Ecological site F005XB101CA
Douglas-fir/tanoak, mountain slopes, sandstone and mudstone, 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

F005XB102CA	**Douglas-fir-tanoak/tanoak, mountain slopes, sandstone and mudstone, very gravelly clay loam** F005BX102CA is found in conjunction with this ecological site but it overlies loamy-skeletal soils and is less productive.

Table 1. Dominant plant species

Tree	(1) *Pseudotsuga menziesii* (2) *Lithocarpus densiflorus*
Shrub	(1) *Lithocarpus densiflorus*
Herbaceous	Not specified

Physiographic features

This ecological site is found near the Beaver and Pine ridge areas. It occurs on uniform to slightly convex summits of broad ridges and upper mountain slopes, which are strongly sloping and moderately steep to very steep.

Table 2. Representative physiographic features

Landforms	(1) Ridge (2) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	50 − 1,500 m
Slope	10 − 30 %

Ponding depth	0 cm
Water table depth	150 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is characterized by dry, warm summers, and cold, moist winters. Summertime temperatures range from 70 to 90 degrees F. The total annual precipitation ranges from 49 to 80 inches and usually falls as rain or snow from October to May.

The climate station data was taken from the nearest station and may vary from conditions found on the ecological site.

Table 3 Representative climatic features

Frost-free period (average)	250 days
Freeze-free period (average)	250 days
Precipitation total (average)	2,030 mm

Influencing water features

No influencing water features occur on this ecological site.

Soil features

These well-drained, very deep soils developed from colluvium and residuum derived from sandstone and mudstone. They are strongly to very strongly acidic at 40 inches with a dominantly loamy subsurface rock content ranging from non-gravelly to gravelly. Some soils may have a clayey subsurface texture group ranging from non-gravelly to very gravelly.

Soils that have been tentatively correlated to this ecological site include the following.
Soil Survey Area: CA605 - Redwood National and State Parks

Mapunit Symbols Soil Components

462 Mooncreek
462 Tossup

Table 4. Representative soil features

Surface texture	(1) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately slow

Soil depth	200 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	12.7 – 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 – 40 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

This site has evolved with natural disturbances from lightning-ignited fire and historic ignitions from Native American burning (Agee, 1993).

Generally this site has a low to moderate fire regime with occasional severe fires (Arno, 2002). Fire return intervals fluctuate from 10 to 30 years (Wills, 1994, Agree, 1991). Fire effects and the patterns of stand development in the mixed evergreen forest-type are complex and highly variable (Eyre, 1990). Often, multiple ages and sizes of trees are found on the same site.

Young Douglas-fir (Pseudotsuga menziesii) is has thin bark and will likely be killed by fire, while the thick-barked mature Douglas-fir is more resistant. Tanoak (Lithocarpus densiflorus) and other hardwoods are sensitive to fire but are able to re-sprout and so are able to maintain their presence following fire (Mc Murray, 1989).

Light surface fire will kill young tanoak, while older stands may survive. Moderate fire may kill some Douglas-fir but leave others. Tanoak and other hardwoods will re-sprout and grow rapidly. Severe fire may kill mature Douglas-fir and while enabling the re-sprouting of tanoak, which will then dominate a site for decades (Agee, 1991). Gradually, Douglas-fir will infill from adjacent areas, and eventually

overtop tanoak. This process could take many years depending on the size of the burned area.

There are a few potential pathways for stand development following fire (adapted from Agee 1993, Thornburg, 1982):

1) Immediately after a fire, Douglas-fir infills and tanoak will re-sprout. This causes a mixed stand with a mosaic of Douglas-fir in the overstory, and tanoak existing as a co-dominant tree in the sub-canopy. Some areas are dominated by tanoak, while other areas are primarily Douglas-fir (Jimerson, 1990).

2) Douglas-fir does not infill or there are large areas of fire-killed Douglas-fir; tanoak and other sprouting hardwoods may dominate the site for decades. Eventually, Douglas-fir overtops tanoak and dominates the site. Tanoak continues to exist in the sub-canopy.

Disturbance from timber harvesting is likely to mimic fire. Forest management may result in the dominance of hardwoods. The combined effects of fire and harvesting have increased the stocking and density of tanoak and Pacific madrone (Arbutus menziesii), as well as other shrubs.

Tanoak can establish under full shade and maintains itself through periodic diebacks. It sustains a shrub-like form until the canopy is opened, and then may rapidly attain tree status (McDonald and Tappenier, 1987). It may regenerate via seed or vegetatively.

Douglas-fir requires a mineral seedbed or light litter to regenerate. Light shade aids the first year’s survival. Thereafter, Douglas-fir requires full sunlight and will not survive under dense shade (Burns and Honkala, 1990).

State and transition model

Figure 3. Douglas-fir-tanoak model

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 2.1 plant community composition

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

Table 7. Community 3.1 plant community composition

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

Table 8. Community 4.1 plant community composition

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

Table 9. Community 5.1 plant community composition

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

Table 10. Community 6.1 plant community composition

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

Animal community

A wide variety of bird and animal species use the Douglas-fir/tanoak forest. The diversity of wildlife utilizing the site is influenced by the presence of the mast-producing tanoak and giant chinquapin, as well as berry producing species such as Pacific madrone and Oregon-grape (Mahonia aquifolium). Bird species that may utilize these upland sites include woodpecker, warbler, nuthatch, finche, and Stellar's jay. Other bird species include numerous hawks. Tanoaks are also used by cavity nesting birds, such as the downy woodpecker, northern flicker, red and white breasted nuthatch, brown creeper and house wren. Tanoak habitats are also food and nesting sites for the northern flying squirrel, Allen's chipmunk, and dusky-footed woodrat. Mammals such as the black-tailed deer, black bear, Townsend chipmunk, California ground squirrel, and redwood chickaree utilize tanoak for food and cover.

Hydrological functions

Runoff class is medium to high. The hydrologic groups, hydrologic conditions and runoff curves for each soil series are: Mooncreek 462--C 463--B 464--C Tossup 462--D 464--D Refer to the Soil Survey Manuscript for further information.

Recreational uses

This site can support a variety of recreational uses. Slopes exceeding 25% may limit trail development.

Wood products

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. The manufacturing of tanoak wood products is limited. Upper-grades produce good quality veneers and plywood. Tanoak flooring, paneling and decking have also been produced. Lower-grades are used to make pallets, crossties, mine timbers, baseball bats and tool handles. The wood had also been chipped for pulp and for use in the cogeneration of electricity. It is also widely utilized as firewood.

Other products

Tannin from tanoak bark is used commercially to cure leather. Berries from Cascade barberry are edible and are made into jams and pies. The foliage is utilized for decorative purposes. Historically, tanoak acorns provided a dietary staple for native americans throughout the California Coast Ranges.

Other information

Site productivity interpretations are based on the following site index curves: Species Curve# Base age Douglas-fir 790 100 years

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
Douglas-fir	*PSME*	120	160	115	170	–	–	–	

Inventory data references

Forestry data was collected in association with the following soils pits: Soil pit # Mooncreek 03-068 03-082 03-083 Tossup 03-066

Type locality

Location 1: Humboldt County, CA	
Township/Range/Section	T7N R3E S11
UTM zone	N
UTM northing	4540622
UTM easting	431790
General legal description	.25 miles north of Faulkner prairie on Barnum Timber land.

Other references

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Franklin, Jerry F. and Dyrness, C.T. 1973. Natural Vegetation of Oregon and Washington. Gen. Tech. Rep. PNW-8. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Southwest Range and Experiment Station. 417 p.

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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:**
