USDA Natural Resources
Conservation Service

Ecological site F003XY706OR
High Cascades Moist

Last updated: 2/04/2025
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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.

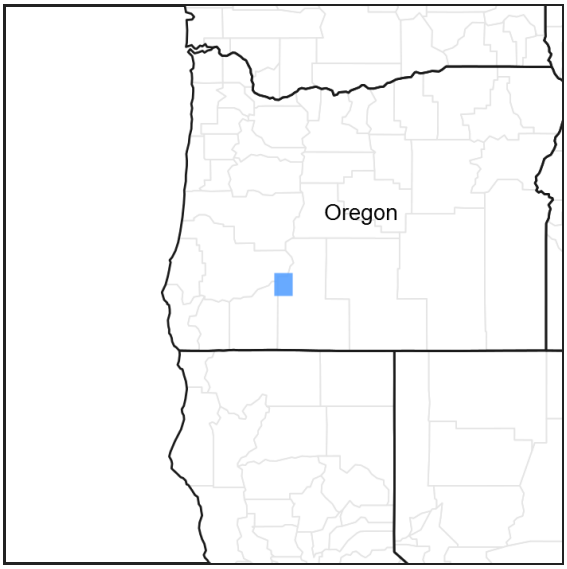


Figure 1. Mapped extent

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.

Table 1. Dominant plant species

Tree	(1) *Tsuga mertensiana*
Shrub	Not specified
Herbaceous	(1) *Luzula glabrata var. hitchcockii*

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Stratovolcano (2) Ash flow
Flooding frequency	None
Ponding frequency	None
Elevation	4,500–7,500 ft
Slope	0–90%
Water table depth	60 in
Aspect	N

Climatic features

Winters are long, cold, windy and snowy, due to the very high elevations. Summers are short and cool. Effective precipitation comes mostly as snow. Average annual ppt is 67 inches.

Table 3. Representative climatic features

Frost-free period (average)	50 days
Freeze-free period (average)	60 days
Precipitation total (average)	100 in

Influencing water features

Soil features

Table 4. Representative soil features

Surface texture	(1) Paragravelly loamy sand (2) Gravelly loamy sand (3) Ashy loamy sand
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Rapid to very rapid
Soil depth	60 in
Surface fragment cover <=3"	5–35%
Surface fragment cover >3"	0–35%
Available water capacity (0-40in)	2.9–8 in
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–50%
Subsurface fragment volume >3" (Depth not specified)	0–40%

Ecological dynamics

Mountain Hemlock plant community is the historic climax plant community. The major disturbance factor is wild fire. The fire return intervals estimated to be approximately 400 or more years. These fires are generally stand replacing fires, meaning that the fires are large and intense.

Small fires can occur that burn smaller acreages. Where small fires occur a seed source is available (mountain hemlock/shasta red fir) and the resiliency of the site allows seedling re-establishment.

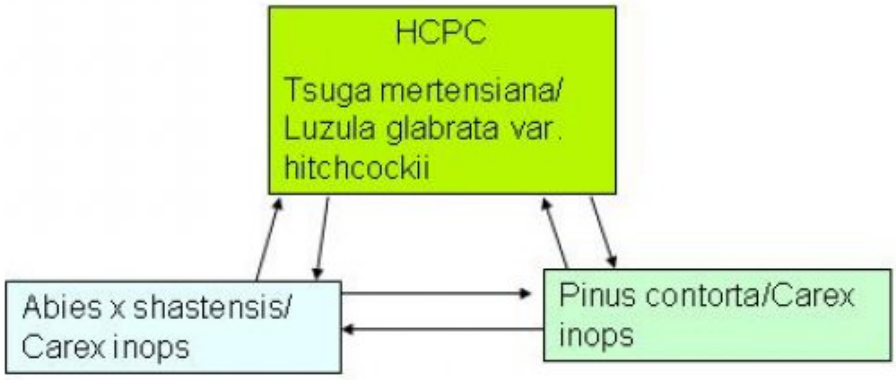
Another significant disturbance factor is disease. Old Mountain hemlock are susceptible to disease, with laminated root rot (Phellinus weiri) being the top infecting agent. Openings created by disease killed trees allows other tree species (Shasta red fir, Western white pine, and Lodgepole pine) to establish.

The Shasta red fir community occurs as a successional step from the Lodgepole pine towards the Mountain hemlock plant community (HCPC). The SRF community also occurs when a significant disturbance occurs in the mountain hemlock plant community that kills the hemlock and allows the fir to become dominant. Mountain hemlock and Lodgepole composition can vary greatly in the overstory.

Ground cover and specie diversity is generally low. The canopy cover is not as great as the mountain hemlock community, and different plants are found in the understory.

The lodgepole pine plant community occurs after a stand replacement fire occurs and consumes all trees. Lodgepole pine, a pioneer specie, establishes readily. If it does not, then brush/forb/grasses establish. When lodgepole establishes the amount of regeneration is generally heavy. When a dense stand matures it becomes susceptible to the mountian pine beetle. If an outbreak occurs all lodgepole are generally killed. By this time, fir and/or hemlock seedlings are established and released when the pine dies.

State and transition model



State 1
Reference

Community 1.1
Mountain Hemlock

Mountain hemlock dominates the mature stand conditions. Other tree species that can be found are Shasta red fir, Western white pine, and sub-alpine fir. The understory is quite sparse and composition is very low.

Forest overstory. The typical forest overstory composition of the historic climax plant community.

Forest understory. The typical forest understory composition. Understory vegetation is expressed as "percent canopy" and "0" denotes less than 1% canopy.

Table 5. Ground cover

Tree foliar cover	40-45%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	10-15%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-40%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0-1%
Bedrock	0%
Water	0%
Bare ground	3-5%

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	2-5%
Forb basal cover	0-1%
Non-vascular plants	0-2%
Biological crusts	0%
Litter	90-95%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-1%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	12-15%	1-4%
>0.5 <= 1	–	–	7-10%	–
>1 <= 2	0-1%	–	–	–
>2 <= 4.5	0-1%	–	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	1-3%	–	–	–
>40 <= 80	50-55%	–	–	–
>80 <= 120	2-5%	–	–	–
>120	–	–	–	–

Community 1.2
Shasta Red Fir

Shasta red fir community is a seral community. It's the transition between the Lodgepole pine plant community and the Mountain hemlock plant community. Understory specie composition is low and canopy cover is low.

Forest overstory. The forest overstory composition for the Shasta red fir plant community.

Forest understory. The forest understory composition of the Shasta red fir plant community. Understory vegetation is expressed as "percent canopy" and "0" denotes less than 1% canopy.

Table 8. Ground cover

Tree foliar cover	35-45%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	10-15%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	30-40%
Surface fragments >0.25" and <=3"	5-8%
Surface fragments >3"	2-5%
Bedrock	0%
Water	0%
Bare ground	20-30%

Table 9. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	2-5%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-45%
Surface fragments >0.25" and <=3"	5-10%

Surface fragments >3"	2-5%
Bedrock	0%
Water	0%
Bare ground	30-40%

Table 10. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	2-5%	0-1%
>0.5 <= 1	–	–	5-10%	–
>1 <= 2	0-1%	–	–	–
>2 <= 4.5	0-1%	–	–	–
>4.5 <= 13	1-2%	–	–	–
>13 <= 40	1-2%	–	–	–
>40 <= 80	35-45%	–	–	–
>80 <= 120	5-10%	–	–	–
>120	–	–	–	–

Community 1.3
Lodgepole Pine

This plant community comes about, generally, after a stand replacement fire has occurred. Lodgepole pine is a pioneer specie and established easily. It is usually the only tree specie but others may be present in a limited amount.

Forest overstory. The typical forest overstory composition of the Lodgepole pine community.

Forest understory. The typical forest understory composition of the Lodgepole pine community. Understory vegetation is expressed as "percent canopy" and "0" denotes less than 1% canopy.

Table 11. Ground cover

Tree foliar cover	20-30%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	10-15%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	5-8%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	40-50%

Table 12. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%

Grass/grasslike basal cover	2-5%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	30-40%
Surface fragments >0.25" and <=3"	5-8%
Surface fragments >3"	2-5%
Bedrock	0%
Water	0%
Bare ground	20-25%

Table 13. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	0-5%	0-1%
>0.5 <= 1	0-1%	–	5-10%	0-5%
>1 <= 2	1-2%	–	–	–
>2 <= 4.5	1-2%	–	–	–
>4.5 <= 13	0%	–	–	–
>13 <= 40	1-5%	–	–	–
>40 <= 80	35-45%	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Pathway 1.1A
Community 1.1 to 1.2

Pathway 1.1B
Community 1.1 to 1.3

Pathway 1.2A
Community 1.2 to 1.1

Pathway 1.2B
Community 1.2 to 1.3

Pathway 1.3A
Community 1.3 to 1.1

Pathway 1.3B
Community 1.3 to 1.2

Additional community tables

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):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**