–15
red huckleberry	VAPA	*Vaccinium parvifolium*	–	–	0–10
pipsissewa	CHUM	*Chimaphila umbellata*	–	–	0–5
rusty menziesia	MEFE	*Menziesia ferruginea*	–	–	0–5
Aleutian mountainheath	PHAL4	*Phyllodoce aleutica*	–	–	0–1
stink currant	RIBR	*Ribes bracteosum*	–	–	0–1
prickly currant	RILA	*Ribes lacustre*	–	–	0–1
trailing black currant	RILA3	*Ribes laxiflorum*	–	–	0–1
blackberry	RUBUS	*Rubus*	–	–	0–1
willow	SALIX	*Salix*	–	–	0–1
red elderberry	SARA2	*Sambucus racemosa*	–	–	0–1
Lapland cornel	COSU4	*Cornus suecica*	–	–	0–1
squashberry	VIED	*Viburnum edule*	–	–	0–1
red baneberry	ACRU2	*Actaea rubra*	–	–	0–1
dwarf mistletoe	ARCEU	*Arceuthobium*	–	–	0–1

dwarf bilberry	VACE	*Vaccinium cespitosum*	–	–	–
Sitka willow	SASI2	*Salix sitchensis*	–	–	–
russet buffaloberry	SHCA	*Shepherdia canadensis*	–	–	–
western mountain ash	SOSI2	*Sorbus sitchensis*	–	–	–
Tree					
western hemlock	TSHE	*Tsuga heterophylla*	–	–	2–80
mountain hemlock	TSME	*Tsuga mertensiana*	–	–	0–31
balsam poplar	POBA2	*Populus balsamifera*	–	–	0–5
Nonvascular					
splendid feather moss	HYSP70	*Hylocomium splendens*	–	–	0–90
Schreber's big red stem moss	PLSC70	*Pleurozium schreberi*	–	–	0–80
goose neck moss	RHYTI2	*Rhytidiadelphus*	–	–	0–60
rhizomnium moss	RHGL70	*Rhizomnium glabrescens*	–	–	0–30
goose neck moss	RHLO70	*Rhytidiadelphus loreus*	–	–	0–25
rough goose neck moss	RHTR70	*Rhytidiadelphus triquetrus*	–	–	0–20
knights plume moss	PTCR70	*Ptilium crista-castrensis*	–	–	0–20
dicranum moss	DICRA8	*Dicranum*	–	–	0–20
tree climacium moss	CLDE70	*Climacium dendroides*	–	–	0–10
rhizomnium moss	RHIZO2	*Rhizomnium*	–	–	0–10
rhytidium moss	RHYTI4	*Rhytidium*	–	–	0–10
beard lichen	USNEA2	*Usnea*	–	–	0–10
polytrichum moss	POLYT5	*Polytrichum*	–	–	0–10
claopodium moss	CLAOP	*Claopodium*	–	–	0–6
claopodium moss	CLCR4	*Claopodium crispifolium*	–	–	0–5
hookeria moss	HOLU	*Hookeria lucens*	–	–	0–5
tube lichen	HYEN60	*Hypogymnia enteromorpha*	–	–	0–5
tube lichen	HYPOG2	*Hypogymnia*	–	–	0–5
felt lichen	PELTI2	*Peltigera*	–	–	0–5
sphagnum	SPHAG2	*Sphagnum*	–	–	0–5
racomitrium moss	RACOM	*Racomitrium*	–	–	0–5
dicranum moss	DISC71	*Dicranum scoparium*	–	–	0–3
hypnum moss	HYPNU2	*Hypnum*	–	–	0–2
lung lichen	LOBAR2	*Lobaria*	–	–	0–2
lung lichen	LOLI60	*Lobaria linita*	–	–	0–1
lung lichen	LOPU60	*Lobaria pulmonaria*	–	–	0–1
peppermint drop lichen	ICER	*Icmadophila ericetorum*	–	–	0–1
peppermint drop lichen	ICMAD	*Icmadophila*	–	–	0–1
isothecium moss	ISOTH	*Isothecium*	–	–	0–1
undulate plagiothecium moss	PLUN4	*Plagiothecium undulatum*	–	–	0–1
bullseye lichen	PLACO	*Placopsis*	–	–	0–1
kidney lichen	NEPHR3	*Nephroma*	–	–	0–1
felt lichen	PEAP60	*Peltigera aphthosa*	–	–	0–1
hookeria moss	HOOKE	*Hookeria*	–	–	0–1
cup lichen	CLSC60	*Cladonia scabriuscula*			0–1

cup lichen	CLSC60	*Cladonia scabriuscula*	–	–	0–1
cup lichen	CLSQ60	*Cladonia squamosa*	–	–	0–1
reindeer lichen	CLADI3	*Cladina*	–	–	0–1
cup lichen	CLADO3	*Cladonia*	–	–	0–1
horsehair lichen	BRYOR2	*Bryoria*	–	–	0–1

Table 14. Community 1.2 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 15. Community 1.2 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 16. Community 1.3 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 17. Community 1.3 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 18. Community 1.4 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 19. Community 1.4 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 20. Community 1.5 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 21. Community 1.5 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Inventory data references

NASIS ID Plant community
13NP00304 Community 1.1
13NP00602 Community 1.1
13TD00904 Community 1.1
13NP00101 Community 1.1
13NP00102 Community 1.1
13NP01401 Community 1.1
13NP05702 Community 1.1
2015AK105124 Community 1.1
2015AK105125 Community 1.1
14DM01101 Community 1.1
14JP02301 Community 1.1
14JP02401 Community 1.1
14JP02404 Community 1.1
14JP02503 Community 1.1

14NP02202 Community 1.1
14NP02203 Community 1.1
14NP02702 Community 1.1
14NP02703 Community 1.1
2015AK105101 Community 1.1
2015AK105103 Community 1.1
2015AK105109 Community 1.1
2015AK105119 Community 1.1
2015AK105120 Community 1.1
2015AK105121 Community 1.1
14DM01202 Community 1.1
14NP02201 Community 1.1
14DM01701 Community 1.1
14JP02102 Community 1.1
13NP01403 Community 1.1
13NP05201 Community 1.1
13NP05701 Community 1.1
13NP05703 Community 1.1
13TD01501 Community 1.1
13TD01503 Community 1.1
14NP00901 Community 1.1
14NP01702 Community 1.1
14NP01704 Community 1.1
2015AK105003 Community 1.1
13TD01601 Community 1.2
13TD01603 Community 1.2
14NP01701 Community 1.2
14DM01301 Community 1.2
13DM01204 Community 1.2
13DM02104 Community 1.2
13NP01501 Community 1.2
13NP03701 Community 1.2
13NP03702 Community 1.2
14JP02402 Community 1.2
14NP02704 Community 1.2
2015AK105102 Community 1.2
2015AK105104 Community 1.2
2015AK105110 Community 1.2
2015AK105118 Community 1.2
14DM01204 Community 1.2
14JP02104 Community 1.2
13NP02301 Community 1.2
13NP03101 Community 1.2
13NP03102 Community 1.2
13NP05202 Community 1.2
13TD01502 Community 1.2
13TD06901 Community 1.2
13NP01201 community 1.3
14DM01801 community 1.3
14DM01302 community 1.3
14JP02403 community 1.3
14NP02701 community 1.3
13NP01605 community 1.3
13NP02302 community 1.3
13TD01301 community 1.3
13TD02001 community 1.3
13TD02403 community 1.3
13TD02702 community 1.3

13TD02703 community 1.3
13TD02704 community 1.3
13NP02401 Community 1.4
13NP02405 Community 1.4
13NP02802 Community 1.4
13NP02803 Community 1.4
13NP03104 Community 1.4
13NP04101 Community 1.4
13NP05301 Community 1.4
13NP05303 Community 1.4
13NP05304 Community 1.4
13TD01101 Community 1.4
13TD01801 Community 1.4
13TD01802 Community 1.4
13TD02101 Community 1.4
13TD02102 Community 1.4
13TD02103 Community 1.4
13TD03405 Community 1.4
13TD06803 Community 1.4
14DM01802 Community 1.4
13NP01601 Community 1.4
13NP01602 Community 1.4
13NP02801 Community 1.4
13NP05302 Community 1.4
13TD01504 Community 1.4
13TD02402 Community 1.4
13TD02601 Community 1.4
13TD06101 Community 1.4
13TD06501 Community 1.4
13NP01603 community 1.5
13NP01803 community 1.5
13NP04201 community 1.5

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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:**

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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:**
