

Ecological site F003XY700OR

High Cascades Tree Line

Last updated: 2/03/2025
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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.

Table 1. Dominant plant species

Tree	(1) <i>Pinus albicaulis</i>
Shrub	Not specified
Herbaceous	(1) <i>Luzula</i> (2) <i>Carex</i>

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Ash flow (2) Debris flow (3) Stream
Flooding frequency	None
Ponding frequency	None
Elevation	2,130 – 2,710 m
Slope	10 – 80 %
Ponding depth	0 cm
Water table depth	150 cm
Aspect	Aspect is not a significant factor

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)	60 days
Freeze-free period (average)	90 days
Precipitation total (average)	2,540 mm

Influencing water features

None

Soil features

This ecological site is found on soils formed in volcanic ash and andesitic lava deposits along high ridges.

Table 4. Representative soil features

Surface texture	(1) Paragravelly loamy sand (2) Ashy loamy sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Rapid to very rapid
Soil depth	150 cm
Surface fragment cover <=3"	20 – 40 %
Surface fragment cover >3"	0 – 30 %
Available water capacity (0-101.6cm)	7.37 – 18.29 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified

Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	5.6 – 7.3
Subsurface fragment volume <=3" (Depth not specified)	20 – 40 %
Subsurface fragment volume >3" (Depth not specified)	0 – 50 %

Ecological dynamics

The historic climax plant community is the Whitebark pine plant community. Under natural conditions the plant community was very open. Whitebark pine dominated the overstory with possibly small amounts of lodgepole pine and mountain hemlock.

Fire frequency in whitebark plant communities was mixed in frequency and severity. Fire return intervals of 30 to 300+ years have been sited. Moderate fires (30-100 years) killed some whitebark and shade tolerant trees. Stand replacement fires (150+ years) killed almost all trees.

Whitebark would re-establish with the help of Clark's nutcracker, caching some seed in the soil. Seeds germinate in caches not found, producing new trees.

Fire exclusion allows Mountain hemlock to increase in composition in the plant community. Eventually it can become the dominant tree due to two reasons: 1) Fire exclusion, and 2) White Pine Blister rust.

White pine blister rust eventually kills an infected tree, though it can take decades. Early in the infection state, the disease limits seed production by infecting and killing cone producing branches. This leads to a decline in potential reproduction.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Contributors

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Approval

Kirt Walstad, 2/03/2025

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	02/03/2025
Approved by	
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:
