USDA Natural Resources
Conservation Service

Ecological site F006XY705OR
East Crater Lake Steep North Slopes

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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.

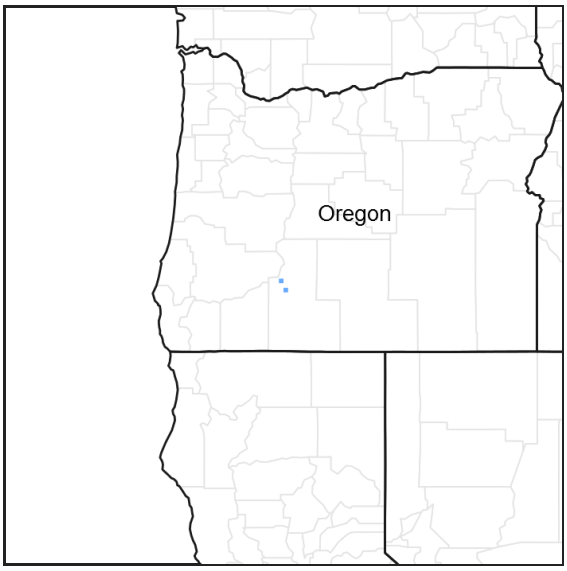


Figure 1. Mapped extent

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) *Pinus ponderosa*
Shrub	(1) *Arctostaphylos patula* (2) *Chrysolepis sempervirens*
Herbaceous	(1) *Carex inops*

Physiographic features

This site is on very steep, somewhat excessively drained and deep soils that formed from volcanic pumice and ash airfall.

Table 2. Representative physiographic features

Landforms	(1) Butte
Flooding frequency	None
Ponding frequency	None
Elevation	4,500–6,500 ft
Slope	30–70%

Water table depth	60 in
Aspect	N

Climatic features

Precipitation is low for the site. A majority of the precip. comes as snow from November thru April. Limited ranifall occurs from May thru Ocotber. Winters are cold and summers are warm.

Table 3. Representative climatic features

Frost-free period (average)	70 days
Freeze-free period (average)	107 days
Precipitation total (average)	30 in

Influencing water features

None

Soil features

This site is found on steep North-facing slopes of volcanic buttes; on soils formed in volcanic pumice and ash airfall and andesite lava deposits.

Table 4. Representative soil features

Surface texture	(1) Paragravelly loamy sand (2) Cobbly loamy sand (3) Ashy loamy sand
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Rapid to very rapid
Soil depth	60 in
Surface fragment cover <=3"	10–50%
Surface fragment cover >3"	0–20%
Available water capacity (0-40in)	3.6–6.6 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	15–50%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

The historic climax plant community would be dominated by Ponderosa pine, with a small percentage of Shasta red fir. Lodgepole pine could be present, but not always.

Under normal ecological processes low-moderate severity fires would occur approximately every 10-40 years. This fire return interval would maintain Ponderosa pine since it is more fire resistant that associated trees. Large Shasta red fir trees, that have escaped fire damage, could be present, but not in great numbers. Lodgepole pine could be present, only if it escaped the fires.

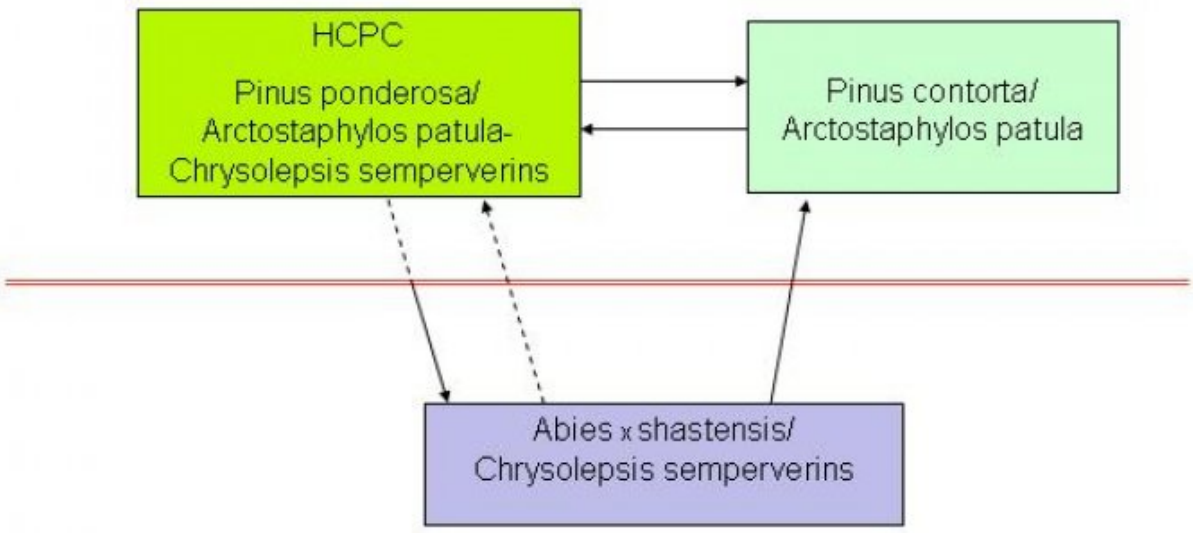
A grass/carex understory would be more common when fire burned more frequently (10-15 years). A brush-carex understory would be more common when fire burns less frequently (30-40 years).

Excluding fire would benefit the more shade tolerant Shasta red fir. By excluding fire seedlings would establish under the canopy, and over time become more numerous that Ponderosa pine. Given enough time Shasta red fir would be dominant or co-dominant with the pine. White fir could also become established, but at low numbers.

Brush cover will increase, initially, with fire exclusion, then it will decrease as the canopy closes and sunlight does not reach the forest floor. As the canopy closes shade tolerant brush species will increase. Grass cover will decrease with increased shade and Carex species will slowly decrease in cover as the canopy cover increases.

A stand replacement fire can possibly kill all trees. After such a fire, Lodgepole pine usually is the first tree to re-establish. Stocking can be light to very heavy. Heavy to very heavily stocked stand will eventually become susceptible to mountain pine beetle infestations. If attacked, generally all lodgepole tree succumb. If other tree seedlings/saplings are present they will flourish, and if not Lodgepole will re-establish itself.

State and transition model



State 1
Ponderosa pine Plant Community

Community 1.1
Ponderosa pine Plant Community

The Ponderosa pine plant community is the historic climax plant community. It was maintained by fire that naturally occurred. Ponderosa pine was the predominant tree with Shasta red fir also present in the canopy.

Forest overstory. The typical overstory composition for the historic climax 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 5. Ground cover

Tree foliar cover	25-30%
Shrub/vine/liana foliar cover	3-5%
Grass/grasslike foliar cover	5-15%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	15-20%
Surface fragments >0.25" and <=3"	1-5%
Surface fragments >3"	1-2%
Bedrock	0%
Water	0%
Bare ground	10-15%

Table 6. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	1-3%
Forb basal cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-30%
Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	2-7%
Bedrock	0%
Water	0%
Bare ground	20-30%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	–
>0.5 <= 1	–	–	10-15%	–
>1 <= 2	0-1%	–	–	–
>2 <= 4.5	0-1%	5-10%	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	1-5%	–	–	–
>40 <= 80	30-35%	–	–	–
>80 <= 120	8-10%	–	–	–
>120	–	–	–	–

State 2
Shasta red fir plant community

Community 2.1
Shasta red fir plant community

Fire exclusion allows Shasta red fir to increase its presence in the site. It regenerates under the pine-fir canopy and over time grows up into the canopy, becoming co-dominant and possibly dominant after many years of fire exclusion.

Forest overstory. The typical overstory composition for the Shasta red 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	25-30%
Shrub/vine/liana foliar cover	10-20%
Grass/grasslike foliar cover	0-1%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-30%
Surface fragments >0.25" and <=3"	1-3%
Surface fragments >3"	1-2%
Bedrock	0%
Water	0%
Bare ground	1-5%

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%
Non-vascular plants	0%
Biological crusts	0%
Litter	70-80%
Surface fragments >0.25" and <=3"	10-15%
Surface fragments >3"	1-5%
Bedrock	0%
Water	0%
Bare ground	1-5%

Table 10. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	0-1%
>0.5 <= 1	–	–	0-1%	–
>1 <= 2	–	–	–	–
>2 <= 4.5	1-2%	28-33%	–	–
>4.5 <= 13	1-2%	–	–	–
>13 <= 40	10-15%	–	–	–
>40 <= 80	25-30%	–	–	–
>80 <= 120	5-19%	–	–	–
>120	–	–	–	–

State 3
Lodgepole pine plant community

Community 3.1
Lodgepole pine plant community

Lodgepole pine will pioneer the site after a stand replacement fire occurs, if a seed source is available. Stocking density can be light to very heavy.

Forest overstory. The typical overstory composition for the Lodgepole pine 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	20-30%
Shrub/vine/liana foliar cover	20-25%
Grass/grasslike foliar cover	1-3%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-15%

Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	1-3%
Bedrock	0%
Water	0%
Bare ground	20-25%

Table 12. Soil surface cover

Tree basal cover	0%
Shrub/vine/liana basal cover	0%
Grass/grasslike basal cover	0-1%
Forb basal cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	20-25%
Surface fragments >0.25" and <=3"	5-10%
Surface fragments >3"	3-5%
Bedrock	0%
Water	0%
Bare ground	40-50%

Table 13. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	4-6%	–
>0.5 <= 1	–	–	–	–
>1 <= 2	0-1%	35-45%	–	–
>2 <= 4.5	0-1%	5-10%	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	1-3%	–	–	–
>40 <= 80	30-35%	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Additional community tables

Contributors

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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:**

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:

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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:**
