

Ecological site F006XY700OR

East Crater Lake Pumice South Slopes

Accessed: 05/16/2024

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) <i>Pinus ponderosa</i> (2) <i>Abies xshastensis</i>
Shrub	(1) <i>Symphoricarpos mollis</i>
Herbaceous	Not specified

Physiographic features

This sight is on gently sloping to steep slopes on hills and valleys that have a southerly aspect.

Table 2. Representative physiographic features

Landforms	(1) Ash flow (2) Butte
Flooding frequency	None
Ponding frequency	None
Elevation	1,219–1,981 m
Slope	0–70%

Water table depth	152 cm
Aspect	S

## Climatic features

Winter are long, cold and snowy. Snow makes up a large amount of the effective precipitation. Summers days are warm, and nights are cool. Summer precipitation comes as infreqesnt rain storms. Summer thunderstorms can drop moderately heavy amounts of rain, but only for a short period of time.

**Table 3. Representative climatic features**

Frost-free period (average)	60 days
Freeze-free period (average)	88 days
Precipitation total (average)	559 mm

## Influencing water features

None

## Soil features

This site is found on soils formed in pumice and ash air fall deposits, and glacial morains on hills, valleys and lava plains.

**Table 4. Representative soil features**

Surface texture	(1) Paragravelly loamy sand (2) Ashy loamy fine sand (3) Medial sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Moderate to very rapid
Soil depth	102–152 cm
Surface fragment cover <=3"	10–50%
Surface fragment cover >3"	0–20%
Available water capacity (0-101.6cm)	9.14–20.32 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)	25–60%
Subsurface fragment volume >3" (Depth not specified)	0–15%

## Ecological dynamics

Ponderosa pine and Shasta red fir are the two major tree species that make up the overstory of the historic climax plant community. Lodgepole pine and White fir may make up a very small percentage of the overstory. Assuming normal site conditions fire is the major disturbance factor influencing pine and fir establishment.

Ponderosa pine can withstand low to moderately intense fires and Shasta red fir can withstand low intensity fires. Historic fire frequency in this site is thought to be between 10 and 40 years. The more frequent fires were generally lower intensity, thus benefiting both Ponderosa pine and Shasta red fir. The longer periods between fire return allowed more fuels to build up on the forest floor, thus allowing for moderately intense fires to burn. These fires benefited Ponderosa pine more.

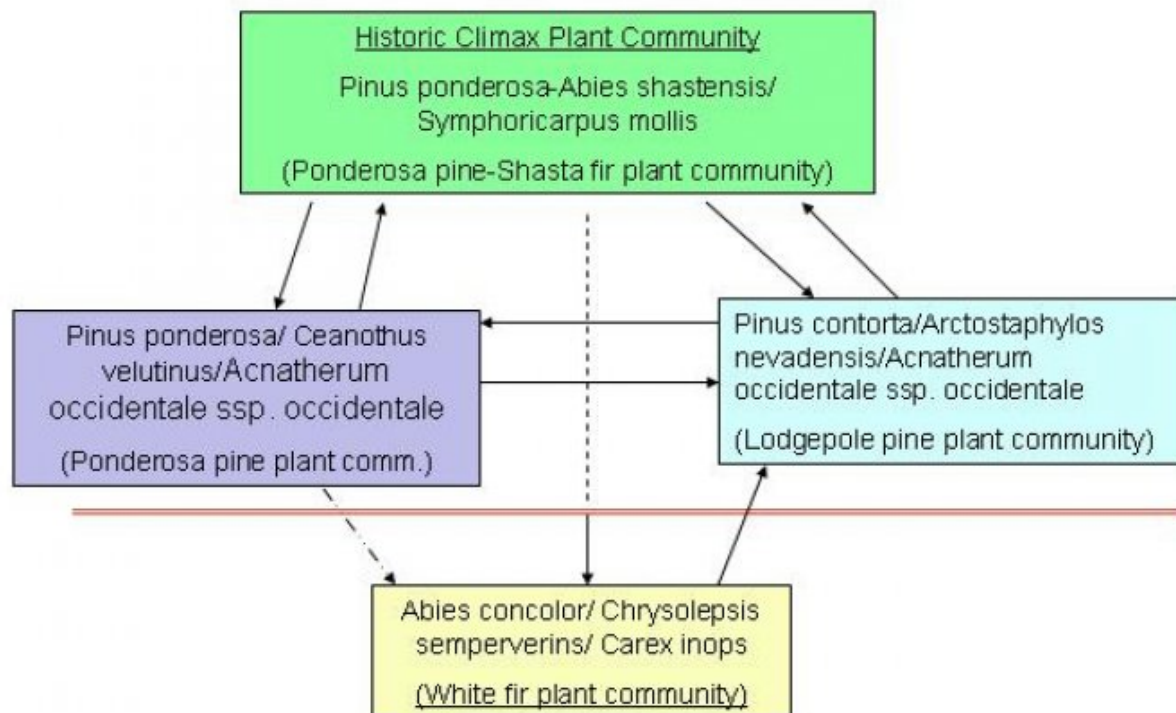
Fire exclusion will initially benefit Shasta red fir. Shasta red fir, being moderately shade tolerant, will regenerate and increase its presence in the overstory. Over time, with extensive periods of fire exclusion, White fir will invade the site. Being very shade tolerant it will easily establish under the overstory and grow up in the canopy. As White fir becomes the dominant overstory specie, Ponderosa pine's abundance will have greatly declined and Shasta red fir will be on the decline.

With long periods of fire exclusion the possibility of a stand replacement fire occurring goes up, due to the build up of fuels on the forest floor and a much heavier stocking density than the HCPC. When a stand replacing fire occurs all or almost all vegetation is consumed. All litter and organic matter are also consumed.

Lodgepole pine, a pioneering specie, is the first to get re-established. Depending upon seed source location light to very thick stands of lodgepole can establish. Over time one of two scenarios can possibly take place. The lodgepole pine continues to replace itself or ponderosa pine seedlings become established and the site moves back toward the HCPC.

The transition from the Ponderosa pine plant community to the White fir plant community is possible but unlikely.

## **State and transition model**



## State 1 Ponderosa pine-Shasta red fir

### Community 1.1 Ponderosa pine-Shasta red fir

Ponderosa pine and Shasta red fir dominate the overstory in the historic climax plant community. Shrub and grass cover are moderate. Longer fire return intervals (15-40 years) benefits the establishment of shasta red fir. The longer intervals also allow more forest fuels to build up leading to moderately intense fires. Shasta fir that survive fires will grow into the canopy becoming a seed source.

**Forest overstory.** The typical forest overstory composition of the HCPC.

**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.

Plant composition is expressed as "percent canopy cover". Species listed as "0" percent are present at less than 1 percent canopy cover.

Table 5. Ground cover

Tree foliar cover	40-50%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	3-7%
Forb foliar cover	0-1%

Non-vascular plants	0%
Biological crusts	0%
Litter	10-20%
Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	0-2%
Bedrock	0%
Water	0%
Bare ground	10-20%

**Table 6. Soil surface cover**

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	1-2%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	40-50%
Surface fragments >0.25" and <=3"	8-10%
Surface fragments >3"	0-2%
Bedrock	0%
Water	0%
Bare ground	20-30%

**Table 7. Canopy structure (% cover)**

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	8-10%	0-1%
>0.15 <= 0.3	0-1%	—	—	0-1%
>0.3 <= 0.6	0-1%	1-2%	—	—
>0.6 <= 1.4	0-1%	8-12%	—	—
>1.4 <= 4	—	—	—	—
>4 <= 12	8-10%	—	—	—
>12 <= 24	10-20%	—	—	—
>24 <= 37	8-10%	—	—	—
>37	—	—	—	—

## State 2

### White fir

### Community 2.1

#### White fir

Fire exclusion allows White fir to enter and become dominant in the stand. Ponderosa pine will drastically decline and Shasta red fir will maintain its presence, but slowly decline as White fir becomes more dominant. White fir will regenerate under its own canopy perpetuating its existence. Ground vegetation will decline due to increased shade.

Not until a series of fires or a stand replacement fire occurs will the stand composition change. Significant inputs in management are needed to move back to the HCPC. Removing all White fir and re-establishing Ponderosa pine and/or Shasta red fir can be done. Prescribe burning on a frequent basis to remove young white fir and create a seedbed to benefit ponderosa pine is an alternative.

**Forest overstory.** The typical forest overstory composition of 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.

Plant composition is expressed as "percent canopy cover". Species listed as "0" percent are present at less than 1 percent canopy cover.

**Table 8. Ground cover**

Tree foliar cover	25-35%
Shrub/vine/liana foliar cover	1-2%
Grass/grasslike foliar cover	8-10%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-40%
Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	0-1%
Bedrock	0%
Water	0%
Bare ground	10-15%

**Table 9. Soil surface cover**

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	70-80%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	8-10%

**Table 10. Canopy structure (% cover)**

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	1-2%	8-10%	0-1%
>0.15 <= 0.3	0-1%	—	—	—
>0.3 <= 0.6	0-1%	—	—	—
>0.6 <= 1.4	1-2%	—	—	—
>1.4 <= 4	3-5%	—	—	—
>4 <= 12	8-10%	—	—	—
>12 <= 24	20-30%	—	—	—
>24 <= 37	3-5%	—	—	—
>37	—	—	—	—

### State 3

#### Lodgepole pine

#### Community 3.1

#### Lodgepole pine

A stand replacement fire would consume all or almost all standing trees. After such a fire Lodgepole pine is the first species to re-establish. The re-establishment time frame is highly variable, meaning that Lodgepole establishment can be soon after a fire, or many many years later. Stocking can also vary greatly from light to heavy. Understory vegetation is sparse and composition make up is light.

**Forest overstory.** The typical forest overstory composition for the lodgepole 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.

Plant composition is expressed as "percent canopy cover". Species listed as "0" percent are present at less than 1 percent canopy cover.

**Table 11. Ground cover**

Tree foliar cover	25-35%
Shrub/vine/liana foliar cover	0-1%
Grass/grasslike foliar cover	10-15%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	5-10%
Surface fragments >0.25" and <=3"	1-3%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	20-30%

**Table 12. 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	20-25%
Surface fragments >0.25" and <=3"	1-5%
Surface fragments >3"	3-5%
Bedrock	0%
Water	0%
Bare ground	40-50%

**Table 13. Canopy structure (% cover)**

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	0-1%	0-1%
>0.15 <= 0.3	0-1%	1-3%	10-15%	—
>0.3 <= 0.6	0-1%	—	—	—
>0.6 <= 1.4	1-2%	—	—	—
>1.4 <= 4	1-3%	—	—	—
>4 <= 12	3-5%	—	—	—
>12 <= 24	20-30%	—	—	—
>24 <= 37	—	—	—	—
>37	—	—	—	—

## State 4 Ponderosa pine

### Community 4.1 Ponderosa pine

Fire returns of less than 10 years significantly benefits ponderosa pine. Fires of this time frame are likely to kill all seedlings and saplings of shade and moderately shade tolerant trees. Almost all ponderosa pine seedlings and saplings are killed except for a few. The few saplings that survive and grow, eventually developing bark thick enough to withstand frequent fires. These trees will eventually move into the canopy replacing old growth trees that will eventually die.

**Forest overstory.** The typical forest overstory composition for the lodgepole 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.

Plant composition is expressed as "percent canopy cover". Species listed as "0" percent are present at less than 1 percent canopy cover.

**Table 14. Ground cover**

Tree foliar cover	35-45%
Shrub/vine/liana foliar cover	5-10%
Grass/grasslike foliar cover	20-25%



Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-20%
Surface fragments >0.25" and <=3"	10-15%
Surface fragments >3"	1-5%
Bedrock	0%
Water	0%
Bare ground	10-20%

**Table 15. Soil surface cover**

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

**Table 16. Canopy structure (% cover)**

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	—	—	8-10%	0-1%
>0.15 <= 0.3	—	—	10-15%	—
>0.3 <= 0.6	—	—	—	—
>0.6 <= 1.4	0-1%	5-10%	—	—
>1.4 <= 4	0-1%	—	—	—
>4 <= 12	3-8%	—	—	—
>12 <= 24	25-30%	—	—	—
>24 <= 37	5-8%	—	—	—
>37	—	—	—	—

## Additional community tables

### Recreational uses

Hiking, backpacking, mountain biking, bird watching

### Wood products

Logs, firewood, posts, poles

## Other products

Native plants

## Contributors

C Ziegler

## 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	
Approved by	
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):**
- 
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:**
-