Ecological site group F004BL101CA
Very acidic marine terraces

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Key Characteristics

- Elevated coastal plains
- Dissected coastal plateaus with high acidity – LRU L
- Sea spray has a dominant influence on the soils and vegetation
- Soils with an E horizon present and strongly acidic (pH <5)
- Not with a wet layer depth <6"

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.

Physiography

The ESG is found on marine terraces and fluviomarine terraces close to the ocean on mostly gentle slopes (<15%) at elevations below 1,000 feet. It is mainly found between the ocean and the first main north-south ridge, where frequent heavy summer fog and sea spray are intercepted by a tree canopy, adding a significant amount of moisture to the soil.

Climate

The average annual precipitation in this MLRA is 23 to 98 inches (585 to 2,490 millimeters), increasing with elevation inland. Most of the rainfall occurs as low-intensity, Pacific frontal storms. Precipitation is evenly distributed throughout fall, winter, and spring, but summers are dry. Snowfall is rare along the coast, but snow accumulates at the higher elevations directly inland. Fog is a significant variable that defines this MLRA from other similar MLRAs. Summer fog frequency values of greater than 35% are strongly correlated to the extent of coast redwood distribution, which is a primary indicator species in this MLRA. Nightime fog is approximately twice as common as daytime fog and seasonally, it reaches its peak frequency in early August, with the greatest occurrence of fog from June through September (Johnstone and Dawson 2010). The average annual temperature is 49 to 59 degrees F (10 to 15 degrees C). The freeze-free period averages 300 days and ranges from 230 to 365 days, decreasing inland as elevation increases.

The Fort Bragg/Fort Ross Terraces form an elevated coastal plain that has less relief (200-800 feet) than the adjacent low elevation mountains of LRU K. Monthly and annual temperature variations are minimal and summer fog is common.

Soil features

Eolian sand deposits and depth to water table provide the growing conditions more suitable for Bishop pine and a less stunted pygmy cypress and shrubs to dominate. Representative soils are Cleone and Tregoning, both coarse-loamy soils that have an effective rooting depth that is limited by saturation for brief or long periods following episodes of heavy rain from December through April. The saturated zone starts between the depths of 30 and 48 inches and extends to a depth of more than 60 inches. These soils are nutrient poor and extremely acidic (<4.5 pH), contributing greatly to the stunted and twisted growth forms of the vegetation.

Vegetation dynamics

This provisional ecological site concept attempts to describe the basic understanding of the very acidic terraces of

LRU L. This concept is primarily supported through literature and available information from the Mendocino County Survey. This provisional ecological site concept covers the specific marine terraces that are very acidic and have a water table between 20-40 inches and are generally somewhat poorly drained. They are within close proximity to the coast and at the lower elevations that spend longer periods within the summer coastal fog. This site is similar to F004BL100CA, however the greater depth to water table and slightly less extreme acidity are both significant enough to impact vegetation composition and increase vegetation production. It is also commonly associated with F004BL100CA and F004BL102CA. Future work will need to be done to better understand the soil and site characteristics that drive the vegetation expression for this provisional ecological site concept.

This ecological site is a unique area within LRU L found on wave cut marine terraces that have restrictive horizons which perch water and are very low in pH. Hesperocyparis pygmaea (pygmy cypress) and *Pinus muricata* (Bishop pine) dominate the shallow and acidic soils within these wave cut terraces.

Soils have water available for plant growth most or all of the year, and average soil temperatures at a depth of 20 inches vary by less than 5 degrees C between summer and winter.

Primary Disturbances

The primary disturbance to this ecological site is urbanization and human developments that either de-water the site or completely obliterate it. Fire plays a prominent role in the life history and reproductive patterns of bishop pine, which is a prominent species in this ESG. Bishop pine is a serotinous, closed cone species, meaning some or all of its cones are locked shut until high heat loosens the resin coating the cones, unlocking seed chambers and allowing seed to be dispersed in large quantities following fire. Similar to other closed cone species, fires in bishop pine forests are often high intensity and stand replacing, though serotiny tends to be less pronounced in the northern portion of this species' range (Cope, 1993). This fire relationship is suggestive of historic fire occurrence in this ESG, but the frequency of fire among the bishop pine in this area is unclear and not well studied. Historically, fires caused by a mix of lightning, tribal burning and early ranching were common in coastal mountains of northern California.

Citations

Cope, Amy B. 1993. *Pinus muricata*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.usda.gov/database/feis/plants/tree/pinmur/all.html [2025, March 6].

Major Land Resource Area

MLRA 004B
Coastal Redwood Belt

Stage

Provisional

Contributors

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State and transition model

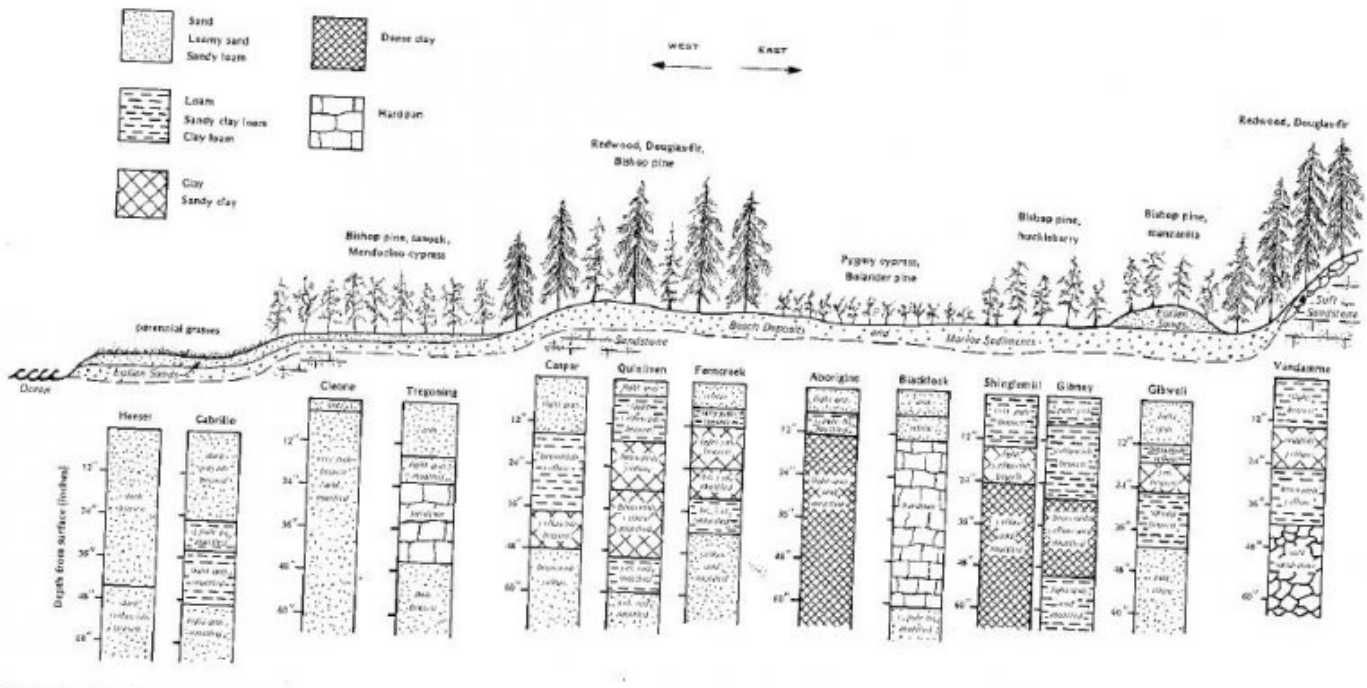

Figure 10.—Idealized illustration of the general relationships among marine terrace soils. This simplified cross-section is typical of the marine terraces near the town of Caspar. The width of the terrace system, from the ocean on the west to the mountainous uplands on the east, is approximately 4 miles at this location. Other cross-sections of the terrace system would reveal different combinations of soils. The upper terrace in this diagram represents perhaps three or more terrace levels. The diagram is not to scale.

State 1
Reference State

The dynamics described below are extremely general to the level that the site concept has been developed for provisional ecological site concept identification and further investigation purposes only. It is meant to give a general overview of the ecological dynamics of the system and should not be viewed as a model for a specific ecological site level management. It is supported by the current available literature that was reviewed for a general understanding of the system and basic understanding of the abiotic and biotic drivers. Further investigations and soil-site data collection and analysis should be conducted before specific land management can be applied at the ecological site specific scale. This STM only serves to explain the general ecology and dynamics. No alternative states were found during the literature review, however that does not mean they do not exist and more time should be spent determining whether or not this model captures all the dynamics of this system, especially once more is known about the soil-site characteristics of this LRU and ecological site concept. Reference State (State 1) – The reference state for this provisional ecological site concept is dominated by Hesperocyparis pygmaea (Mendocino or pygmy cypress) and *Pinus muricata* (bishop pine). Variation within this reference state relates primarily to the extent of acidity and degree of saturation. Drainage is generally poor, however depth to a water slowing horizon is greater than the soils in F004BL100CA that forms the bog-like conditions that produce the shortest stature pygmy cypress and supports a greater dominance of bolander pine, which has a greater tolerance for anaerobic conditions, nutrient poor often acidic soils. Bishop pine does better in more well drained conditions making the depth to water and sandier surface textures the crucial distinction between this ESG and the poorly-drained ESG. At this very general scale, this reference state only really captures the generalities related to the dominant functional group that is most dominant and does not capture the more specific dynamics and patterns that would be found at the more detailed and refined ecological site scale that focuses on specific abiotic factors that drive some of these various complex plant expressions within this very unique site concept. More data and refinement is needed to capture the information needed in order to make specific land management decisions at the ecological site-component scale.

Community 1.1
Reference Community Phase

The reference community for this site is a mix of stunted (<5 m) and less stunted (>5 m tall) pygmy cypress and bishop pines with *Arctostaphylos nummularia* (glossyleaf manzanita) as the most typical understory, growing as a

low mat form, along with a variety of other shrubs and herbaceous species and sphagnum bog. Together, Hesperocyparis pygmaea and *Pinus muricata* dominate the tree layer, while *Pinus contorta* ssp. bolanderi is absent. This is the most widely distributed expression of the H. pygmaea ESGs and is the only one found south of the Navarro River. Compared to the other two ESGs dominated by H. pygmaea, it has the widest distribution with the broadest range of average annual precipitation. In addition to being the most widespread, it is also the most biotically diverse of soil mapping units (CDFW, 2018).

Dominant plant species

- pygmy cypress (*Hesperocyparis pigmaea*), tree
- Bishop pine (*Pinus muricata*), tree
- glossyleaf manzanita (*Arctostaphylos nummularia*), shrub
- California wax myrtle (*Morella californica*), shrub
- Pacific rhododendron (*Rhododendron macrophyllum*), shrub
- tanoak (*Notholithocarpus densiflorus*), shrub

State 2

This state represents the intensive land uses that have significantly altered this ESG in a myriad of ways including removal of topsoil, fertilizer additions and other topsoil manipulations, hydrologic alterations that remove native soil fauna, among many other things and is typically due to urban developments, recreational activities, and intensive agriculture. More information about this state is needed to flesh out the various impacts these types of land uses/alterations have had on the ecological site in order to better understand how to manage these areas or potentially attempt restoration of these areas where possible.

Community 2.1
Intensive disturbance

This community phase represents all the varied land uses that significantly alter this ecological site group. This is an extremely varied community phase that includes all types of alterations that so significantly alter the ecological site that it is permanently changed and no longer has typical or even representative ecological dynamics. Land use models would be an appropriate option to develop these types of variations in altered landscapes. At this scale of grouping, specific drivers and triggers and expressions of communities is too varied and broad to be more specific. More data collection and field verification is necessary.

Transition T1
State 1 to 2

This transition is caused by significant human alterations that remove essential topsoil horizons, alter hydrologic functions, and/or add significant inputs that change soil chemistry and soil properties for housing developments, urban infrastructures or intensive cropping systems and force this ecological site over a threshold and change the function and structure of this site in extensive ways.

Citations