

Ecological site F002XN902WA

Western hemlock - Douglas-fir/Cascade Oregongrape

Last updated: 11/27/2024
Accessed: 09/19/2026

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.

Classification relationships

Related to plant associations PSME-TSHE/GASH/POMU, PSME-TSHE/HODI/POMU, PSME-TSHE/MANE, PSME-TSHE/TITRLA in Chappell, C.B. 2006. Upland plant associations of the Puget Trough ecoregion, Washington. Natural Heritage Rep. 2006-01. Washington Department of Natural Resources, Natural Heritage Program, Olympia, Wash. [<http://www.dnr.wa.gov/nhp/refdesk/communities/pdf/intro.pdf>].

Table 1. Dominant plant species

Tree	(1) <i>Tsuga heterophylla</i> (2) <i>Pseudotsuga menziesii</i>
Shrub	(1) <i>Mahonia nervosa</i>
Herbaceous	Not specified

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	0 – 730 m
Slope	10 – 80 %
Water table depth	50 cm

Aspect	N, E, NW
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Climatic features

The climate is characterized by warm dry summers and mild moist winters. Precipitation is received mostly in the ealy fall to late winter.

Table 3 Representative climatic features

Frost-free period (average)	220 days
Freeze-free period (average)	
Precipitation total (average)	1,140 mm

Influencing water features

Soil features

Applicable soil series:

Constitution, Kahboo, Pickett, Skipjack

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Gravelly fine sandy loam (3) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately rapid to rapid
Soil depth	30 cm
Available water capacity (0-101.6cm)	7.11 – 24.38 cm
Soil reaction (1:1 water) (0-101.6cm)	3.5 – 10

Ecological dynamics

These sites are only found within the rain shadow of the Puget Trough. They are relatively cool, moist sites on gentle to steep slopes. The historic plant climax community (HPCP) is dominated by western hemlock with a minority of Douglas-fir and western redcedar.

Wind storms, insects and diseases (particularly root- and butt-rots) are the main disturbance agent on these sites, causing mostly small patch-sized disruptions. If the opening created is large enough, Douglas-fir would likely seed in. Smaller gaps would be dominated by one or more of the many shrub species.

Cutting practices could easily shift these forests to a Douglas-fir dominated community, but this would have to be maintained by steady management. Without intervention, shade tolerant hemlock would infill and eventually replace the majority of the Douglas-fir, moving back to the HPCP

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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Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 1.5 plant community composition

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

Site Index data, by species, derived from: *Pseudotsuga menziesii*: King, James E. 1966. Site index curves for Douglas-fir in the Pacific Northwest . Weyerhaeuser Company, Forestry Research Center. Forestry Paper 8. USDA NRCS curve # 795. *Tsuga heterophylla*: Wiley, Kenneth N. Site index tables for western hemlock in the Pacific Northwest. Weyerhaeuser Company, Western Forestry Research Center Forestry Paper No. 17. USDA NRCS curve # 995. CMAI data, by species, derived from: *Pseudotsuga menziesii*: Chambers, C. Washington State Department of Natural Resources Technical Report #20. *Tsuga heterophylla*: Appendix 2 of Wiley, K.N. 1978. Net and gross yields for natural stands of western hemlock in the Pacific Northwest. Weyerhaeuser Forestry Paper No. 19.

Table 10. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
Douglas-fir	PSME	90	115	116	163	—	—	—	
western hemlock	TSHE	60	100	57	136	—	—	—	

Other references

Fire Effects Information System, [Online].

U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer).
<http://www.fs.fed.us/database/feis/>

Agee, J.K. Fire ecology of Pacific Northwest forests. Covelo, CA: Island Press; 1993. 493 pages .

Perry, D.A. Forest Ecosystems. Baltimore, MD: The Johns Hopkins University Press; 1994. 649 pages.

Contributors

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Approval

Kirt Walstad, 11/27/2024

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	11/27/2024
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:
