Ecological site group R004BI204CA
Coastal Scrub Shrublands

Key Characteristics

- Heavy coastal fog dominates the landscapes below 1500 ft.
- Soil moisture is udic – LRU I
- Soils supporting rangelands
- Soils supporting predominantly coastal scrub shrublands

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

This ESG encompasses all of the coastal shrublands found across the coastal ridgelines, rocky shallow slopes, and high wind bluffs of LRU I within MLRA 4B. Elevations typically range from sea level to 150 feet. Slopes vary considerably and aspects are generally south- or west-facing, but will also be found on exposed ridges or shallow slopes on all aspects.

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 low mountains of the Northern Franciscan Redwood Forest, LRU I, lie entirely within the coastal fog zone and are characteristically covered by fog-dependent coast redwoods and Douglas-fir. Historically, unbroken redwood forests occurred and moderated local climate by trapping coastal fog and producing shade. The combination of shade, root competition, young soils with a deep organic debris layer on the soil surface, occasional fire, and silting by floods limits the number of plant species that occur here.

Soil features

Soils vary but are typically mesic and finer-textured with skeletal subsurface horizons. They are well drained with low runoff. A representative soil for this ESG is Tsunami.

Vegetation dynamics

This provisional ecological site concept attempts to describe the coastal scrub areas of this LRU. They exist in a patchy dynamic of dense woody shrub cover and dense, tall herbaceous forbs and perennial grasses mainly along the coastal ridgelines, rocky shallow slopes, and high wind bluffs. As with much of California grasslands, introduced species have gained a significant presence across much of the variety of coastal scrub expressions contained

within this ESG. This concept lumps many of the unique scrub expressions into one large concept, due to limited soil mapping that successfully parses out the differences between these types and focuses primarily on the abiotic factors and ecological dynamics that maintain and/or alter these vegetative communities. The extent of this ecological site concept stretches along the coastline portions of LRU I. This provisional ecological site concept covers a wide variety of coastal scrub and prairie dynamics and expressions that will need to be further refined to better represent dynamics on a smaller, more ecologically specific scale.

Abiotic Factors

This ecological site is generally found between the coastal strand and forests of LRU A and LRU I. This site is generally found below 1000 ft. on the low coastal plains and terraces adjacent to the coastal strand and beaches. The primary factors that prevent these sites from developing into forest are the unstable substrates and high, salty winds that are common along the coastline. Plants in this ESG are highly adapted to the warmer days that dry out the soils, salty air and high winds that are prohibitive of trees and other shrubs commonly found in the adjacent mountains.

Although the soils of this provisional site concept are highly varied, they all share the common variable of higher soil moisture content throughout the year and in most cases the soils within this concept are on harsher and more skeletal soils than those of the coastal scrub sites to the south and inland from the coast.

Primary Disturbances

The primary disturbances to this ecological site are landslides that occur because of a dominance of unstable soils and wet storm events that provide enough water to destabilize the soil/slopes. Native American use along these coastlines would also have likely included burning for various resource management objectives. However, because there are few or no trees in these ecological sites, determination of historic fire frequencies as recorded in tree growth rings is impossible. There is significant debate about appropriate fire intervals in these plant communities and how frequently tribal ignitions (which are known to have been frequent in much of California's ecosystems) may have impacted these sites.

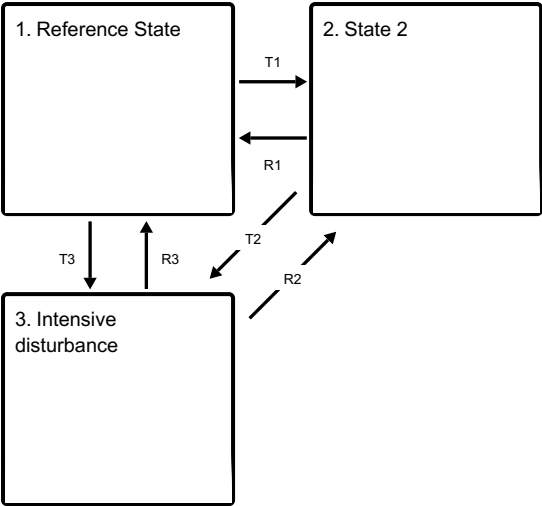## Major Land Resource Area

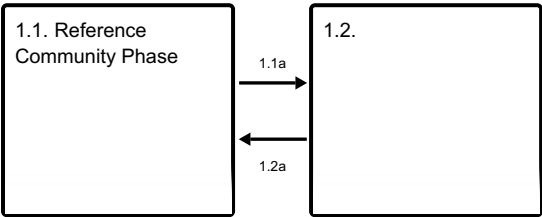MLRA 004B
Coastal Redwood Belt

Stage

Provisional
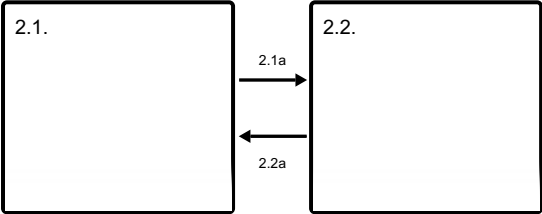
Contributors

Kendra Moseley
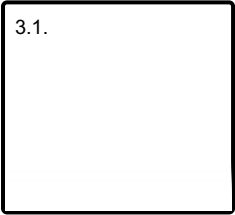
State and transition model

Ecosystem states

1. Reference State	2. State 2

T1 →
← R1

T3 ↓ ↑ R3

T2 ↙ ↗ R2

| 3. Intensive disturbance | |

State 1 submodel, plant communities

1.1. Reference Community Phase	1.2.

1.1a →
← 1.2a

State 2 submodel, plant communities

2.1.	2.2.

2.1a →
← 2.2a

State 3 submodel, plant communities

3.1.

State 1
Reference State

The dynamics described below are 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. Reference State (State 1) – This reference state includes a patchwork of coastal scrub dominated shrublands and dense, tall herbaceous forbs and grasses. These communities are all varied in size and extent, depending on the width of coastline available, elevation and slope, the geologic and soil substrates, and dynamics of disturbance. This variability requires further site investigation and field data collection to refine these communities to the appropriate ecological site scale for more specific site characteristics for each of these finer-scaled differences that have impacts on the land management decision-making process. The herbaceous component is less dominant in this ecological site due to the location of this site along the coastline and competitive abilities of the coastal scrub species to withstand the harsh winds, unstable soils and slopes, and salt spray.
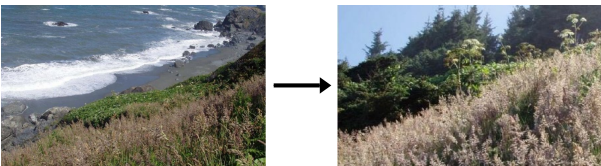
Community 1.1
Reference Community Phase

This community phase represents the most resistant and resilient community phase dominated by coastal scrub vegetation. The coastal scrub species are well adapted to the high, frequent summer winds and salty air and are highly competitive and capable of capitalizing on the available resources of the cool, maritime climate in this LRU. Coastal scrub can be found on the steep slopes, rocky bluffs, and exposed ridgelines. Where the site characteristics create less ideal growing conditions, the coastal scrub species are more consistently stable and uniform in their dominance, and receive less disturbance pressures that impact the ecological dynamics. However, in the areas where the site characteristics are ideal for plant growth (lower slopes, higher fertility soils), the coastal scrub species are more intermixed with herbaceous species and are less likely to be uniform, and more likely to be experiencing a multitude of pressures from disturbances both natural and manmade. This community phase is generally dominated by *Baccharis pilularis* (coyotebrush), with *Eriogonum latifolium* (seaside buckwheat), *Coreopsis gigantea* (giant coreopsis), *Dudleya caespitosa* (sealettuce), and *Erigeron glaucus* (seaside fleabane). Other species that are commonly found throughout this community phase include *Toxicodendron diversilobum* (poison oak), Heracleum lanatum (cowparsnip), *Rubus ursinus* (blackberry), *Rubus parviflorus* (thimbleberry), and *Polystichum munitum* (swordfern).

Community 1.2

This community phase represents the herbaceous dominated vegetation. This community phase is most common on the flatter or more concave depressions where water tends to collect more often, creating moist conditions that herbaceous species compete well. This community is currently dominated by a variety of perennial and annual forbs and some grasses and grass-likes.

Pathway 1.1a
Community 1.1 to 1.2

Reference Community Phase

This pathway occurs due to significant weather events that either create too much water input and begin to drown out the shrub species or too little water for too long that begins killing off the scrub species. Other possibilities would be slope slumping or movement of the soils that results in the mortality of the shrubs and favors the conditions for herbaceous species, or fire that thins out shrubs.

Pathway 1.2a
Community 1.2 to 1.1

Reference Community Phase

This pathway occurs over time as the coastal scrub species re-establish or encroach into the grasslands where

grazing has been removed or fire is infrequent. This pathway may also be hastened during periods of excessive moisture that favor the scrub species over the herbaceous plants.

State 2
State 2

This state represents the community phases that have been invaded by non-native species. This ecological site is highly susceptible to non-natives and invasives. Non-natives and invasives are able to capitalize quickly on available resources much better than the native species can, especially during years that are hotter and drier than average.

Community 2.1

This community phase is very similar to CP 1.1, however there is also a significant component of non-native and invasive species. This community phase is still generally dominated by *Baccharis pilularis* (coyotebrush), and other species common in the reference community phase however *Rubus armeniacus* (Himalayan blackberry) is a significant species and much of the herbaceous component is either non-native forbs and grasses.

Community 2.2

This community phase represents all the different community expressions of the herbaceous dominated phase of the invaded state. Common species found in this phase include *Anthoxanthum aristatum* (annual vernalgrass), Dactylis glomeratum (orchardgrass) and *Holcus lanatus* (common velvetgrass).

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs due to significant weather events that either create too much water input and begin to drown out the shrub species or too little water for too long that begins killing off the scrub species. Other possibilities would be slope slumping or movement of the soils that results in the mortality of the shrubs and favors the conditions for herbaceous species, heavy grazing, or fire.

Pathway 2.2a
Community 2.2 to 2.1

This pathway occurs over time as the coastal scrub species re-establish or encroach into the grasslands where grazing has been removed or fire is less frequent. This pathway may also be hastened during periods of excessive moisture that favor the scrub species over the herbaceous plants.

State 3
Intensive disturbance

This state represents the intensive land uses that have significantly altered this ecological site due to urban developments, recreational activities, and 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 better manage of these areas or potentially attempt restoration of these areas where possible.

Community 3.1

This community phase represents all the varied land uses that significantly alter this ecological site. 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.

Transition T1
State 1 to 2

This transition occurs when the seed source is introduced to the ecological site. This ecological site is more

resistant to outside pressures like invasive species due to its location on the landscape and difficult growing conditions. The threshold is crossed when feedback mechanisms shift from natural dynamics to feedback mechanisms that cater to the invasive species.

Transition T3
State 1 to 3

This transition is caused by significant human alterations that force this ecological site over a threshold and change the function and structure of this site in extensive ways.

Restoration pathway R1
State 2 to 1

This restoration pathway occurs through the control of invasive species that can potentially restore this ecological site to its reference state. It is more likely that the invasions are minimized and controlled, but complete removal of the invasives may not be possible without significant time and money inputs and repeated treatments.

Transition T2
State 2 to 3

This transition is caused by significant human alterations that force this ecological site over a threshold and change the function and structure of this site in extensive ways that serve mostly intensive agriculture or urban/housing developments.

Restoration pathway R3
State 3 to 1

This restoration pathway occurs only when significant time and money inputs that would require constant maintenance and weed management and should be focused on areas that have not been permanently altered by urban developments. This restoration pathway may be less likely than R2, since most of these very altered landscapes will be more hospitable to invasive species than to the native species that are more particular and require specific growing conditions that may not be replicable due to the alterations to the site that had occurred.

Restoration pathway R2
State 3 to 2

This restoration pathway occurs only when significant time and money inputs are focused on areas that have not been permanently altered by urban developments. This restoration pathway may be more likely than R3, since most of these very altered landscapes will be more hospitable to invasive species than to the native species that are more particular and require specific growing conditions that may not be replicable due to the alterations to the site that had occurred.

Citations

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