

Ecological site F004BX107CA

Redwood/western swordfern, hills, soft sandstone, clay loam

Accessed: 09/24/2026

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.

Associated sites

F004BX106CA	Redwood/Douglas-fir/California huckleberry/western swordfern, hills, soft sandstone, very gravelly loam F004BX106CA is found in conjunction with F004BX107CA as they are found in the same geographic location and on associated landforms.
F004BX111CA	Redwood/western swordfern-redwood sorrel, floodplains and terraces, loam F004BX111CA is found in conjunction with F004BX107CA but occurs along stream terraces and alluvial fans.

Similar sites

F004BX106CA	Redwood/Douglas-fir/California huckleberry/western swordfern, hills, soft sandstone, very gravelly loam F004BX106CA may resemble or be confused with F004BX107CA because the two sites are found in association with each other and the vegetation may initially appear similar. In F004BX106CA the shrub layer of California huckleberry dominates the understory, and in F004BX107CA, the forb layer of western swordfern dominates the understory. Ecological site 107 is also a more productive site due to soil factors and slope position.
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Table 1. Dominant plant species

Tree	(1) <i>Sequoia sempervirens</i>
Shrub	Not specified
Herbaceous	(1) <i>Polystichum munitum</i>

Physiographic features

This ecological site is found along the coast and inland between Goldbluffs beach and Prairie Creek, with areas northeast of Orick and east of Prairie Creek. It occurs on uniform to slightly convex summits, shoulders and backslopes of hills and steep mountain slopes. These hills are strongly sloping to steep.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	10 – 590 m
Slope	10 – 50 %
Water table depth	150 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is humid with cool, foggy summers, and cool, moist winters. Coastal influence limits the diurnal range in temperatures. Summer temperatures range from 65 to 70 degrees F. Mean annual precipitation ranges from 60 to 90 inches and usually falls from October to May.

Table 3 Representative climatic features

Frost-free period (average)	330 days
Freeze-free period (average)	330 days
Precipitation total (average)	2,290 mm

Influencing water features

There are no influencing water features on this site.

Soil features

These well-drained, very deep soils developed from colluvium and residuum derived from weakly consolidated sandstone and a conglomerate of the Prairie Creek Formation. They are very strongly to strongly acidic at 40 inches, with a dominantly loamy subsurface and rock content ranging from non-gravelly to extremely gravelly.

This ecological site occurs on the following soil components and map units:

Map Unit Soil Component

291 Ossagon

292 Ossagon
 293 Ossagon
 294 Ossagon
 291 Squashan
 292 Squashan
 293 Squashan
 294 Squashan

Table 4. Representative soil features

Surface texture	(1) Loam (2) Gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	15.24 – 22.86 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	4.5 – 5.5

Subsurface fragment volume <=3" (Depth not specified)	0 – 60 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The historical origins of fires within the northern Redwood Region remain unknown. Lightning-ignited fires are considered rare. However, Native American burning is thought to have played a major role by burning fires from the interior into the redwood zone (Veirs, 1996). Natural fire intervals ranged from 500 to 600 years on the coast, 150 to 200 years on intermediate sites, and 50 years on inland sites. The northern range of redwoods evolved within a low to moderate natural disturbance regime. (Veirs, 1979).

Surface fires likely modified the tree species composition by favoring the thicker-barked redwood (*Sequoia sempervirens*) and killing western hemlock (*Tsuga heterophylla*), tanoak (*Lithocarpus densiflorus*) and grand fir (*Abies grandis*) (Veirs, 1979). Western hemlock's shallow roots and thin bark make it susceptible to fire damage (Arno, 2002). The establishment of a western hemlock understory is increased by surface fires. This is due to the exposure of mineral-rich soil and the reduction of other plant competition (Veirs, 1979, Williamson, 1976). Tanoak seedlings and sapling-sized stems are often top-killed by surface fire, though larger stems may survive with only basal wounding (Tappeiner, 1984).

Both redwood and tanoak have the ability to re-sprout following fire (Veirs, 1996). After fire, redwood may sprout from the root crown or from dormant buds located under the bark of the bole and branches (Noss, 2000). The sprouting ability of redwood is most vigorous in younger stands and decreases with age. Frequent fire reduces tanoak's sprouting ability and tends to keep understories open (Arno, 2002). Fire exclusion would allow for the gradual increase of tanoak in the understory (McMurray, 1989).

A moderate fire could lead towards more of a mosaic in regeneration patterns. Patches of trees would be killed leaving others slightly damaged or unharmed. Douglas-fir (*Pseudotsuga menziesii*) regeneration would be favored in the large gaps that are created following a moderate fire, potentially leading to a larger proportion of Douglas-fir to redwood for several centuries (Agee, 1993). Without these gaps caused by fire, Douglas-fir regeneration is unsuccessful, and with continued lack of disturbance it may slowly be replaced by redwood as the dominant canopy species (Veirs, 1979, 1996).

California huckleberry (*Vaccinium ovatum*) is normally a fire-dependent shrub species; little is known concerning its adaptation to fire under low to moderate fire return intervals (Tirmenstein, 1990). It is a common species in both moist and dry redwood environments. Sprouting is widespread following fire and recovery may be rapid.

Red alder is present as a minor component on these sites. Red alder is a pioneering hardwood tree species that may quickly invade disturbed areas. It has been suggested that its historical distribution was more restricted than it is today (Franklin, 1981).

Pacific rhododendron (*Rhododendron macrophyllum*) is considered sensitive to fire and may sprout from the rootcrown or stembase following surface fire (Crane, 1990). After disturbance a decrease in plant cover is common, followed by a gradual increase over time.

Other potential disturbances in the redwood zone include winter storms that can cause top breakage. This breakage may kill individual or groups of trees and create small openings from windfall (Noss, 2000). This would likely favor the establishment of redwood and other shade tolerant conifers. On alluvial sites with periodic flooding, redwood may dominate, along with other colonizing hardwoods (Veirs, 1996). Where existing redwoods are inundated, new roots develop in newly deposited silt (Veirs, 1996).

Past harvesting and the use of fire as a slash treatment has altered species composition on many sites (Noss, 2000). Within many areas of the park, aerial seeding of Douglas-fir has led to a 10:1 ratio of Douglas-fir to redwood (Noss, 2000).

Redwood's interior range is largely contained within the coastal fog belt. Coastal fog ameliorates the effects of solar radiation on conifer transpiration rates (Daniel, 1942). Research in the redwood region (Dawson 1998) has indicated that fog drip and direct fog uptake by foliage may contribute significant amounts of moisture to the forest floor during summer months and over the course of the year.

State and transition model

Figure 3. Redwood/Western swordfern 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 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 6.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

The Redwood forest provides habitat for 61 species of mammals and approximately 100 native bird species. Historical predators included the grizzly (extirpated) and black bear, fisher and marten, mountain lion, fox, and bobcat. Ungulates include deer and elk. Many bird species use the redwood forest on a seasonal basis. Bird species include warblers, tanagers, sparrows, blackbirds, the Marbeled Murrelet, the Northern spotted owl and the Bald Eagle. Common reptiles found in forested areas would include the alligator lizard and garter snake. Amphibians are mostly associated with riparian and wetland areas. The northwest salamander and two newt species spend much of their lives in upland habitat.

Hydrological functions

Hydrologic Group: 291-Ossagon--C 292-Ossagon--C 293-Ossagon--C 294-Ossagon--B 291-Squashan--B 292-Squashan--B 293-Squashan--C 294-Squashan--B Refer to the Soil Survey Manuscript for further information.

Recreational uses

Limitations to recreational uses and development may occur due to slope considerations, soil texture and rock fragments.

Wood products

Redwood is a highly valued lumber because of its resistance to decay. Uses of redwood include house siding, paneling, trim and cabinetry, decks, hot tubs, fences, garden structures, and retaining walls. Other uses include fascia, molding and industrial storage and processing tanks. Douglas-fir is employed in residential structures and light commercial timber-frame construction. It is also used for solid timber heavy duty construction such as pilings, wharfs, bridge components and warehouse construction.

Other products

Redwood burls are used for tabletops, veneers, bowls and other turned products. Redwood bark is widely used as garden mulch. Douglas-fir is a very desirable Christmas tree; branches and cones are also used as materials for Christmas wreaths. California huckleberries are made into wine, as well as processed into pie fillings for home and commercial use. Foliage of the California huckleberry is used by florists in floral arrangements and to make Christmas decorations.

Other information

Pacific rhododendron is sometimes used for erosion protection on steep slopes. California Huckleberry leaves may be eaten by deer, and its berries are utilized by many bird and mammal species including bear, fox, squirrel, and skunk.

Table 11. 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
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redwood	SESE3	172	178	276	294	–	–	–	
Douglas-fir	PSME	135	160	138	170	–	–	–	

Inventory data references

Vegetation data was collected in association with soil pits or notes and on vegetation transects. MU Component Soil Pit # 293 Ossagon 03-059 04-036 03-069 04-025 03-062 294 Ossagon 03-011 04-038 03-050 04-028 291 Squashan 03-001 03-008 292 Squashan 03-002 293 Squashan 04-026 04-037 294 Squashan 04-030

Type locality

Location 1: Humboldt County, CA	
Township/Range/Section	T8 R2 S22
General legal description	Panther Creek Quad, 2.5 miles from CR 2960.

Other references

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Tappeiner, John C., II; Harrington, Timothy B.; Walstad, John D. 1984. Predicting recovery of tanoak (Lithocarpus densiflorus) and Pacific madrone (Arbutus menziesii) after cutting or burning. Weed Science. 32: 413-417.

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Viers, Stephen D. 1996. Ecology of the Coast Redwood. Conference on Coast Redwood Forest Ecology and Management. P 9-12.

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Williamson, Richard L.; Ruth, Robert H. 1976. Results of shelterwood cutting in western hemlock. Res. Pap. PNW-201. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 25 p.

Contributors

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:

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:
