# Ecological site R019XI105CA
# Deep slopes
# 13-24" p.z.

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## General information

**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.

## Similar sites

| | |
|---|---|
| **R019XI106CA** | **Shallow slopes 13-31" p.z.**<br><br>This is a prostrate chamise chaparral type, found on wind blown ridges. |
| **R019XI112CA** | **Moderately deep volcanic slopes 13-31" p.z.**<br><br>This is an oak woodland-chaparral ecological site found on volcanic soils. |
| **R019XI108CA** | **Convex slopes 13-24" p.z.**<br><br>This site has similar species, but much more continuous and consistently higher chaparral cover. |
| **R019XI109CA** | **Shaly slopes 13-24" p.z.**<br><br>This is a chaparral community dominated primarily by Quercus pacifica. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Cercocarpus montanus var. blancheae*<br>(2) *Ceanothus megacarpus var. insularis* |
| Herbaceous | Not specified |

## Physiographic features

This ecological site is found on hillslopes ranging from 2 to 75 percent and elevations from sea level to 2470 feet. It is found on all aspects, but most commonly on southern aspects.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Hill |

| | |
|---|---|
| Flooding frequency | None |
| Ponding frequency | None |
| Elevation | 0 – 750 m |
| Slope | 0 – 80 % |
| Aspect | SE, S, SW |

### Climatic features

This ecological site is found only on Santa Cruz Island, and due to it's size, the temperature and precipitation ranges have been grouped together to capture the entire island's variance.

The average annual precipitation is 19 inches with a range between 13 to 24 inches, mostly in the form of rain in the winter months (November through April). The average annual air temperature is approximately 56 to 73 degrees Fahrenheit, and the frost-free (>32F) season is 320 to 365 days.

**Table 3 Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 370 days |
| Freeze-free period (average) | 370 days |
| Precipitation total (average) | 610 mm |

### Influencing water features

This site is not influenced by wetland or riparian water features.

### Soil features

The soils are derived from residuum weathered from andesite, basalt, volcanic breccia, diorite, and gabbro parent materials. The soils are moderately deep to deep, with loamy or sandy textures. Mean annual soil temperatures (MAST) range from 54 to 59 degrees F on north-facing slopes, which are classified as isomesic and 59 to 71 degrees F on south-facing slopes, which are classified as thermic.

This ecological site is found in the following mapunits and components:

SSA MU Component
CA688 150 Halyard
CA688 151 Halyard
CA688 152 Halyard
CA688 310 Macool
CA688 800 Halyard

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Gravelly |
| Family particle size | (1) Clayey |
| Drainage class | Moderately well drained |
| Permeability class | Slow |
| Soil depth | 50 – 130 cm |
| Available water capacity (0-101.6cm) | 11.43 – 15.75 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0 – 10 % |
| Electrical conductivity (0-101.6cm) | Not specified |
| Sodium adsorption ratio (0-101.6cm) | Not specified |
| Soil reaction (1:1 water) (0-101.6cm) | 5.6 – 7.8 |
| Subsurface fragment volume <=3" (Depth not specified) | 10 – 20 % |
| Subsurface fragment volume >3" (Depth not specified) | Not specified |

**Ecological dynamics**

Before European settlement, the natural plant communities for this ecological site ranged from a pre-fire ecology of dense island chaparral with a sparse understory of native grasses and forbs to a post-fire open, patchy island chaparral grassland dominated community. The reference state for this ecological site is similar to its pre-European state. However, the density of the island chaparral may be different due to more frequent fires and the invasion of non-native annual grasses and forbs. Primary species include island big-pod ceanothus (Ceanothus megacarpos spp. insularis), Channel Island scrub oak (Quercus pacifica), chamise (Adenostoma fasciculatum), island mountain mahogany (Cercocarpus montanus var. blancheae), island redberry (Rhamnus pirifolia), lemonade sumac (Rhus integrifolia) and manzanitas (Arctostaphylos spp.). In the central valley of Santa Cruz Island, this habitat is open and patchy, and is

intermixed with the coastal sagebrush and grassland ecological sites.

Mixed chaparral is one of the most dominant and widely known plant communities throughout much of the Channel Islands. It is comprised of dense stands of shrubs that are all structurally similar with deep roots and evergreen, sclerophyllous leaves. Depending on the combined influences of disturbance, elevation, aspect and soils, the variation of species within the mixed chaparral habitat will be different. Although soil and parent material have some influence on the variety of species, microclimatic differences in soil moisture, temperature, and aspect often dictate what species will be most dominant in a given location (England 2006 and Fried et al 2004).

The primary elements that maintain this ecological site are drought and fire. Chaparral species are physiologically adapted to droughty conditions and many are also well-adapted to fire. Some of these fire adaptations include: sclerophyllous leaves, specialized stomates, extensive rooting systems which take advantage of water near the soil surface as well as water far into the soil profile, the shape of the canopies which dissipates radiation by convection, the height of the shrubs which can keep the leaves away from the hot soil surface, post-fire crown sprouting, and seeds that often require high temperatures before germination (Fried et al 2004).

The successional patterns of chaparral begin and end with fire. Chaparral can develop into extremely dense, sometimes impenetrable stands and many of the shrubs become senescent, requiring a fire to clear out the dead branches and heavy litter. This clearing recharges the soil's available nitrogen and carbon and stimulate new growth and seed germination. Most of the dominant chaparral species are able to rapidly recover and grow after a fire. Very little research can be found on the fire adaptations of the island endemic chaparral species; however similar species that are found on the mainland are capable of re-sprouting and reseeding after fire, which suggests these species have similar adaptations. Post-fire chaparral on north-facing slopes exhibit higher species richness, higher species turnover rates, and faster vegetation recovery in terms of biomass accumulation, causing it to return to pre-fire species composition faster than chaparral communities found on the drier, south-facing slopes (Guo 2001).

The historical fire regime for these mixed chaparral communities is difficult to determine prior to European settlers arrival, however there are indications of a fire-return interval was probably greater than 70 years, with lightning being the primary ignition source (Keeley and Fotheringham 2001). Fire intervals may have been up to 200 years, but have generally increased to 40 to 50 year intervals with the increase in human caused fires.

Chaparral is an important habitat for many species of birds, reptiles, rodents and mammals. Some deep habitat dwellers rely almost entirely on chaparral for food, shelter, and reproduction sites. Others may occupy the ecotonal zones between the chaparral and woodland, chaparral, and grassland, or chaparral and riparian habitats to satisfy their various needs. As the chaparral becomes denser, it will become too crowded for many of these species to properly utilize the habitat. Consequently, fires are necessary to open up the canopy, which will provide better movement through the site. It also stimulates new growth of the shrubs as well as the understory herbaceous species, providing more food and shelter for a greater variety of species.

## State and transition model

**Figure 3. State Transition Model**

## Additional community tables

**Table 5. Community 1.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|---|---|---|---|---|---|

**Table 6. Community 2.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|---|---|---|---|---|---|

**Table 7. Community 3.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|---|---|---|---|---|---|
| **Shrub/Vine** | | | | | |
| 1 | **Shrubs** | | | 560-1681 | |
| | coastal sagebrush | ARCA11 | *Artemisia californica* | 168-560 | – |
| | island ceanothus | CEMEI2 | *Ceanothus megacarpus var. insularis* | 112-280 | – |
| | island mountain mahogany | CEMOB | *Cercocarpus montanus var. blancheae* | 112-280 | – |
| | Santa Cruz Island buckwheat | ERAR6 | *Eriogonum arborescens* | 11-224 | – |
| | lemonade sumac | RHIN2 | *Rhus integrifolia* | 22-168 | – |
| | chamise | ADFA | *Adenostoma fasciculatum* | 11-112 | – |
| | Channel Island scrub oak | QUPA6 | *Quercus pacifica* | 22-56 | – |

| | | | | | |
|---|---|---|---|---|---|
| | island broom | LODE2 | *Lotus dendroideus* | 1-28 | – |
| **Grass/Grasslike** | | | | | |
| 2 | **Grasses** | | | 224-897 | |
| | wild oat | AVFA | *Avena fatua* | 56-448 | – |
| | needlegrass | NASSE | *Nassella* | 168-336 | – |
| | soft brome | BRHOH | *Bromus hordeaceus ssp. hordeaceus* | 1-56 | – |
| | compact brome | BRMA3 | *Bromus madritensis* | 11-34 | – |
| **Forb** | | | | | |
| 3 | **Forbs** | | | 1-56 | |
| | monkeyflower | MIMUL | *Mimulus* | 1-34 | – |
| | cudweed | GNAPH | *Gnaphalium* | 1-6 | – |

**Table 8. Community 4.1 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|---|---|---|---|---|---|

## Inventory data references

The following NRCS plots were used to describe this ecological site. SC-391 lbs - Site location SCV-113 % SCV-104 % SC-278 lbs

## Type locality

| Location 1: Santa Barbara County, CA | |
|---|---|
| UTM zone | N |
| UTM northing | 3765467 |
| UTM easting | 248210 |
| General legal description | The site location is on Santa Cruz Island, on the north side of the Central Valley on a south facing slope, across from the UC Field Station. |

## Other references

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No. 6, December 2001. pp. 1536-1548.

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Uchytil, Ronald J. 1991. Cercocarpus betuloides. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [ 2005, June 29].

## Contributors

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## Rangeland health reference sheet

**Interpreting Indicators of Rangeland Health** is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

| | |
|---|---|
| Author(s)/participant(s) | |
| Contact for lead author | |
| Date | |
| Approved by | |
| Approval date | |
| Composition (Indicators 10 and 12) based on | Annual Production |

## Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    **Dominant:**

    **Sub-dominant:**

    **Other:**

    **Additional:**

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth ( in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**

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