Ecological site F004BX117CA
Redwood-shore pine/California huckleberry-western Labrador tea/rush, marine terraces, silty eolian deposits over marine deposits, silt loam

Accessed: 09/20/2024

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.

Associated sites

F004BX124CA	**Redwood-Douglas-fir/California huckleberry-salal, marine terrace, silty eolian deposits over marine deposits, loam** F004BX124CA is found in conjunction with this site but it overlies well drained soils and is highly productive.

Table 1. Dominant plant species

Tree	(1) *Sequoia sempervirens* (2) *Pinus contorta ssp. contorta*
Shrub	(1) *Vaccinium ovatum* (2) *Ledum glandulosum*
Herbaceous	(1) *Juncus*

Physiographic features

This ecological site is of limited extent and is only found on an upper, dissected marine terrace southeast of Trinidad, CA, which was uplifted over 300,000 years ago. The site occurs on a uniform nearly flat to gently sloping surface.

Table 2. Representative physiographic features

Landforms	(1) Marine terrace
Flooding frequency	None
Ponding frequency	None
Elevation	520–800 ft
Slope	1–5%
Water table depth	4–10 in
Aspect	SW, W

Climatic features

The climate is humid with cool, foggy summers and cool, moist winters. Proximity to the coastal limits the diurnal range in temperatures. Mean annual temperature is 50 to 55 degrees. Total annual precipitation ranges from 60 to 71 inches and usually falls from October to May.

Table 3. Representative climatic features

Frost-free period (average)	325 days
Freeze-free period (average)	325 days
Precipitation total (average)	71 in

Influencing water features

Besides a high water table, no influencing water features appear on this ecological site.

Soil features

These very deep, poorly drained soils with an udic moisture regime were formed in silty eolian deposits over marine deposits on upper dissected marine terraces. Savagecreek soils contain a depleted gray E horizon and have redoximorphic features close to the surface indicating a high water table. The taxonomic class of these soils is fine, mixed, active, isomesic Typic Albaqualfs.

Soils that have been tentatively correlated to this ecosite include:

Soil Survey Area map unit component
CA605 254 Savagecreek

Table 4. Representative soil features

Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Slow
Soil depth	200 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	12 in

Calcium carbonate equivalent (0-40in)	0%
Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This ecological site occupies a marine terrace outside Trinidad, CA and is largely contained with the coastal fog belt. This site is of limited extent and the reference plant community is inferred as the entirety of the site has been harvested. The range of redwood (*Sequoia sempervirens*) is largely influenced by this coastal fog, which ameliorates the effects of solar radiation on conifer transpiration rates (Daniel 1942). Fog is a critical source of water in the summer months for redwood, which has high transpiration rates.

This ecological site differs from other redwood ecological sites in the region because of its poorly drained soils and their effect on vegetation composition. Site productivity of redwood is lower than that of the surrounding redwood ecological sites, as redwood is intolerant of extended periods of soil saturation. When the root zone of redwood becomes permanently saturated, the roots die for lack of oxygen and the tree dies (Veirs 1996). Shore pine (*Pinus contorta* spp. contorta) is able to quickly establish on this site as it competes well on nutrient poor or wet sites (Cope 1993). Plant species found on this ecological site are uniquely adapted to poorly drained conditions. Plants often found in saturated areas can be found on this site including: rush (Juncus spp.), rose spiraea (Spirea douglasii), Gentian spp., and western Labrador tea (*Ledum glandulosum*). Redwood is the dominant overstory tree species on this site but shore pine and Douglas-fir (*Pseudotsuga menziesii*) are also present.

The northern range of redwoods evolved within a low to moderate natural disturbance regime, with severe fire intervals ranging from 500 to 600 years on the coast (Veirs 1979). Fires could have historically occurred by lightning ignition or deliberate setting by Native Americans to create desirable hunting habitat (Veirs 1996). Whereas frequent surface fires on other redwood ecological sites may promote establishment of western hemlock in the understory (Veirs 1979), the poorly drained soils of this site may limit this successional shift. Redwood has the ability to resprout following fire from the root crown or from dormant buds under the bark of the bole and branches (Noss 2000). Previous harvest and the use of fire as a slash treatment can alter species composition on many sites (Noss 2000) as repeated burning can favor resprouting of redwood and hardwoods and limit the regeneration of Douglas-fir and other conifers. Shore pine is sensitive to fire, does not exceed 50 feet in height, and is short-lived (Cope 1993). However, recruitment of shore pine on this site is high and would be expected to provide for a continuously regenerating community of shore pine on this site. The limited height and longevity of shore pine could help create a subcanopy under the much longer lived and taller redwood.

Other dynamic ecological patterns include windthrow and non-native species invasion. Wind damage from winter storms can cause canopy top breakage which may kill individual trees or create windthrow gaps in the forest (Noss 2000). Pioneer species tolerant of this site's high water table could infill into these gaps in the canopy. The close proximity of this site to residential areas provides the opportunity for non-natives such as Pampas grass (*Cortaderia jubata*) and Spanish heath (*Erica lusitanica*) to colonize the site in early seral stages. These invasive species can colonize most quickly in early seral stages and may even out-compete native conifers and shrubs. Pampas grass invasion may prevent conifer seeding establishment and may even increase fire potential (DiTomaso). After conifer establishment and canopy closure decreases light levels in the understory, invasive species may be eliminated from the site.

Species often found in marshes and along riparian areas are found prevalently on this site. Rose spiraea, rush species, and gentian species are indicative of the high water table present on this site.

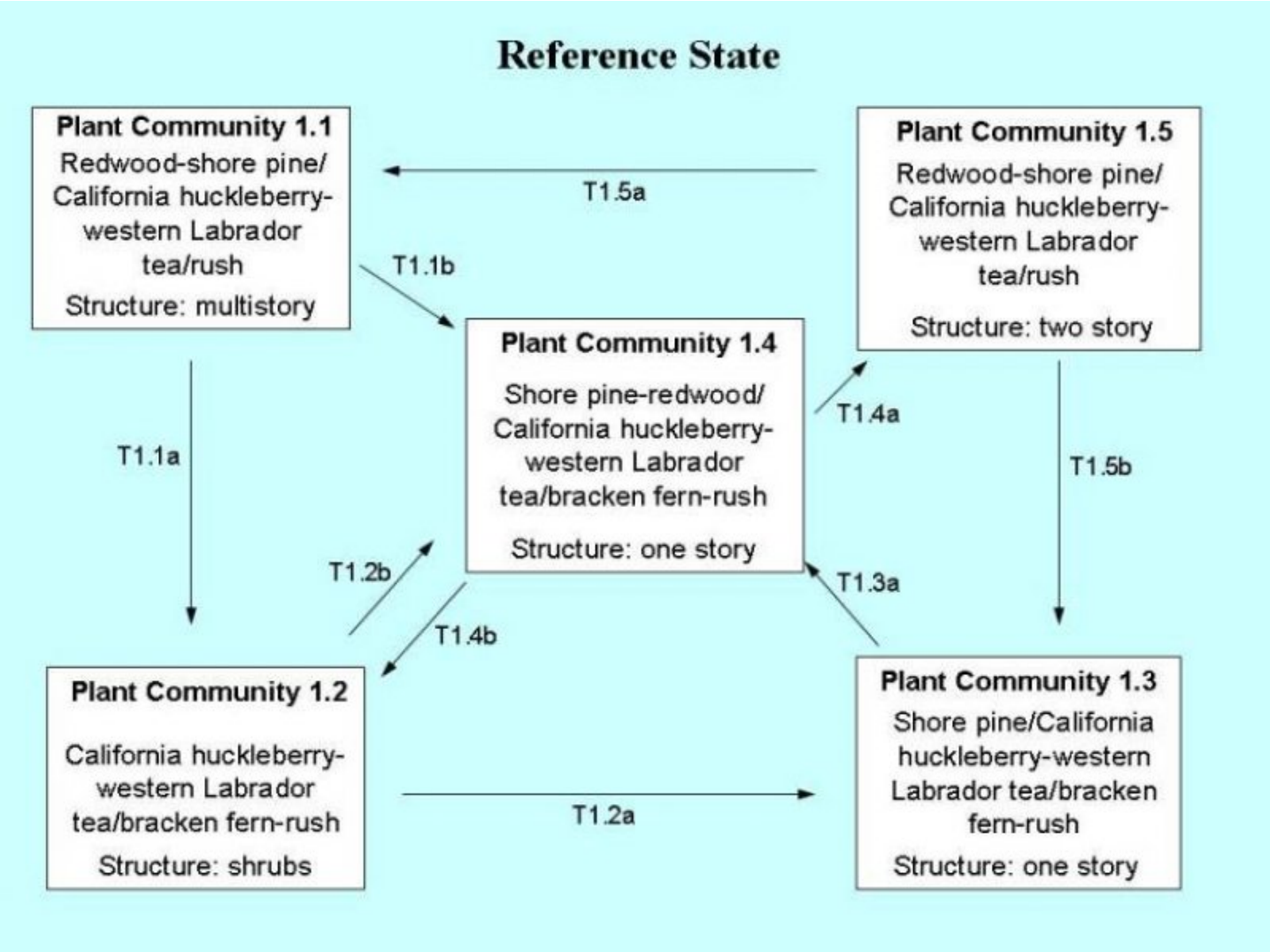
California huckleberry occupies a large percentage of the understory on this site. California huckleberry is a dominant shrub species across redwood ecological sites as it can thrive in both moist and dry environments. As California huckleberry is typically a fire-dependent species, sprouting can be widespread following natural fire or site preparation treatments (Tirmenstein 1990).

This ecological site occupies young marine terraces near Trinidad and Crescent City. The marine terrace sequence

around Trinidad demonstrates the fluctuations of sea level and tectonic uplift over the past 400,000 years. Six distinct marine terraces are identified in this area, the sediments of which we deposited during times of higher sea level (Woodward-Clyde Consultants). The youngest emergent terrace is found closest to the coast, and subsequently older terraces are found further east and at higher elevation. The oldest and highest terrace (Maple Stump) is found furthest east and exhibits the most soil development (Stephens 1982). Local eolian and colluvial deposits overlie the marine sediments on older terraces (Stephens 1982), which in the case of this ecological site influence drainage and vegetation patterns distinct from the other terraces. The A Line terrace, upon which this ecological site is found, likely formed about 300,000 years.

The effects of climate change on species distribution and viability need to be considered in this age of rapidly changed climate regimes. The western United States is already experiencing an increase in tree mortality across all tree cohort age classes, likely due to regional warming and water deficits (van Mantgem et al 2009). These forest structure changes may cause species to migrate to higher elevations, as much as 500-1000m, as temperatures increase in lower elevations (Urban et al 1993). Climate models project many different climate regimes for the north coast of California. One model predicts a warmer, wetter climate regime in which redwood may be able to expand into canyon live-oak-madrone and chaparral systems (Lenihan et al 2003). Climate change and its effects on vegetation patterns should be considered along with historical perspectives in ecological site development.

State and transition model



State 1
Plant Community 1.4

Community 1.1
Plant Community 1.4

This plant community phase is presently most common on this ecological site and will serve as the representative plant community for data collection. Shrub species tolerant to a high water table dominate this site following harvest or major disturbance. California huckleberry, western Labrador tea, salal, rush species, rose spiraea, deer fern, and bracken fern may be present in appreciable amounts. Redwood and shore pine will become established in this community phase but will not comprise a significant percentage of the canopy cover. T1.4a) Redwood and shore pine will eventually dominate the site and reduce light availability, lessening the dominance of the understory. Redwood will continue to grow and overtop the shore pine. T1.4b) Following block harvest, shrubs and colonizers of poorly drained soils will quickly occupy the site.

Forest overstory. The trees establishing in the understory consist of redwood and shore pine. These trees have yet to fully overtop the rest of the understory.

Average Percent Canopy Cover:

Redwood 1-5%
Shore pine 3-5%
Douglas-fir 0-1%

Forest understory. The understory is dominated by plants tolerant of poorly drained soils with western Labrador tea, California huckleberry, salal, western brackenfern, deer fern, rush, and spiraea species commonly present.

Average Percent Canopy Cover:

California huckleberry 10-20%
western Labrador tea 3-10%
salal 5-25%
western brackenfern 8-12%
deer fern 1-10%
rush 0-10%
spiraea 0-10%

State 2
Reference State - Plant Community 1.1

Community 2.1
Reference State - Plant Community 1.1

The reference plant community for this site is the presumed historic plant community prior to European settlement. This reference community is characterized by an overstory dominated by redwood (*Sequoia sempervirens*), a shore pine subcanopy, and a moderate cover of western Labrador tea (*Ledum glandulosum*), California huckleberry (*Vaccinium ovatum*), and rush species (Juncus spp.) in the understory. T1.1a) Block harvest or intensive fire would open up light and nutrients for pioneer species and shrubs to dominate the site. In these poorly drained soils, plants that grow well in marginal or saturated conditions will first establish, including western Labrador tea, bracken fern, rush species, and California huckleberry. T1.1b) As the market value of redwood is much higher than that of shore pine, selective cutting of redwood in the overstory could be a common management decision for this site. Selective harvesting of redwood could leave shore pine dominating the overstory.

State 3
Plant Community 1.5

Community 3.1
Plant Community 1.5

This plant community is dominated by redwood with multiple cohorts of shorter-lived shore pine in the subcanopy, creating a multi-tiered overstory. The more closed overstory will limit the cover of understory species. T1.5a) Over time the original cohort of shore pine will die off or be killed by a low level surface fire. New recruits of shore pine

could create a younger cohort in the subcanopy of this site. Longer-lived redwood will continue to dominate the site. The site will transition towards the reference plant community with a multi-layered canopy and more open understory. T1.5b) Selective cutting of redwood in this community phase may remove redwood from the site and create a more open canopy with only shore pine in the overstory.

State 4
Plant Community 1.3

Community 4.1
Plant Community 1.3

Over time or after shrub management, shore pine may infill onto the site if a seed source is present. Shore pine can quickly establish on nutrient poor and sandy soils. T1.3a) Redwood will begin to re-establish on site either from stump sprouts or adjacent seed sources and will grow to reach the height of shore pine.

State 5
Plant Community 1.2

Community 5.1
Plant Community 1.2

Following block harvest or major disturbance shrub species will colonize the site. Species tolerant of this site's high water table will also establish in the understory. T1.2a) Over time shore pine will infill into the site and begin to overtop the shrub layer. Redwood may take longer to resprout and become established in these poorly, drained soils. Shore pine can infill quickly onto nutrient-poor, sandy soils and will be the first conifer species to colonize this marginal site. T1.2b) If viable redwood stumps remain after harvest or other disturbance, redwood may resprout as readily as shore pine infills the site. These two conifer species may then establish on site as one cohort.

Additional community tables

Animal community

California huckleberry leaves may be eaten by deer, and its berries are utilized by many bird and mammal species including bear, fox, squirrels and skunks.

Hydrological functions

This site has a very high runoff potential because of the fine, poorly drained soils. These soils also have a moderately low saturated hydraulic conductivity.

The hydrologic groups, hydrologic conditions and runoff curves for the soils of this site are as follows:

254--Savagecreek--D

Recreational uses

As this ecological site has a limited extent and will likely not be targeted for widescale recreational use. Additionally, the poorly drained soils of this site are not suited for building trails or infrastructure.

Wood products

Although this site is not highly productive it may still be used for timber production.

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.

Shore pine is not highly valued for lumber but can be used as fuel. The wood of shore pine is light, brittle, and coarse grained.

Other products

California huckleberries are made into wine, and used by home and commercial processors for pie fillings. Berries from Rubus species can also be eaten raw or processed. Foliage of the California huckleberry and salal are used by florists in floral arrangements.

Other information

Site productivity interpretations are based on the following site index curves:

Species Curve Base age

Redwood 930 100 years

Table 5. 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*	50	55	27	33	–	–	–	

Inventory data references

Forestry data was collected in association with the following soils pits in the CA605 soil survey area:

Forestry plot# soil pit#
08F025 07-1235
08F026 07-110
08FT002

Type locality

Location 1: Humboldt County, CA	
Township/Range/Section	T8N R1W S13
UTM zone	N
UTM northing	4549377
UTM easting	0405164
General legal description	USGS Crannell Quadrangle.

Other references

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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:**

   _____

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):**

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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:**
