

Ecological site F004BX109CA

Douglas-fir/redwood/tanoak/California huckleberry, mountain slopes, sandstone and schist, clay loam

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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.

Associated sites

F004BX103CA	Redwood-Douglas-fir/Pacific rhododendron, mountain slopes, sandstone, clay loam F004BX103CA is found in conjunction with this site.
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Similar sites

F004BX102CA	Douglas-fir-redwood/tanoak, mountain slopes, sandstone, clay loam F004BX102CA is similar in vegetation composition to this site but site productivity is higher for F004BX102CA than for F004BX109CA.
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Table 1. Dominant plant species

Tree	(1) <i>Pseudotsuga menziesii</i> (2) <i>Sequoia sempervirens</i>
Shrub	(1) <i>Lithocarpus densiflorus</i> (2) <i>Vaccinium ovatum</i>
Herbaceous	Not specified

Physiographic features

This ecological site is found within the Mill and Rock Creek watersheds. It occurs on dry, uniform to slightly convex summits and shoulders of broad ridges and upper mountain slopes. These mountain slopes are gently sloping to steep.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Mountain slope
Flooding frequency	None

Ponding frequency	None
Elevation	50 – 680 m
Slope	10 – 50 %
Water table depth	150 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is warm in the summer, with cool, moist in the winter. Coastal influence and fog is diminished by this sites distance inland from the coast. Lower slopes may receive some fog influence. The mean annual precipitation ranges from 80 to 100 inches and usually falls from October to May.

* Climate station data not representative for site, no local information available. The information below is based on the nearest climate station available.

Table 3 Representative climatic features

Frost-free period (average)	280 days
Freeze-free period (average)	280 days
Precipitation total (average)	2,540 mm

Influencing water features

There are no unique hydrological features on this site.

Soil features

These well-drained soils developed from colluvium and residuum derived from primarily sandstone and mudstone with small areas weathered from schist. They are strongly to very strongly acidic at 40 inches with a dominantly loamy subsurface rock content ranging from non-gravelly to very gravelly. These soils are dominantly very deep with small areas that are moderately deep to a lithic contact. Some soils on moderately to strongly steep summit positions may have a clayey subsurface texture group with minimal rock content.

Soils that have been tentatively correlated to this ecological site include the following.

Soil Survey Area: CA605 - Redwood National and State Parks

Map Unit Component

583 Wiregrass
584 Wiregrass
584 Scaath
585 Wiregrass
585 Rockysaddle
586 Rockysaddle

Table 4. Representative soil features

Surface texture	(1) Loam (2) Gravelly loam (3) Clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to slow
Soil depth	100 – 200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	5.08 – 20.32 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 – 50 %

Subsurface fragment volume >3" (Depth not specified)	Not specified
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Ecological dynamics

The historical origins of fires within this 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. This site has developed on mountain ridges and slopes in drier and warmer inland locations, and likely has a moderate natural disturbance regime.

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).

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).

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.

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.

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. Douglas-fir-redwood-tanoak/tanoak 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 many species of mammals and native birds. Predators include black bear, fisher and marten, mountain lion, fox and bobcat. Ungulates included deer and elk, which use the forested areas for foraging and cover. 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. Tanoak provides an important wildlife habitat for many animals, by providing forage and cover sites for mammals such as: squirrel, black bear and black-tailed deer; as well as many birds, including the band-tailed pigeon and various cavity nesters. 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

The site is subject to erosion where adequate vegetative cover is not maintained. Road building, timber harvest, and site preparation for planting may increase surface erosion and potential for mass wasting. Hydrologic Group 583 Wiregrass--C 584 Wiregrass--C 584 Scaath--C 585 Wiregrass--C 585 Rockysaddle--D 586 Rockysaddle--D

Recreational uses

Limitations to recreational uses and development may occur due to slope considerations, the amount of rock fragments, or soil permeability.

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. Tanoak is most widely used as a source of firewood. Manufacture of tanoak products has been limited due to lack of demand and difficulty in processing. When processed properly, it may be used for flooring or paneling. The wood may also be chipped for particle board and pulp manufacture.

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. Foliage of the California huckleberry is used by florists in floral arrangements and to make Christmas decorations.

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
redwood	SESE3	168	174	263	282	—	—	—	
Douglas-fir	PSME	115	150	106	158	—	—	—	

Inventory data references

Forestry data for this ecosite was collected at the following soil pits: Rockysaddle 585 04-138 Rockysaddle 586 04-107 Scaath 584 04-141 Wiregrass 583 04-107 Wiregrass 584 04-054 Wiregrass 584 05-007 Wiregrass 585 04-142 Wiregrass 585 04-137 Wiregrass 585 04-055 Wiregrass 585 04-055

Other references

Adams, W. T. et al, 1992. Reforestation Practices in Southwestern Oregon and Northern California. Forest Research Laboratory, Oregon State University, Corvallis, Oregon.

Agree, James K., 2000. Fire Ecology of Pacific Northwest Forests. Island Press.

Burns, Russell M., and Honkala, Barbara H., Technical Coordinators. 1990. Silvics of North America. Agricultural Handbook 271, Volumes 1 and 2. United Sates Department of Agriculture, Forest Service.

Contributors

Judy Welles

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:
