Ecological site AX001X04X003
Mesic Aquic Forest

Last updated: 9/09/2023
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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): 001X–Northern Pacific Coast Range, Foothills, and Valleys

This long and narrow resource area stretches along the Pacific Border Province of the Pacific Mountain System in Oregon and Washington. The area is bounded by the Olympic Mountains on the north and the Klamath Mountains on the south. Most of the area consists of hills and low mountains with gentle to steep slopes. The parent materials are composed primarily of young Tertiary sedimentary rocks with some minor volcanic rocks. Glacial till and outwash deposits are found in the northern half of the area within Washington. In the far southern portion of the area, near the Klamath Mountains, the sedimentary rocks are older and some have been metamorphosed. The average annual precipitation ranges from 60 to 200 inches, increasing with elevation.
The dominant soil orders in this MLRA are Andisols, Inceptisols, and Ultisols. Soil depth ranges from shallow to very deep. While most soils in the area are well drained and occur on foothills, mountain slopes and ridges, floodplain and depressional soils can range from well drained to very poorly drained. Soil textures are typically medial, loamy, or clayey. The dominant soils in the area have a mesic or frigid soil temperature regime and a udic soil moisture regime; however, soils with an aquic soil moisture regime or cryic soil temperature regime do occur.

LRU notes

The Southern Pacific Coast Range land resource unit (LRU 4) of MLRA 1 is located in central to southern Oregon State. The LRU extends from the Siletz River to the Rogue River and is bounded on the west by MLRA 4a Sitka Spruce Belt and MLRA 2 Willamette and Puget Sound Valleys to the east. Several major rivers carved valleys through the landscape depositing more recent alluvium. These include the Alsea, Coos, Coquille, Green, Yachats, Siletz, Siuslaw, Umpqua, and Rogue Rivers.

Ecological site concept

This ecological site is found on the western Coast Range in the Pacific Northwest from central to southern Oregon. It is located at low elevations (less than 1500 ft.) with abundant precipitation. The site is strongly influenced by physiography and hydrology, which provide rare and unique habitats in the coastal range. It consists of forested wetlands in depressions, on marine terraces and relatively flat earthflows, and in seeps of mountain slopes that have a seasonal high water table.
The most common overstory species are western hemlock (Tsuga heterophylla), western redcedar (Thuja plicata), and red alder (Alnus rubra). As a result of soil saturation during much of the year, conifers may be restricted to nurse logs or higher microsites and they commonly are short and stunted (Roccio, 2015). Shrubs may be sparse or entirely absent in some areas. Shrubs may include evergreen huckleberry (Vaccinium ovatum) and salal (Gaultheria shallon). The herb layer commonly is dominantly American skunkcabbage (Lysichiton americanus).
The most common natural disturbance is ponding. The volume and longevity of the ponding determine the effect on the dynamics of the forest. The site is vulnerable to windthrow following large coastal storms. Trees in this site are particularly susceptible to windthrow due to the shallow rooting depth in response to the seasonal high water table and long periods of ponding that extend into the growing season. Fallen trees that have exposed root systems and large woody debris are common. The fallen trees result in more canopy openings. The openings allow more

sunlight to reach the forest floor, which leads to a shrubby understory. Logging and agricultural disturbances in adjacent areas may alter the hydrology and increase the susceptibility to infestation by invasive species.

Table 1. Dominant plant species

Tree	(1) *Tsuga heterophylla* (2) *Alnus rubra*
Shrub	Not specified
Herbaceous	(1) *Lysichiton americanus*

Legacy ID

F001XD003OR

Physiographic features

This ecological site is located at low elevations (less than 1500 ft.).

Table 2. Representative physiographic features

Landforms	(1) Mountains > Terrace--stream or lake (2) Valley > Terrace--stream or lake
Flooding frequency	None
Ponding frequency	None to frequent
Elevation	10–1,500 ft
Slope	0–20%
Water table depth	0–18 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

The climate has hot, moist summers and warm, wet winters. Mean annual precipitation ranges from 60 to 130 inches and occurs mostly as rain, when snow occurs it does not persist. Average annual temperatures range from 45 to 54 degrees F.

Table 3. Representative climatic features

Frost-free period (characteristic range)	110-240 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	60-130 in

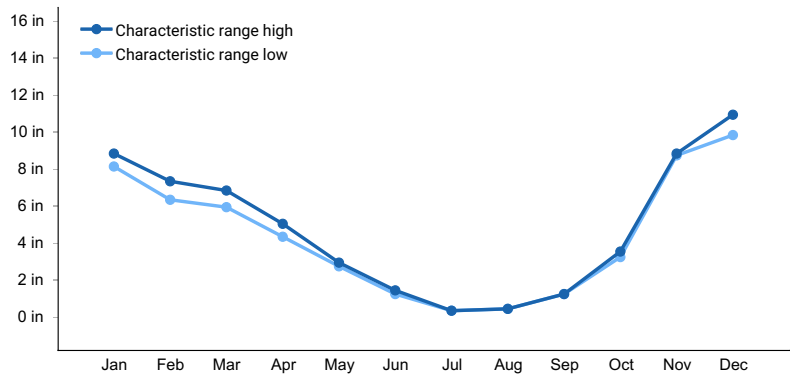


Figure 1. Monthly precipitation range

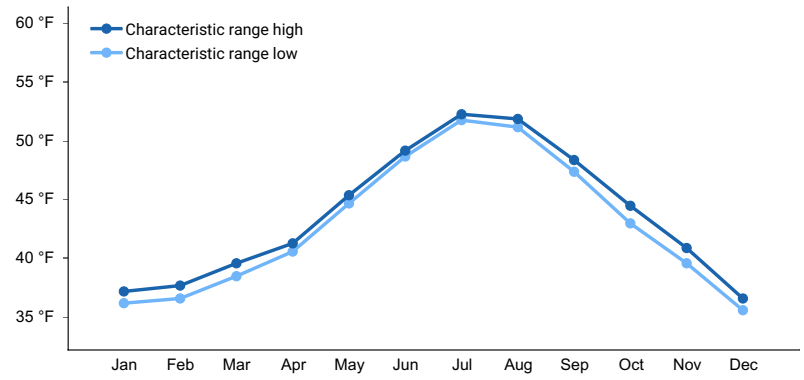


Figure 2. Monthly minimum temperature range

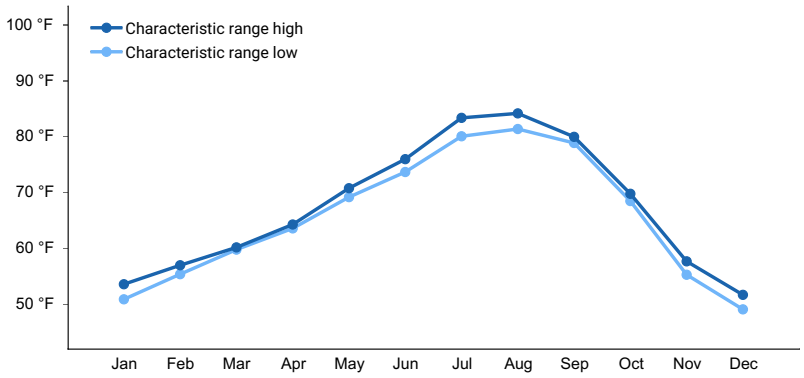


Figure 3. Monthly maximum temperature range

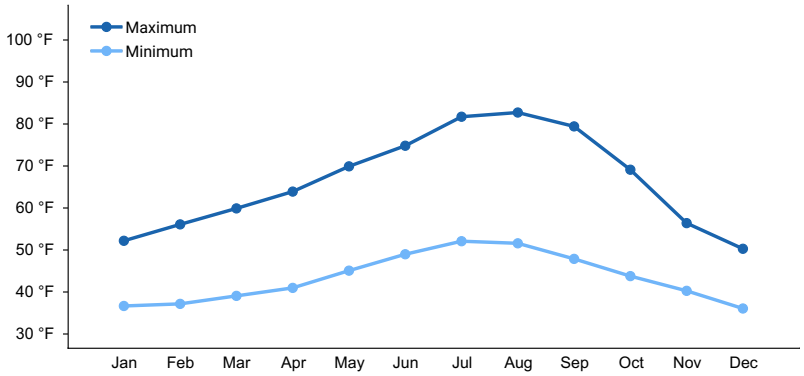


Figure 4. Monthly average minimum and maximum temperature

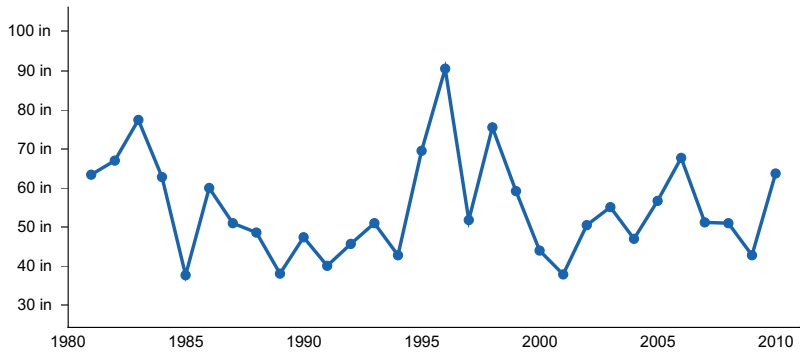


Figure 5. Annual precipitation pattern

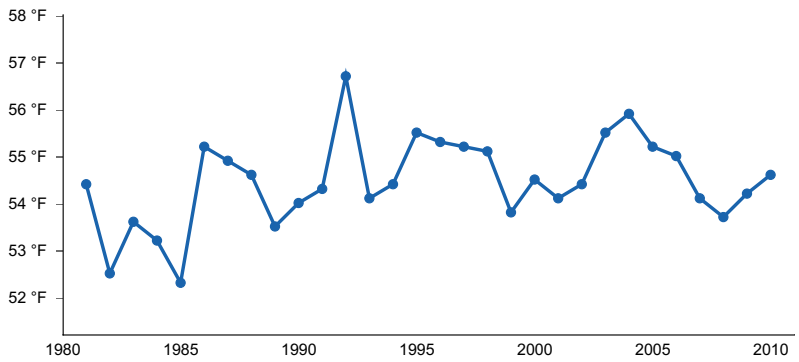


Figure 6. Annual average temperature pattern

Climate stations used

- (1) ELKTON 3 SW [USC00352633], Elkton, OR
- (2) POWERS [USC00356820], Powers, OR

Influencing water features

The site is strongly influenced by hydrology, it consists of forested wetlands that have a seasonal high water table.

Soil features

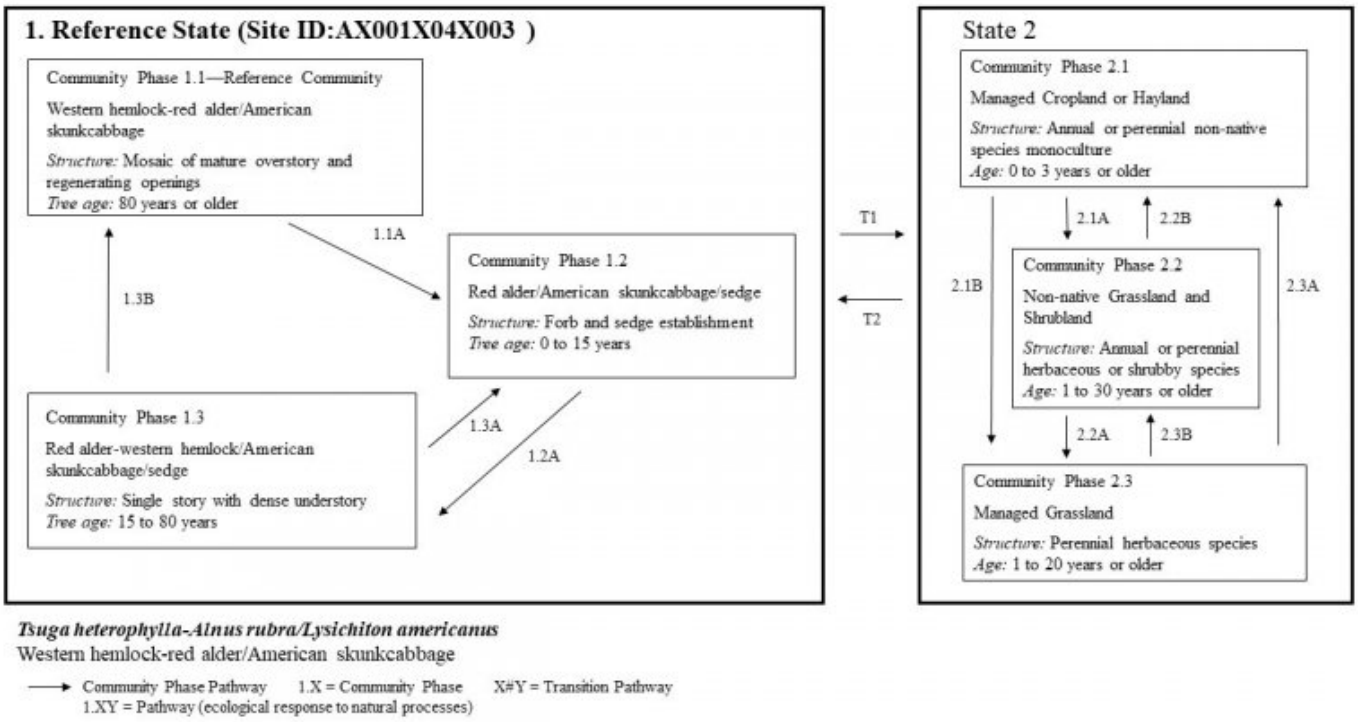
Soils that support this ecological site are in the mesic soil temperature regime and aquic soil moisture regime. This site typically is subject to residual ponding or a seasonal high water table. The water table commonly is at or near the surface much of the growing season, and the rate of organic decomposition is slow due to anaerobic conditions. The seasonal high water table and ponding dynamics may be altered by artificial drainage of the site or adjacent areas. A thin organic horizon consisting of decomposing twigs, needles, and litter is on the surface, which helps to protect the soils from water erosion.

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Colluvium–siltstone (3) Colluvium–basalt
Surface texture	(1) Silty clay loam (2) Silty clay (3) Silt loam (4) Clay loam
Drainage class	Poorly drained to somewhat poorly drained
Depth to restrictive layer	14–60 in
Surface fragment cover <=3"	0–8%
Surface fragment cover >3"	0–2%
Clay content (0-14in)	25–45%
Subsurface fragment volume <=3" (1-60in)	0–8%
Subsurface fragment volume >3" (1-60in)	0–2%

Ecological dynamics

State and transition model



State 1

Community 1.1

Western hemlock-red alder /American skunkcabbage Structure: Mosaic of mature overstory and regenerating

openings The reference community represents a lack of major disturbance from windthrow or ponding for at least 80 years, which allows the pioneering species to form a mature canopy. Western hemlock and red alder are the dominant overstory species. Western redcedar and Douglas-fir may be present, but they are limited to drier microsites such as nurse logs and mounds. Shrubs commonly are restricted to nurse logs, stumps, and higher microsites. Understory species include salal, American skunkcabbage, evergreen huckleberry, California wax myrtle (*Morella californica*), swordfern (*Polystichum munitum*), deer fern (*Blechnum spicant*), and sedges (Carex spp.). Common disturbances include small gap dynamics (1/2-acre openings or smaller) following windstorms and excessive ponding.

Dominant plant species

- western hemlock (*Tsuga heterophylla*), tree
- red alder (*Alnus rubra*), tree
- Douglas-fir (*Pseudotsuga menziesii*), tree
- western redcedar (*Thuja plicata*), tree
- salal (*Gaultheria shallon*), shrub
- California huckleberry (*Vaccinium ovatum*), shrub
- California wax myrtle (*Morella californica*), shrub
- American skunkcabbage (*Lysichiton americanus*), other herbaceous
- western swordfern (*Polystichum munitum*), other herbaceous
- deer fern (*Blechnum spicant*), other herbaceous
- sedge (*Carex*), other herbaceous

Community 1.2

Red alder/American skunkcabbage/sedge Structure: Forb and sedge establishment Community phase 1.2 represents a forest that is undergoing regeneration or stand initiation immediately following excessive ponding or windthrow. Scattered remnant mature trees and shrubs may be in some areas, and woody debris is abundant. Loss of the overstory and the fallen trees may impact the hydrology by resulting in more frequent, longer periods of ponding. Successful regeneration is dependent on the local seed source, an adequate seedbed, and sufficient light (Nierenberg, 2000). Rapid recolonization is limited to plants that are well adapted to saturated soil conditions much of the year. American skunkcabbage and sedges will begin to re-establish during this phase.

Dominant plant species

- red alder (*Alnus rubra*), tree
- American skunkcabbage (*Lysichiton americanus*), other herbaceous
- sedge (*Carex*), other herbaceous

Community 1.3

Red alder-western hemlock/American skunkcabbage/sedge Structure: Single story with dense understory Community phase 1.3 is an early seral forest in regeneration. Scattered remnant mature trees may be present. Red alder is the primary tree and will establish quickly with an open canopy. Western hemlock will regenerate on hummocks and mounds and will begin to establish a canopy. Shrubs are sparse, but species such as salal and evergreen huckleberry become established on fallen trees and in higher microsites. Understory species may include deer fern, American skunkcabbage, and sedges.

Dominant plant species

- red alder (*Alnus rubra*), tree
- western hemlock (*Tsuga heterophylla*), tree
- salal (*Gaultheria shallon*), shrub
- California huckleberry (*Vaccinium ovatum*), shrub
- American skunkcabbage (*Lysichiton americanus*), other herbaceous
- sedge (*Carex*), other herbaceous
- deer fern (*Blechnum spicant*), other herbaceous

Pathway 1.1A

Community 1.1 to 1.2

This pathway represents excessive ponding that results in a shallow rooting zone. The trees are susceptible to windthrow, which may create pockets of fallen trees larger than 1 acre in size. Catastrophic windstorms may be stand replacing.

Pathway 1.2A
Community 1.2 to 1.3

This pathway represents growth over time with no further major disturbance.

Pathway 1.3B
Community 1.3 to 1.1

This pathway represents no further major disturbance. Continued growth over time and ongoing mortality lead to increased vertical diversification. The community begins to resemble the structure of the reference community, including small pockets of regeneration (both deciduous and coniferous) and a more diversified understory.

Pathway 1.3A
Community 1.3 to 1.2

This pathway represents excessive ponding that results in a shallow rooting zone. The trees are susceptible to windthrow, which may create pockets of fallen trees larger than 1 acre in size. Catastrophic windstorms may be stand replacing.

State 2

Community 2.1

Managed Cropland or Hayland Structure: Annual or perennial non-native species monoculture Community phase 2.1 may consist of a range of crops, including annually planted species, short-lived perennial species, and more permanent shrubby plants. Hay and grasses and legumes for silage are included in this community phase.

Community 2.2

Non-native Grassland and Shrubland Structure: Annual or perennial herbaceous or shrubby species Community phase 2.2 is characterized by low-level agronomic or management activity such as adding soil nutrients, intensive grazing management, regular mowing, or weed control. This plant community commonly consists dominantly of introduced weedy species. Areas that have extremely low fertility or are subject to heavy grazing pressure have a higher proportion of annual, stoloniferous, or rhizomatous species. Wetland areas commonly support dominantly non-native rhizomatous grasses. The plant community may include remnants of introduced pasture species that commonly are seeded.

Community 2.3

Managed Grassland Structure: Perennial herbaceous species Community phase 2.3 receives regular agronomic inputs, including adding soil nutrients and other soil amendments such as lime, implementing grazing management plans, regular mowing, controlling weeds, and reseeding as needed. This plant community typically includes introduced perennial pasture and hay species that commonly are seeded. In areas of historic native grassland, mixtures of perennial and annual native species may be seeded and managed by appropriate agronomic and livestock management activities. Minor amounts of introduced species that commonly are in non-native grassland and shrubland communities (community phase 2.2) are in this phase.

Pathway 2.1A
Community 2.1 to 2.2

In the absence of agronomic and livestock management activities, seeds from surrounding weedy plant

communities will be transported to the site by wind, animals, or vehicle traffic. Adapted species will become established. Management activities include tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Pathway 2.1B
Community 2.1 to 2.3

This pathway represents agronomic and livestock management activities, including tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Pathway 2.2B
Community 2.2 to 2.1

This pathway represents agronomic activities such as tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, and planting to desirable crop species.

Pathway 2.2A
Community 2.2 to 2.3

This pathway represents agronomic and livestock management activities, including tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Pathway 2.3A
Community 2.3 to 2.1

This pathway represents agronomic activities, including tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, and planting to desirable crop species.

Pathway 2.2B
Community 2.3 to 2.2

In the absence of agronomic and livestock management activities, seeds from surrounding weedy plant communities will be transported to the area by wind, floodwater, animals, or vehicle traffic. Adapted species will become established. Management activities include tilling, adding soil nutrients and other soil amendments such as lime, mowing, burning, harvesting or chemically controlling vegetation, planting to desirable herbaceous species, and implementing grazing management plans.

Transition T1
State 1 to 2

This pathway represents a change in land use. Land management includes modifications to the hydrologic function to develop pasture and agriculture. Non-native seed disbursement is introduced (intentionally or unintentionally), which alters the reference community.

Transition T2
State 2 to 1

This pathway represents restoration of the natural hydrologic function and native plant habitat. Native seed sources and extensive management and mitigation of brush and invasive species are needed to restore the community.

Additional community tables

Inventory data references

Other Established Classifications for Ecological Site

National vegetation classification: G853 Tsuga heterophylla – Alnus rubra / Lysichiton americanus Swamp Forest Group

Other references

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Approval

Kirt Walstad, 9/09/2023

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	12/16/2021
Approved by	Kirt Walstad
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:**
