USDA Natural Resources
Conservation Service

Ecological site F003XY708OR
Abies ×shastensis-Pinus monticola/Arctostaphylos nevadensis

Last updated: 2/04/2025
Accessed: 05/13/2025

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.

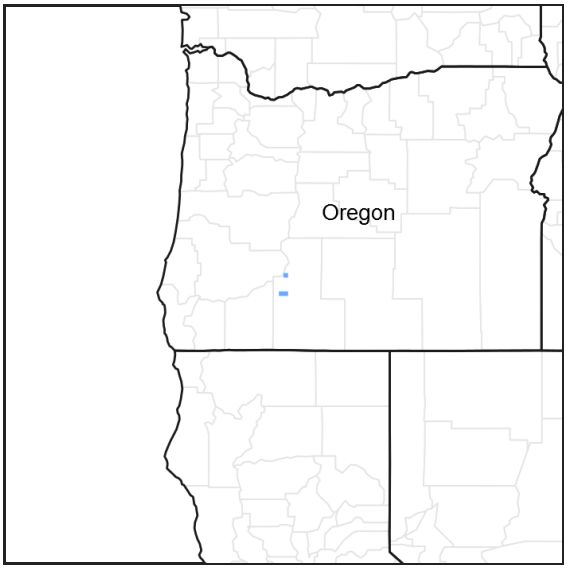


Figure 1. Mapped extent

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) *Abies ×shastensis* (2) *Pinus monticola*
Shrub	(1) *Arctostaphylos nevadensis*
Herbaceous	Not specified

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Ash flow
Flooding frequency	None
Ponding frequency	None
Elevation	1,524–1,676 m
Slope	0–10%
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)	75 days
Precipitation total (average)	2,540 mm

Influencing water features

Soil features

Soils formed in andasitic lava flows, ahs flow and airborne pumice and ash material. The soils are found in valleys, sideslopes and ridges.

Table 4. Representative soil features

Surface texture	(1) Paragravelly fine sandy loam
Family particle size	(1) Sandy
Drainage class	Excessively drained
Permeability class	Rapid
Soil depth	152 cm
Surface fragment cover <=3"	10–30%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	12.19–16 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)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	10–50%

Ecological dynamics

Shasta red fir is the dominant climax overstory specie on this site. At maturity Western white pine and Ponderosa pine may be present in the stand. Lodgepole pine may be present too.

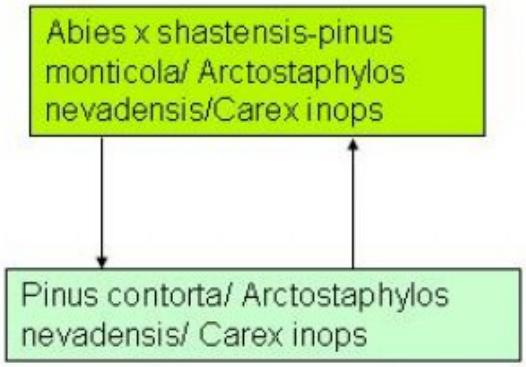
Fire return intervals are thought to be 70 to 130 years for Shasta red fir sites. Frequent fires (and moderately intense fires) would favor the pines, Ponderosa and Western white. Light intensity fires would favor all three tree species. Severe stand replacement fires would kill all trees, favoring the establishment of lodgepole pine.

Fire exclusion does not significantly change the plant community. Stocking density would increase and this would favor Shasta red fir, due to its moderate shade tolerance.

A severe stand replacement fire favors lodgepole and western white pine. Western white pine makes up a large component of this community.

Lodgepole pines abundance can be light to very heavy. Heavy and very heavy stands can become susceptible to mountain pine beetle outbreaks. An outbreak generally kills all trees. The lodgepole provides protection (temperature) for shasta red fir seedlings that will eventually re-establish.

State and transition model



State 1
Reference

Community 1.1
Shasta Red Fir

Shasta red fir dominates the overstory and with fire exclusion only increases. Understory cover is very low and specie diversity is also low. Specie composition of the overstory can vary, depending upon fire history. More frequent fires will reduce Shasta red fir component. More frequent and moderately intense fires will increase ponderosa and western white pine in the overstory.

Forest overstory. The forest overstory is mostly Shasta red fir but can contain other species.

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	25-35%
Shrub/vine/liana foliar cover	3-8%
Grass/grasslike foliar cover	3-5%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	40-50%
Surface fragments >0.25" and <=3"	1-3%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	5-10%

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	60-70%
Surface fragments >0.25" and <=3"	1-3%
Surface fragments >3"	3-5%
Bedrock	0%
Water	0%
Bare ground	5-10%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	0-1%	5-10%	3-5%	0-2%
>0.15 <= 0.3	0-1%	–	1-2%	–
>0.3 <= 0.6	0-1%	–	–	–
>0.6 <= 1.4	3-5%	–	–	–
>1.4 <= 4	1-3%	–	–	–
>4 <= 12	5-10%	–	–	–
>12 <= 24	10-15%	–	–	–
>24 <= 37	25-30%	–	–	–
>37	–	–	–	–

Community 1.2
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. Shasta red fir may survive in isolated areas and provide the seed source for regeneration.

Forest overstory. Lodgepole pine makes up the largest component of the overstory.

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.

Table 8. Ground cover

Tree foliar cover	25-30%
Shrub/vine/liana foliar cover	3-6%
Grass/grasslike foliar cover	2-4%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	70-80%
Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-1%

Table 9. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0-2%
Grass/grasslike basal cover	0-1%
Forb basal cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	75-85%

Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0-1%

Table 10. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	0-1%	5-10%	2-5%	–
>0.15 <= 0.3	0-1%	–	–	–
>0.3 <= 0.6	0-1%	–	–	–
>0.6 <= 1.4	1-2%	–	–	–
>1.4 <= 4	1-3%	–	–	–
>4 <= 12	3-5%	–	–	–
>12 <= 24	20-25%	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Pathway 1.1A
Community 1.1 to 1.2

Pathway 1.2A
Community 1.2 to 1.1

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	02/04/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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:**
