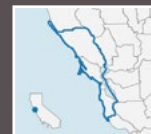


# Maritime Chaparral



## Ecosystem Description

Maritime chaparral is an evergreen shrub-dominated community characterized primarily by manzanita (*Arctostaphylos* spp.) or Ceanothus species, and is associated with unique soils (e.g., sand, sandstone, serpentine) in areas influenced by coastal fog. Dominant chaparral species are categorized by mode of post-fire regeneration: obligate seeders require fire for germination from stored seedbanks, while facultative seeders utilize vegetative resprouting and seed germination following fire-induced topkill. Maritime chaparral in the Golden Gate Biosphere (GGB) region is typically found on coastal ridges in Sonoma County; Point Reyes, Bolinas Ridge, and lower slopes of Mt. Tamalpais in Marin County; on serpentine bluffs in San Francisco; on San Bruno Mountain, Montara Mountain, and the Kings Mtn. Area in San Mateo County.

## Ecosystem Vulnerability - Moderate

### Sensitivity & Exposure - Moderate

Projected Changes	Trend
Air temperature	▲ Increase
Precipitation	▲▼ Varies
Soil moisture	▼ Decrease
Drought	▲ Increase
Wildfire	▲ Increase
Disease	▲ Increase

#### Potential Impacts:

- Enhanced water stress and the threat of more frequent fires due to increasing air temperatures and heat waves
- Altered recruitment and community composition due to changes in precipitation and soil moisture
- Dieback and mortality for shallow-rooting species and seedlings due to increased severity and length of droughts
- Mortality of sprouts and seedlings, disruption of soil seed bank replenishment, and establishment of invasive grasses as wildfires become more frequent and intense
- Dieback of madrone and manzanita stands due to pathogens, facilitating loss of wildlife habitat and erosion

**Non-climate stressors** may interact with climate stressors and disturbance regimes:

- *Residential and commercial development* increases habitat loss and fragmentation, causes soil compaction and erosion, and reduces endemic mammal abundance and diversity
- *Roads, highways, and trails* contribute to disturbance, fragmentation, and habitat loss and act as barriers to small mammals and other wildlife, including those that disperse seeds
- *Fire exclusion and suppression* alter natural fire regimes, impacting obligate seeder germination and leading to encroachment and overshadowing by coniferous species like Douglas-fir
- *Invasive species* alter habitat composition, displacing native vegetation and increasing fire risk



**Maritime chaparral habitats are sensitive to changes in water availability, which is likely to impact plant survival and recruitment. Shifts in wildfire regimes may also drive changes in structure and regeneration by preventing stands from reaching maturity and facilitating the establishment of invasive plants.**

# Ecosystem Vulnerability - Moderate

## Adaptive Capacity - Low

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

#### **Enhance:**

- Exceptionally high species diversity
- Potential as future climate refugia
- Well-adapted to low-nutrient soils, recurrent drought, and periodic fire

#### **Undermine:**

- Naturally occurs as isolated patches
- Reduced resistance/recovery on sites where invasive species have become established
- Significant ecosystem loss and degradation due to land-use conversion

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

#### **Enhance:**

- Provides ecosystem services (e.g., wildlife habitat, flood/erosion control, water filtration, carbon sequestration, recreation)

#### **Undermine:**

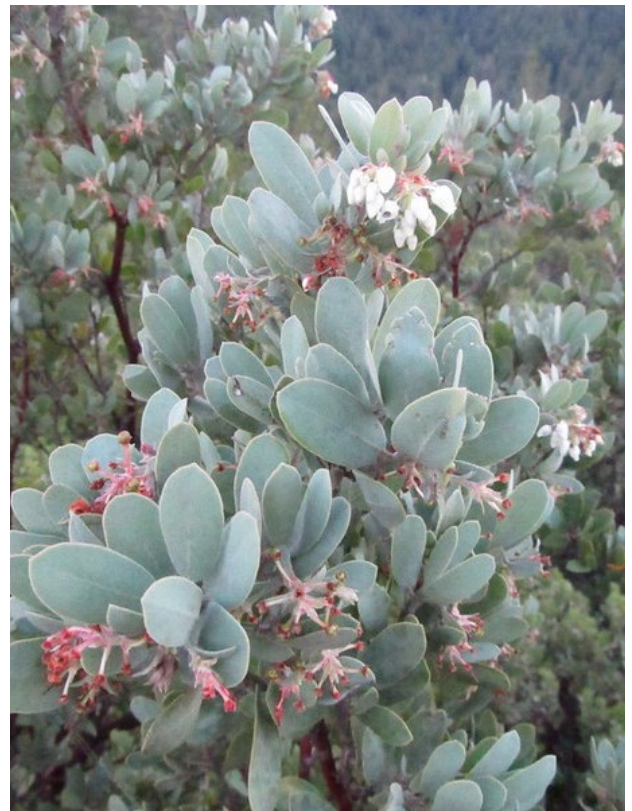
- Low public value compared to other vegetation types because it is difficult to recreate in and is associated with high fire risk



**Maritime chaparral continuity and integrity are impacted by ecosystem loss and fragmentation, which have reduced species migration in response to climate change and contributed to degradation of remaining patches.**



*Arcrostaphylos montaraensis*, Joe Blowe, Flickr (CC BY-SA 2.0)



*Arcrostaphylos crustacea*, Joe Blowe, Flickr (CC BY-SA 2.0)

# Adaptation Strategies & Actions

Adaptation strategies can reduce climate change vulnerability of a given ecosystem or species by addressing any or all of the three components of vulnerability (i.e., by reducing sensitivity, reducing exposure, and/or increasing adaptive capacity). The table below presents examples of adaptation strategies and actions, which fall within five categories, or approaches: Resistance/Resilience (**R**), Acceptance (**A**), Direct/Response (**D**), Knowledge (**K**), and Collaboration (**C**). *Please note that the strategies and actions provided here should not be considered a checklist or plan, but rather as a set of examples for land managers to consider for further study when developing site- or species-specific actions.*

Adaptation Strategies	Adaptation Actions
<b>Prevent the introduction and establishment of invasive species and remove existing populations</b>	<ul style="list-style-type: none"> <li>• Increase monitoring of known or potential invasive species to ensure early detection (<b>R/K</b>)</li> <li>• Remove invasive plants and encroaching woody trees and shrubs using a variety of treatments (e.g., prescribed fire, mowing, hand pulling, herbicides) (<b>R</b>)</li> </ul>
<b>Reduce the risk of introduced pathogens</b>	<ul style="list-style-type: none"> <li>• Develop a collaborative monitoring and detection program to watch for symptoms (e.g., mortality) caused by invasive pathogens (<b>R/K/C</b>)</li> </ul>
<b>Restore the role of fire as an ecological process on the landscape</b>	<ul style="list-style-type: none"> <li>• Evaluate the variable effects of prescribed fire on individual species within maritime chaparral, with an emphasis on rare species and impacts on species composition (<b>R/K</b>)</li> <li>• Use prescribed fire to allow for germination of obligate-seeding species (<b>R</b>)</li> </ul>
<b>Maintain and/or create migration corridors for native plants and wildlife</b>	<ul style="list-style-type: none"> <li>• Map and characterize connectivity between natural areas for plant and animal migration (<b>K</b>)</li> <li>• Protect priority corridors and potential climate refugia for sensitive species via acquisition, realty actions, or land trades (<b>R</b>)</li> </ul>
<b>Understand distribution of and threats to maritime chaparral</b>	<ul style="list-style-type: none"> <li>• Expand the existing map of maritime chaparral distribution using rare and indicator manzanita and ceanothus species as surrogates where finescale mapping is incomplete (and as a check of map accuracy) (<b>K</b>)</li> <li>• Use the above map to target acquisition, assess stands for management, and identify corridors and refugia (<b>K</b>)</li> </ul>
<b>Promote awareness of and appreciation for chaparral ecosystems and associated species</b>	<ul style="list-style-type: none"> <li>• Create outreach campaigns designed to increase recognition of maritime chaparral as an important California ecosystem (<b>C</b>)</li> </ul>

*Adaptation strategies and actions suggested by individual stakeholders (not discussed during the December 2023 adaptation workshop).*