COASTAL SCRUB

Climate Change Vulnerability and Adaptation Strategies for the Santa Cruz Mountain Region

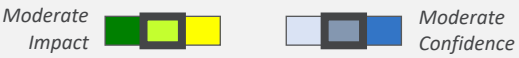
Habitat Description

Coastal scrub ecosystems are dominated by drought-deciduous or semi-evergreen shrubs with shallow root systems, and are distributed within areas influenced by coastal fog. Coastal scrub dominance and composition varies across sites depending on the influence of salt deposition, water availability, post-disturbance succession, soils, and topography. In the Santa Cruz Mountains region, commonly associated species include coyote brush (*Baccharis pilularis*), brambles (*Rubus* spp.), coffeeberry (*Frangula californica*), and poison oak (*Toxicodendron diversilobum*), among others.

Photo © Laura Hilberg

Habitat Vulnerability

Sensitivity & Exposure



Projected Changes	Trend
Air temperature	▲
Precipitation	▲▼
Soil moisture	▼
Coastal fog	▼
Drought	▲

Potential impacts:

- Increased moisture stress due to greater evaporative demand and reduced frequency of days with coastal fog
- Altered succession regimes for key shrub species due to changes in the amount and/or timing of precipitation and soil moisture (e.g., increased risk of conversion to dominance of grasses under drier conditions; possible expansion of coyote brush into adjacent habitats under wetter conditions)
- Reduced extent, productivity, species richness, and herbaceous cover during periods of drought

Disturbance regimes and *non-climate stressors* have a relatively low impact on climate change sensitivity of coastal scrub within the study region. However, these factors have a strong influence on successional dynamics.

Although coastal scrub has relatively low sensitivity to disturbance regimes and non-climate stressors, changes in climate factors that influence plant water availability are likely to influence functional group dominance and patterns of succession.

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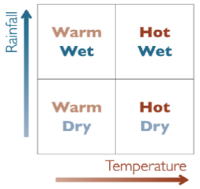
Modeled Changes in Vegetation Distribution

	San Francisco	Santa Cruz Mtns. North	Santa Cruz	Sierra Azul
Coastal Scrub				

Climate Future



Coastal scrub vegetation is likely to decline across the region, particularly under hotter scenarios.

Adaptive Capacity

Moderate Adaptive Capacity   *Moderate Confidence*

Intrinsic factors (i.e., inherent characteristics) that enhance or undermine adaptive capacity:

- ▲ Widely distributed in the region
- ▲ Provides habitat for diverse plant and wildlife communities
- ▲ Well-adapted to drought and wildfire
- ▲ Rapid recovery allows opportunistic expansion into adjacent disturbed areas
- ▼ Significant declines in structurally-diverse, species-rich coastal scrub due to fragmentation and loss of historical disturbances and microsite variability
- ▼ Reduced plant dispersal, gene flow, and wildlife movement in fragmented habitats

Extrinsic factors (i.e., management potential) that enhance or undermine adaptive capacity:

- ▲ Valued by the public for aesthetics and recreation; growing recognition of the value of mature, structurally-diverse communities
- ▼ Limited public understanding of habitat value for biodiversity (including pollinators) and erosion control

Although coastal scrub habitats are widespread, mature, high-quality habitats have been lost and the majority of remaining areas are degraded and dominated by coyote brush.

Key Climate Vulnerabilities: ***Coyote Brush***

Low Vulnerability   **High Confidence**

Coyote brush (*Baccharis pilularis*) establishment and growth is strongly tied to water availability, and shifts in patterns of precipitation, soil moisture, and drought are likely to alter successional dynamics within grasslands and shrublands by driving expansion or contraction of coyote brush relative to adjacent habitats. Generally, increases in spring rainfall and/or overall increases in annual precipitation would likely increase the rate of spread, while drier conditions and periods of drought would drive declines in survival and recruitment. Because coyote brush can grow under a wide range of conditions and is well-adapted to disturbances, this species has low sensitivity to climate-driven changes in disturbance regimes as well as non-climate stressors.

Factors that enhance or undermine adaptive capacity:

- ▲ Common and widely distributed species
- ▲ Produces many wind-dispersed seeds, enabling rapid recovery and colonization of disturbed areas
- ▼ Often considered a problematic species due to encroachment into coastal prairie
- ▼ Management generally focuses on reduction of coyote brush presence in more sensitive habitats

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Adaptation Strategies for Coastal Scrub

Management activities that may increase habitat resilience to climate change include invasive species control to promote native communities and maintaining appropriate disturbance regimes through the use of managed grazing and/or prescribed fire. It is also critical to protect existing high-quality scrub areas to limit habitat conversion and preserve potential climate refugia.

Management strategies related to coyote brush generally focus on limiting encroachment in adjacent habitats. However, it is sometimes used to provide erosion control in sloping areas, and in southern California it is being used to facilitate the recovery of diverse native ecosystems in areas previously dominated by invasive grasses.

ADAPTATION APPROACH	ADAPTATION STRATEGIES
Resistance strategies: Maintain current conditions by limiting change *Near-term approach*	• Adjust grazing timing, frequency, and intensity to promote recovery of perennial grasses and other desired vegetation • Remove non-native annual grasses and other invasive plant species using a variety of treatments (e.g., prescribed fire, mowing, hand pulling, herbicides) • Build invasive species management into post-fire restoration activities (e.g., suppression repair, BAER)
Resilience strategies: Accommodate some change while enabling a return to prior conditions *Near- to mid-term approach*	• Use prescribed burning to remove encroaching woody vegetation and increase vigor and recruitment in native grassland and shrubland plants • Protect land in priority connectivity/corridor areas via acquisition, realty actions, or land trades*
Response strategies: Intentionally facilitate or direct change that adaptively responds to new conditions *Long-term approach*	• Collect and store seed from species and genotypes that are expected to be adapted to future conditions* • Prioritize and maintain sites that may be more resistant to changes in climate (e.g., cooler, wetter sites), harbor high biodiversity, and/or provide habitat for rare species*
Knowledge strategies: Gather information about climate impacts, and/or management effectiveness *Near- to long-term approach*	• Expand research on and monitoring of observed and projected phenological shifts in plants and native pollinators* • Map and characterize connectivity between natural areas for plant and animal migration* • Identify species that may disappear due to climate-driven changes (e.g., rare and/or specialized species) and determine whether other species will be able to fulfill a similar functional role within the ecosystem*
Collaboration strategies: Coordinate management efforts and/or capacity across boundaries *Near- to long-term approach*	• Improve regional collaboration and coordination with regard to data sharing and monitoring* • Partner with local tribes to share resources and expand the use of cultural burning and managed wildfire*

** Future management strategies (not currently occurring)*

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Further information and citations can be found in the source reports of the Santa Cruz Mountains Climate Adaptation Project, available online at http://ecoadapt.org/programs/awareness-to-action/santa-cruz-mountains.