

Ecological site F003XY703OR **South Cascades - Mid-Elevation**

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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.

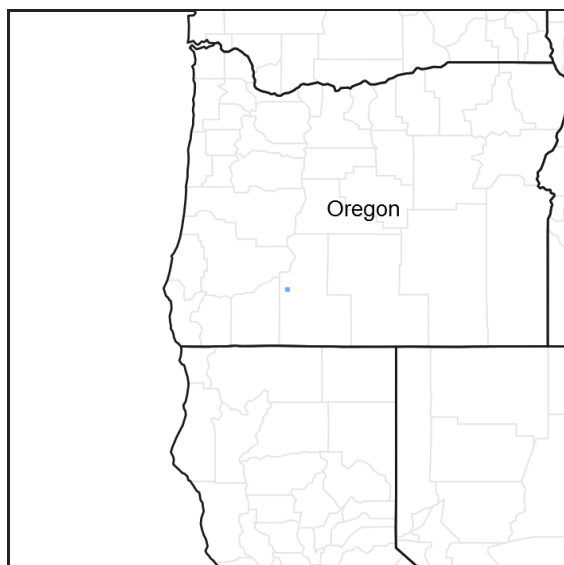


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Similar sites

F003XY704OR	Southern Cascades Mid-Elevation Dry This site has a brush component in understory.
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Table 1. Dominant plant species

Tree	(1) <i>Abies xshastensis</i>
Shrub	Not specified
Herbaceous	(1) <i>Carex inops</i>

Physiographic features

This site is found on soils formed in andesitic lava flows and glacial moraine deposits on sideslopes and ridges.

Table 2. Representative physiographic features

Landforms	(1) Ground moraine
Flooding frequency	None

Ponding frequency	None
Elevation	1,600–1,829 m
Slope	0–30%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

Climatic features

Winters are long, cold and snowy, due to the very high elevations. Summers are short and cool. Effective precipitation comes mostly as snow. Average annual ppt is approximately 55 inches.

Table 3. Representative climatic features

Frost-free period (average)	50 days
Freeze-free period (average)	90 days
Precipitation total (average)	2,032 mm

Influencing water features

None

Soil features

This ecological site is found on soils formed in andesitic lava flows and glacial moraine deposits on side slopes and ridges.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	51–152 cm
Surface fragment cover <=3"	5–20%
Surface fragment cover >3"	0–20%
Available water capacity (0-101.6cm)	10.92–37.34 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	20–45%
Subsurface fragment volume >3" (Depth not specified)	5–35%

Ecological dynamics

Shasta red fir is the dominant climax overstory specie on this site. At maturity, white fir and western white pine can also be present but at very low stocking levels. This site is a transition zone between the higher and wetter Mountain hemlock sites and the lower and drier Ponderosa pine sites. At the upper and lower elevations of this site, dominant tree species, from neighboring sites may invade the site.

Fire is the leading disturbance factor in this site. The reported fire return intervals for Shasta red fir stands is 70 to 130 years. Fire intensity is generally low due to the light accumulation of surface fuels. Older Shasta red fir trees can generally survive light-intensity fire but can be killed by moderate to severe fires. The natural size of fires are thought to be small due to the openness of Shasta red fir stands. Fire created openings for regeneration of Shasta red fir and/or Lodgepole pine.

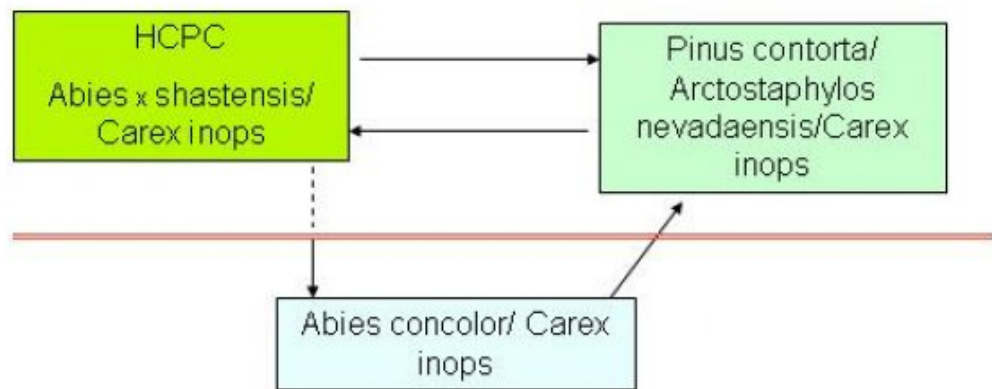
Fire exclusion favors the establishment of white fir. White fir, which is shade tolerant, will readily establish and grow up into the existing canopy. Prior to domination by White fir in the overstory the process is reversable and the HCPC can become dominant again.

Given enough time, and total fire exclusion, white fir will continue regenerating and become the dominant tree in the canopy. At this time a threshold has been crossed and to move back to the HCPC significant inputs will have to occur. With a heavy overstory canopy ground vegetation is sparse.

With fire exclusion the potential for a stand replacing fire occurring dramatically increases. When a stand replacing fire occurs, it is usually large in size and severe. After such a fire Lodgepole pine usually establishes. Lodgepoles stocking density can be light to very heavy. Heavy to very heavily stocked stands can become susceptible to mountain pine beetle infestations. An outbreak will almost kill all the pine. Generally, by this time, shasta red fir seedlings are established and the death of the pine releases the fir seedlings.

Western white pine can also be part of the Lodgepole pine plant community. It survives low to moderately intense fire, that can occur, in pockets, during severe fires. If conditions are right after a fire western white pine will regenerate.

State and transition model



State 1 Reference

Community 1.1 Shasta Red Fir

Shasta red fir is the dominant overstory tree species in the climax plant community. Western white pine and white fir may also be present. The understory is sparse and is dominated by two plants, longstolon sedge and princes pine.

Forest overstory. The typical overstory composition of the Shasta red fir plant community.

Forest understory. The typical annual production of the understory species to a height of 4.5 feet (excluding boles of trees) under low, high, and representative canopy covers.

The percentages expressed are percent canopy cover. Those species with "0" percent have a canopy cover of less than 1 percent.

Table 5. Ground cover

Tree foliar cover	40-50%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	8-11%
Forb foliar cover	0-1%
Non-vascular plants	0%

Biological crusts	0%
Litter	60-70%
Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	1-3%

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	5-7%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	75-85%
Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	2-5%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	0-1%	1-2%
>0.15 <= 0.3	—	—	10-15%	—
>0.3 <= 0.6	—	—	—	—
>0.6 <= 1.4	—	—	—	—
>1.4 <= 4	2-5%	—	—	—
>4 <= 12	5-10%	—	—	—
>12 <= 24	35-40%	—	—	—
>24 <= 37	5-10%	—	—	—
>37	—	—	—	—

Community 1.2

White Fir

The White fir plant community occurs when fire is excluded from the site beyond the natural fire return intervals. Being shade tolerant white fir will establish under the canopy of existing trees and over time take over the canopy.

Forest overstory. The typical forest overstory composition for the White fir plant community.

Forest understory. The typical annual production of the understory species to a height of 4.5 feet (excluding boles of trees) under low, high, and representative canopy covers.

The percentages expressed are percent canopy cover. Those species with "0" percent have a canopy cover of less than 1 percent.

Table 8. Ground cover

Tree foliar cover	50-60%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	2-4%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	30-40%
Surface fragments >0.25" and <=3"	3-5%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	1-3%

Table 9. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	1-2%
Forb basal cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	80-90%
Surface fragments >0.25" and <=3"	3-8%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	2-5%

Table 10. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	3-5%	—
>0.15 <= 0.3	—	—	—	—
>0.3 <= 0.6	0-1%	—	—	—
>0.6 <= 1.4	0-1%	—	—	—
>1.4 <= 4	2-5%	—	—	—
>4 <= 12	5-10%	—	—	—
>12 <= 24	12-17%	—	—	—
>24 <= 37	30-40%	—	—	—
>37	—	—	—	—

Community 1.3

Lodgepole Pine

The Lodgepole pine plant community occurs after a stand replacing fire, on a large or small scale. Lodgepole, a pioneer specie, readily establishes if a seed source is available.

Forest overstory. The typical forest overstory composition for the Lodgepole pine plant community.

Forest understory. The typical annual production of the understory species to a height of 4.5 feet (excluding boles of trees) under low, high, and representative canopy covers.

The percentages expressed are percent canopy cover. Those species with "0" percent have a canopy cover of less than 1 percent.

Table 11. Ground cover

Tree foliar cover	25-30%
Shrub/vine/liana foliar cover	1-3%
Grass/grasslike foliar cover	4-7%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	25-30%
Surface fragments >0.25" and <=3"	5-8%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	30-35%

Table 12. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	1-2%
Forb basal cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-45%
Surface fragments >0.25" and <=3"	8-12%
Surface fragments >3"	3-5%
Bedrock	0%
Water	0%
Bare ground	30-40%

Table 13. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	1-3%	0-1%	—
>0.15 <= 0.3	—	—	4-7%	—
>0.3 <= 0.6	0-1%	—	—	—
>0.6 <= 1.4	0-1%	—	—	—
>1.4 <= 4	0-1%	—	—	—
>4 <= 12	1-2%	—	—	—
>12 <= 24	30-35%	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

Pathway 1.1A **Community 1.1 to 1.2**

Fire exclusion

Pathway 1.1B **Community 1.1 to 1.3**

Stand replacing fire

Pathway 1.2A **Community 1.2 to 1.3**

Stand replacing fire

Pathway 1.3A **Community 1.3 to 1.1**

Additional community tables

Inventory data references

The historic plant community has been determined from the collection of field data.

Contributors

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Approval

Kirt Walstad, 2/04/2025

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	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:

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):
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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):
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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:**
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