Ecological site group R004BO200CA
Windy coastal plains

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Key Characteristics

- Elevated coastal plains
- Not dissected coastal plateaus with high acidity -LRU O
- Other than protected, narrow, low elevation slopes.

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 is generally found between the coastal strand and redwood and Douglas-fir forests of LRU O and LRU N. This site is generally found below 1000 ft. on the low coastal plains and terraces adjacent to the coastal strand and beaches.

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.

Soil features

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 thicker, more organically rich soils than those of the coastal scrub sites to the south and inland from the coast. The cooler, maritime temperatures allow for more soil moisture during the hotter summer days, and the organic matter turnover is greater in these scrub and prairie communities as a result.

Vegetation dynamics

This provisional ecological site concept attempts to describe the coastal scrub and coastal prairies of this small LRU. They exist in a continuum of herbaceous to dense woody shrub cover wherever the cooling influence of the Pacific Ocean moderates the summer drought (high evapotranspiration rates). This concept lumps many of the unique scrub and prairie expressions into one large concept, due to limited soil mapping that successfully parses out the differences between these types and focuses primarily on the primary abiotic factors and ecological dynamics that maintain and/or alter these vegetative communities. The extent of this ecological site concept stretches along the coastline from approximately Mori Point to the north tip of Monterey Bay. 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

The primary factors that maintain these sites in either coastal scrub or coastal prairie are the unstable substrates and high, salty winds that are common along the coastline and their adaptability to the warmer days that dry out the soils too much for trees and other shrubs commonly found in the adjacent mountains. Coastal scrub and herbaceous species are more readily able to colonize and stabilize and adapt to these heavy winds and salty conditions, which explains why they dominate these open plains along the coast line.

Primary Disturbances

The primary disturbances to this ecological site concept are fire, grazing and in some areas, unstable soils. Historically, lightning-ignited fires are thought to have occurred in the surrounding forested habitats every 30-135 years and with the winds, would have burned significant acres across many soil types and landforms. Between soil and landform differences and frequencies and intensities of burning that would be interacting with yearly weather patterns that shifted between wet years to drier years, this would have created a patchwork of areas that returned over time to forest while others remained in coastal scrub and grassland. It is also believed that native grazers were common in these lower gradient coastal plains and may have contributed to the open nature and complex patchwork of coastal scrub and prairies. In combination with the fires and periodic droughts, grazers may have assisted in maintaining areas with good soils in more herbaceous vegetation and the less ideal soils in a more coastal scrub and grass patchwork expression. Native American use along these coastlines would also have included burning to maintain as much of the coastal prairies as possible, often times quite frequently to improve hunting and grass and forb production for plant harvesting.

Historically, this ecological site would likely have been much more extensively covered by the coastal prairies due to the repeated burnings by many of the coastal tribes and the scrub species would have likely been more confined to the rocky bluffs, steep slopes, and exposed ridges. As the fires became less and less frequent, the coastal scrub species was able to encroach back into the prairies and dominate much of the coastline. Areas where grazing still occurs either by livestock or native grazers, tend to maintain the open prairies, however they have become a mix of native perennials and forbs and annual grasses and forbs since the introduction of the non-native seed sources and heavy pressures from grazing. Fire to this ecological site is less likely now, due to the urban development and cultivation of much of these areas along the coast.

Major Land Resource Area

MLRA 004B
Coastal Redwood Belt

Stage

Provisional

Contributors

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State and transition model

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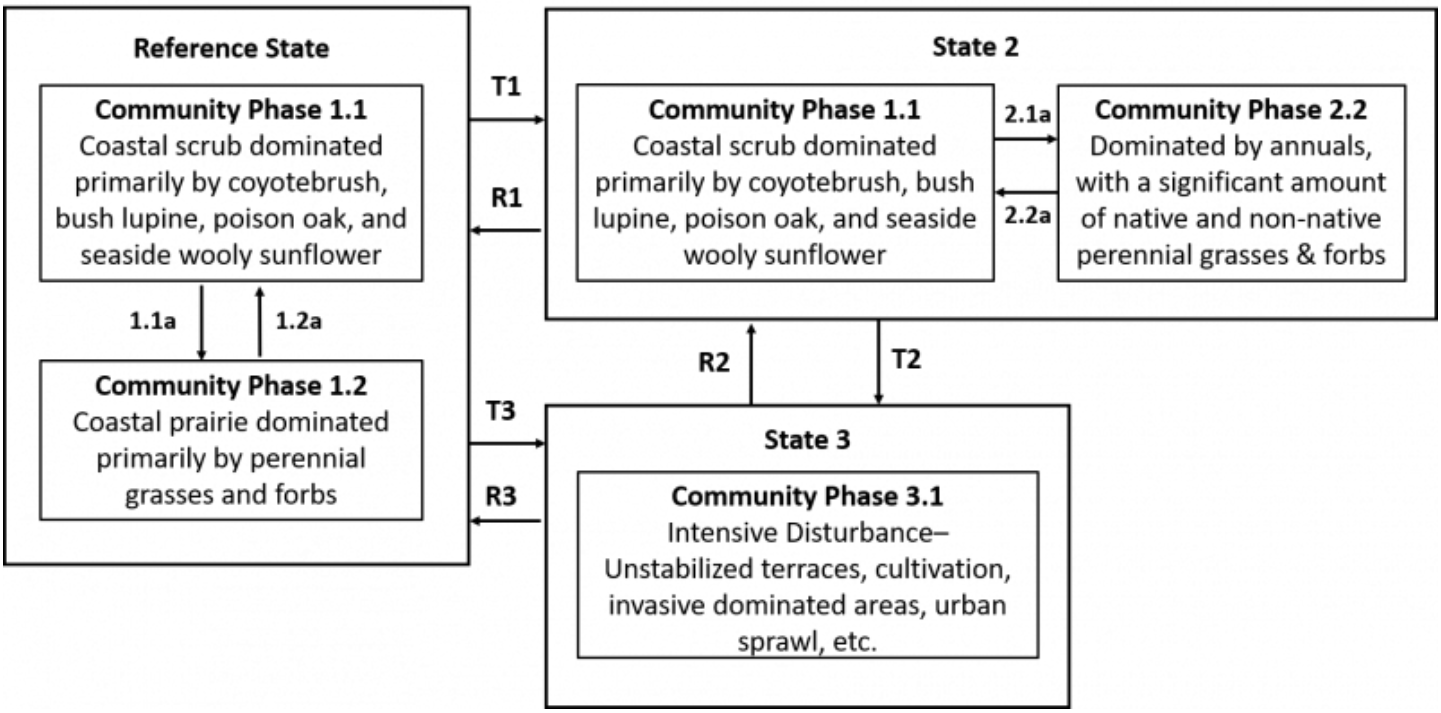

State 1
Reference State

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 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 coastal prairie dominated grasslands. 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 coastal prairie is less dominant in this ecological site due to the infrequent fires, and reduction in grazing activities that would have assisted in keeping the coastal scrub species from encroaching into the prairies and dominating the overstory structure. Much of this ecological site is now coastal scrub and dominated primarily by coyotebrush.

Community 1.1
Reference Community Phase

This community phase represents the more stable and 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, sandy and loamy plains, 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) dominated type,

however there will be areas dominated by *Ceanothus thyrsiflorus* (blueblossom ceanothus), and *Lupinus albifrons* (silver bush lupine). Other species that are commonly found throughout this community phase include *Toxicodendron diversilobum* (poison oak), *Eriophyllum stoechadifolium* (seaside woolly-sunflower), *Scrophularia californica* (California figwort), *Polystichum munitum* (swordfern), *Artemisia californica* (Califonia sagebrush), *Danthonia californica* (California oatgrass), Bromus californica (California brome), Nasella pulchra (purple needlegrass), and *Leymus triticoides* (creeping wildrye).

Community 1.2

This community phase represents the coastal prairie vegetation. This community phase is most common on the flatter coastal plains where grazing practices assist in maintaining the herbaceous cover. Historically, the community phase was also maintained by more frequent fires by the Native Americans living along the coastline that were dependent on the food and materials the herbaceous communities provided. This community is currently dominated by native perennial grasses such as *Danthonia californica* (California oatgrass), Bromus californica (California brome), Nasella pulchra (purple needlegrass), and *Leymus triticoides* (creeping wildrye). Other species will include *Polystichum munitum* (swordfern), and a variety of perennial and annual forbs—many of which are endemic and disappearing due to loss of habitat and invasive species pressures.

Pathway 1.1a
Community 1.1 to 1.2

This pathway occurs after a fire or grazing that is sufficient enough to remove most of the woody species and open the canopy and soil resources to the herbaceous species. This pathway may also include periods of extended drought or extended periods without summer fog that is common to this LRU, creating drought stress to the coastal scrub species that require sufficient summer soil moisture to survive the summer heat. Herbaceous species may capitalize on this drought-caused mortality.

Pathway 1.2a
Community 1.2 to 1.1

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 infrequent. This pathway may also be hastened during periods of excessive moisture that favor the scrub species over the herbaceous plants.

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, especially in Community Phase 2.2, given the current types of pressures from human use in this LRU. 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. This state is like State 1, with a shift in herbaceous dominance from perennials over to annuals and invasives.

Community 2.1

This community phase is similar to CP 1.1; however, the dominant herbaceous understory is annual grasses and forbs.

Community 2.2

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.

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs after a fire or grazing that is sufficient enough to remove most of the woody species and open

the canopy and soil resources to the herbaceous species. This pathway may also include periods of extended drought or extended periods without summer fog that is common to this LRU, creating drought stress to the coastal scrub species that require sufficient summer soil moisture to survive the summer heat. Herbaceous species may capitalize on this drought-caused mortality.

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 infrequent. 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 not highly resistant to outside pressures like invasive species, and in Community Phase 1.2 the site is most at-risk of this type of invasion. 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