USDA Natural Resources
Conservation Service

Ecological site R022BI208CA
Cryic Pyroclastic Cones

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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.

MLRA notes

Major Land Resource Area (MLRA): 022B–Southern Cascade Mountains

Site Concept –
Slopes: 10 to 80 percent, but are generally 10 to 45.
Landform: Shoulders of Nunataks and cinder cones.
Soils: Well drained, shallow to moderately deep. Indurated bedrock is encountered between 10 to 40 inches. Skeletal soils with high percentage of cobbles and stones. There is 10 percent rock outcrop.
Temp regime: Cryic.
MAAT: 41 to 43 degrees F (5 to 6.1 degrees C).
MAP: 37 to 81 inches (940 to 2,057 mm).
Soil texture: Stony ashy loamy sand
Surface fragments: Range from 10 to 30 percent, with 5 percent subangular fine gravel, 1 percent subangular medium gravel, 5 percent subangular cobbles and 5 percent subangular stones.
Vegetation: A mixed shrubland with oceanspray (*Holodiscus discolor*), prostrate ceanothus (*Ceanothus prostratus*), rabbit brush (*Ericameria nauseosa* ssp. nauseosa var. nauseosa) and other forbs and grasses.

Associated sites

F022BI104CA	**Cryic Coarse Loamy Colluvial Slopes** This is a mountain hemlock forest found above this site.
F022BI111CA	**Cryic Gravelly Or Ashy Sandy Loam Gentle Slopes** This is a sub-alpine mixed-conifer forest that surrounds this site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Holodiscus discolor* (2) *Ceanothus prostratus*
Herbaceous	(1) *Eriogonum umbellatum*

Physiographic features

This ecological site is found on the shoulders of pyroclastic cones at 6,960 to 8,330 feet in elevation. Slopes range from 10 to 80 percent, but are generally between 10 to 45 percent.

Table 2. Representative physiographic features

Landforms	(1) Cinder cone (2) Nunatak
Flooding frequency	None
Ponding frequency	None
Elevation	6,960–8,330 ft
Slope	10–80%
Aspect	E, S, W

Climatic features

This ecological site receives most of its annual precipitation in the form of snow from November to April. The mean annual precipitation ranges from 37 to 81 inches (940 to 2,057 mm). The mean annual temperature ranges from 41 to 43 degrees F (5 to 6.1 degrees C). The frost free (>32 degrees F) season is 50 to 85 days. The freeze free (>28 degrees F) season is 65 to 190 days.

There are no representative climate stations for this site.

Table 3. Representative climatic features

Frost-free period (average)	85 days
Freeze-free period (average)	190 days
Precipitation total (average)	81 in

Influencing water features

This site is not influenced by wetland or riparian water features.

Soil features

This site is associated with the Xeric Vitricryands, bedrock soil component. These soils are well drained, shallow to moderately deep with very low available water capacity (AWC). They formed in tephra over residuum from volcanic rocks. The A1 and A2 horizons have a stony ashy loamy sand texture. Subsurface textures are extremely stony ashy sandy loam and very stony medial very fine sandy loam. Indurated bedrock is encountered between 10 to 40 inches.

This ecological site is associated with the following major soil components within the Lassen Volcanic National Park Soil Survey Area (CA789):

Map Unit Component Comp %
122 Xeric Vitricryands, bedrock 20

Table 4. Representative soil features

Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Not specified
Soil depth	10–40 in
Surface fragment cover <=3"	3–15%
Surface fragment cover >3"	8–15%
Available water capacity (0-40in)	0.4–2.14 in
Soil reaction (1:1 water) (0-40in)	6.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	5–40%
Subsurface fragment volume >3" (Depth not specified)	10–85%

Ecological dynamics

This ecological site is found on cinder cones and nunataks in the eastern portion of Lassen Volcanic National Park. A colorful combination of shrubs and forbs contrast against dark volcanic outcrops and rocks. Common plants include oceanspray (*Holodiscus discolor*), prostrate ceanothus (*Ceanothus prostratus*), rubber rabbit brush (*Ericameria nauseosa* ssp. nauseosa var. nauseosa), wavyleaf Indian paintbrush (*Castilleja applegatei* ssp. pinetorum), sulphur-flower buckwheat (*Eriogonum umbellatum* var. nevadense), and granite prickly phlox (*Linanthus pungens*). There is less than 10 percent cover of the larger montane shrubs such as greenleaf manzanita (*Arctostaphylos patula*), snowbrush ceanothus (*Ceanothus prostratus*), Sierra chinquapin (*Chrysolepis sempervirens*), and bitter cherry (*Prunus emarginata*).

This site is limited by water availability. Soils are 10 to 40 inches deep over indurated bedrock. Above the bedrock is a droughty coarse-textured soil with a moderate amount of cobbles and stones. In addition, this site is often situated on south-facing shoulders and ridges of cinder cones that are exposed to high solar radiation, resulting in water loss to evaporation, evapotranspiration, and natural drainage. Although the cinder cones receive abundant snow in winter, wind re-deposits the snow on the leeward side of the ridges, leaving them exposed early in the spring. Trees in this area seem to be anchored in bedrock outcrops, which likely provide shelter from wind, partial shade for seedling development, and fissures that allow for penetration of roots and water.

Due to the lack of large fuels, a fire would be relatively mild on this site. Lighting is common on the cinder cones, but fuel loads are light, patchy, and interlaced with bedrock outcrops. Fires could spread through patches, but would most likely remain small and be of low to moderate intensity.

State and transition model

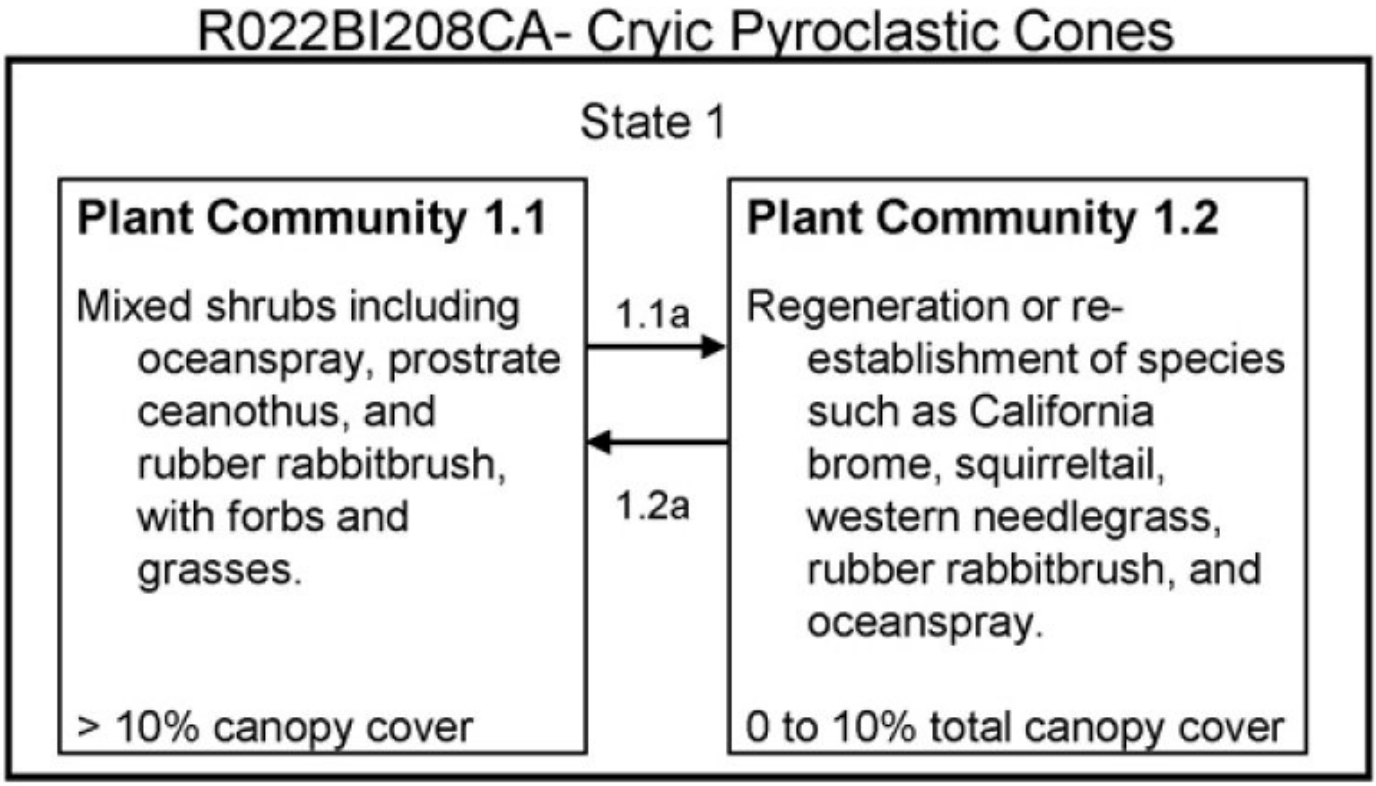

Figure 2. Cryic Pyroclastic Cone Model

State 1
Natural State

Community 1.1
Shrubs, forbs, and grasses.

Figure 3. Cryic Pyroclastic Cones

A mixed shrubland with forbs and grasses is the reference community for this ecological site. Trees will not successionally replace this community due to the characteristics of the site mentioned above. The dominant species include oceanspray (*Holodiscus discolor*), prostrate ceanothus (*Ceanothus prostratus*), and rabbitbrush (*Ericameria nauseosa* ssp. nauseosa var. nauseosa), Shrubs like oceanspray (*Holodiscus discolor*), bush chinquapin (*Chrysolepis sempervirens*), and greenleaf manzanita (*Arctostaphylos patula*) are well suited to this site. Oceanspray (*Holodiscus discolor*) occurs in many successional communities and is well adapted to fire and disturbance (Archer 2000). Bush chinquapin (*Chrysolepis sempervirens*) is very tolerant of the harsh, rocky conditions found here, and the seeds are preferred food for small mammals and birds (Howard 1992), attracting various wildlife species to the site. Greenleaf manzanita (*Arctostaphylos patula*), whose seeds are commonly

dispersed by birds and small mammals, also does well in dry environments such as this.

Forest understory. This plant community consists of mostly shrubs and sub-shrubs intermixed with a few forbs and grasses. The most notable species are oceanspray (Holodiscus discolor), rubber rabbit brush (Ericameria nauseosa ssp. nauseosa var. nauseosa), and sulfur-flower buckwheat (Eriogonum polyanthum). Large montane shrubs such as greenleaf manzanita (Arctostaphylos patula), snowbrush ceanothus (Ceanothus velutinus), bush chinquapin (Chrysolepis sempervirens), and bitter cherry (Prunus emarginata) provide less than 10 percent cover. There is a variety of other species including western needlegrass (Achnatherum occidentale), California brome (Bromus carinatus), squirreltail (Elymus elymoides), Lemmon's rockcress (Arabis lemmonii), wavyleaf Indian paintbrush (Castilleja applegatei ssp. pinetorum), naked buckwheat (Eriogonum nudum), sulphur-flower buckwheat (Eriogonum umbellatum var. nevadense), granite prickly phlox (Linanthus pungens), prostrate ceanothus (Ceanothus prostrates), and turpentine wavewing (Pteryxia terebinthina var. terebinthina). Total canopy cover is about 40 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	200	350	965
Grass/Grasslike	10	48	131
Forb	10	29	74
Total	**220**	**427**	**1170**

Table 6. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	0-2%
Grass/grasslike basal cover	0-1%
Forb basal cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-60%
Surface fragments >0.25" and <=3"	3-15%
Surface fragments >3"	8-25%
Bedrock	2-10%
Water	0%
Bare ground	0-5%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	0-3%
>0.5 <= 1	–	2-24%	1-10%	0-10%
>1 <= 2	–	0-2%	0-2%	0-1%
>2 <= 4.5	–	5-25%	–	–
>4.5 <= 13	–	2-18%	–	–
>13 <= 40	–	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Community 1.2
Barren with few shrubs, forbs, and grasses

Community 1.2 exists for several years after a fire. Fires are more likely to produce small burned patches than large-scale devastation. The native perennial bunch grasses present in this area can resprout from the root crown or germinate from on or off-site seed sources. Included are California brome (*Bromus carinatus*), squirreltail (*Elymus elymoides*) and western needlegrass (*Achnatherum occidentale*). Rubber rabbitbrush (*Ericameria nauseosa* ssp. nauseosa var. nauseosa) will not only resprout from adventitious buds on remaining roots and stems after a fire, it will germinate prolifically from off-site seed sources. It is likely to dominate early and stay abundant, along with the grasses. Oceanspray (*Holodiscus discolor*) is often top-killed by fire but resprouts from the root crown. It regenerates from stored seed as well, but seedlings are not usually abundant. Bush chinquapin (*Chrysolepis sempervirens*) can resprout after fire and regenerate from seed. Greenleaf manzanita (*Arctostaphylos patula*) is a fire dependent shrub because its seeds remain dormant in the soil until heat from fire scarifies the seed coat. The presence of greenleaf manzanita on this site may indicate past fires. Sometimes the canopy is enhanced after fire, although a full recovery may take 5 to 10 years. Other forb and grass species may resprout or regenerate from seed after fire as well. There may be a flush of post fire annuals.

Pathway 1.1a
Community 1.1 to 1.2

1.1a. Fire is the most likely disturbance for this site and would create small pockets of regeneration (Community 1.1).

Pathway 1.2a
Community 1.2 to 1.1

1.2a. With time and growth this pathway will lead to the recovery of the canopy cover (Community 1.1).

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Shrub/Vine					
1	**shrubs**			90–965	
	prostrate ceanothus	CEPR	*Ceanothus prostratus*	20–290	2–24
	greenleaf manzanita	ARPA6	*Arctostaphylos patula*	15–220	1–8
	oceanspray	HODI	*Holodiscus discolor*	15–120	5–25
	snowbrush ceanothus	CEVE	*Ceanothus velutinus*	0–100	0–2
	rubber rabbitbrush	ERNAN5	*Ericameria nauseosa ssp. nauseosa var. nauseosa*	20–95	2–8
	bush chinquapin	CHSE11	*Chrysolepis sempervirens*	20–80	1–4
	bitter cherry	PREM	*Prunus emarginata*	0–30	0–2
	pinemat manzanita	ARNE	*Arctostaphylos nevadensis*	0–30	0–2
Grass/Grasslike					
1	**grass/ grasslike**			10–131	
	squirreltail	ELEL5	*Elymus elymoides*	0–70	0–6
	western needlegrass	ACOC3	*Achnatherum occidentale*	10–45	1–4
	California brome	BRCA5	*Bromus carinatus*	0–16	0–2
Forb					
1	**forbs**			0–74	
	sulphur-flower buckwheat	ERPO16	*Eriogonum polyanthum*	0–20	0–2
	sulphur-flower buckwheat	ERUMN	*Eriogonum umbellatum var. nevadense*	0–20	0–2
	naked buckwheat	ERNU3	*Eriogonum nudum*	0–10	0–2
	silverleaf phacelia	PHHA	*Phacelia hastata*	0–8	0–2
	turpentine wavewing	PTTET	*Pteryxia terebinthina var. terebinthina*	0–5	0–2
	granite prickly phlox	LIPU11	*Linanthus pungens*	0–5	0–2
	wavyleaf Indian paintbrush	CAAPP4	*Castilleja applegatei ssp. pinetorum*	0–5	0–2
	Lemmon's rockcress	ARLE	*Arabis lemmonii*	0–1	0–1

Animal community

The shrub dominated plant community on this site provides important browse for wildlife. Oceanspray is a moderately important browse species for mule deer within the park. In addition to browse, species like oceanspray provide cover for large wildlife, and food and nesting habitat for small mammals and birds. Seeds produced by bush chinquapin are an important food source for ground squirrels and chipmunks, as well as birds. Flowers produced by buckwheat species host a variety of butterflies and moths. There are several forb and grass species growing here that are favored grazing species by wildlife.

Recreational uses

This site is situated on upper cinder cones that provide excellent views, but trails need to be designed carefully to prevent erosion.

Inventory data references

The following NRCS vegetation plots were used to describe this ecological site:

789200- site location
789250

Type locality

Location 1: Lassen County, CA	
Township/Range/Section	T30 N R6 E S1
UTM zone	N
UTM northing	4484003
UTM easting	647642
General legal description	The type location is near Red Cinder Cone, about 3.5 miles north-northeast of the new Juniper Lake ranger station.

Other references

Archer, Amy J. 2000. *Holodiscus discolor*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2009, September 19].

Howard, Janet L. 1992. *Chrysolepis sempervirens*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2009, September 19].

Simonin, Kevin A. 2001. *Elymus elymoides*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2009, September 24].

Tollefson, Jennifer E. 2006. *Bromus carinatus*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2009, August 26].

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:**

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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:**
