

Ecological site R019XI109CA

Shaly 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

R019XI112CA	Moderately deep volcanic slopes 13-31" p.z. This chaparral ecological site has more shrub and understory diversity, and is on soils derived from volcanic parent materials.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Quercus pacifica</i>
Herbaceous	(1) <i>Bromus rigidus</i>

Physiographic features

This ecological site is found on all aspects, on the backslopes of hills. Slopes range from 15 to 80 percent, and elevations from sea level to 2470 feet.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	0 – 750 m
Slope	20 – 80 %

Aspect	Aspect is not a significant factor
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Climatic features

This ecological site is found only on Santa Cruz Island. However, due to its size, 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

These soils are primarily from uplifted marine deposits derived from clayey shale or residuum weathered from shale, andesite, and either basalt or volcanic breccia, or both. They are deep to very deep. The surface textures are loamy, with clayey subsurface textures. Permeability is slow, runoff is rapid, and they are moderately well-drained. Available water capacity ranges from 0.7 to 4.1 inches. Mean annual soil temperatures (MAST) range from 54 to 59 degrees F, which is classified as isomesic.

This ecological site is found on the following soil surveys and components:

SSA MU SYM Component
CA688 200 Forestay
CA688 210 Forestay
CA688 210 Forestay (Strongly sloping)
CA688 263 Pachic Palexerolls
CA688 292 Typic Palexerolls

Table 4. Representative soil features

Surface texture	(1) Very gravelly (2) Gravelly (3) Extremely gravelly
Family particle size	(1) Clayey
Drainage class	Well drained

Permeability class	Moderately slow to very slow
Soil depth	10 – 150 cm
Available water capacity (0-101.6cm)	1.78 – 10.41 cm
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	3.5 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	10 – 60 %
Subsurface fragment volume >3" (Depth not specified)	10 – 30 %

Ecological dynamics

The reference state for this site is a Channel Island chaparral community, and is dominated by Channel Island scrub oak (*Quercus pacifica*). Other common plants include Santa Cruz Island manzanita (*Arctostaphylos insularis*) and California live oak (*Quercus agrifolia*). It is found in patches, primarily associated with the shale geology on the isthmus of Santa Cruz Island.

This community has been altered from the historic plant community—severe grazing in the past has caused a shift in species composition. Grazing has also produced a tree-like stature to the shrub oak, changing the appearance of the community. Much of the understory has been altered by this over-grazing which has increased the introduction of non-native species, such as wild oat (*Avena fatua*), black mustard (*Brassica nigra*), ripgut brome (*Bromus rigidus*), and horehound (*Marrubium vulgare*).

The historical fire regime for this community is unclear. The natural fire return interval for the chaparral in this area was probably greater than 70 years (Keeley and Fotheringham, 2001). Fire intervals may have been up to 200 years, but have generally increased near 40 to 50 year intervals with the increase in human caused fires. Lightning, the primary natural ignition source, is very uncommon on these islands (Keeley, 2000). Only three lightning-ignited fires have been documented on the Channel Islands in the last 140 years (Junak et al., 1995). Historical evidence from the nearby Santa Monica Mountains indicates that when chaparral burns, it is very intense and difficult to control (Keeley, 2002). When fires are ignited early in the season they tend to remain small in size. However, the Santa Ana winds in the fall can spread fires rapidly and cover large areas. Fire in this community almost always burns the entire canopy, and so it is very unlikely it would remain a surface fire.

After a fire, native grasses and annual forbs dominate for a couple of years, but the chaparral shrubs quickly regain dominance by re-sprouting and establishing seedlings. The chaparral community can be replaced by the non-native annual grassland community if fires become too frequent. This community can also be caused by heavy grazing which can inhibit the shrubs from regenerating properly and can also lead to soil loss. The grasses can in-turn increase the frequency of fire since they provide an easily ignitable, continuous fuel

cover.

Many of the shrubs are dependent on fire for regeneration. However, if fire becomes too frequent (less than 10 year intervals) it can detrimentally affect the chaparral species that rely on establishing seedlings rather than re-sprouting after a burn. These reseeding species do not reach maturity during short fire intervals, and cannot replenish their seed banks in time. Frequent fires also tend to favor non-native annual grasses and forbs. (Haidinger and Keeley, 1993; Keeley 2003). Very little research can be found concerning the fire effects on the island’s endemic chaparral species, namely Santa Cruz Island manzanita (*Arctostaphylos insularis*) and Channel Island scrub oak (*Quercus pacifica*). More research is needed to determine which shrubs tend to re-sprout and which are obligate seeders. Species similar to the Santa Cruz Island manzanita and Channel Island scrub oak indicate that they will probably resprout well and reseed moderately well after fire.

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 (%)
Shrub/Vine					
1	Shrubs			448-1569	
	Channel Island scrub oak	QUPA6	<i>Quercus pacifica</i>	448-673	–
	California live oak	QUAG	<i>Quercus agrifolia</i>	11-448	–
	island manzanita	ARIN2	<i>Arctostaphylos insularis</i>	11-112	–
	island broom	LODE2	<i>Lotus dendroideus</i>	11-112	–
Grass/Grasslike					
2	grasses			336-897	
	wild oat	AVFA	<i>Avena fatua</i>	34-224	–
Forb					
3	forbs			112-448	
	horehound	MAVU	<i>Marrubium vulgare</i>	1-560	–
	Cucamonga manroot	MAMA8	<i>Marah macrocarpus</i>	1-168	–
	black mustard	BRNI	<i>Brassica nigra</i>	11-112	–

Table 6. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 6.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 7.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Inventory data references

The following NRCS plots were used to describe this ecological site. SC301 Lbs SC302 Lbs SC103 Lbs- site location

Type locality

Location 1: Santa Barbara County, CA	
UTM zone	N
UTM northing	3765064
UTM easting	253751
General legal description	The site location is on Santa Cruz Island, off of the Navy Road.

Other references

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Keeley, Jon E. (2004). Impact of Antecedent Climate on Fire Regimes in Coastal California. *International Journal of Wildland Fire*, 2004, 13, 173-182.

Keeley Jon E. (2002). Fire Management of California Shrubland Landscapes. *Environmental Management* Vol. 29, No. 3, pp. 395-408.

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Keeley, Jon E. and Fotheringham C.J. (2001). Historic Fire Regime in Southern California shrublands. *Conservation Biology*, Volume 15, No. 6, December 2001. pp. 1536-1548.

Keeley, Jon E. and Fotheringham C.J. (1998). Mechanism of smoke-induced seed germination in a post-fire chaparral annual. *Journal of Ecology*, 1998, 86, 27-36. British Ecological Society.

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Contributors

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:

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

5. Number of gullies and erosion associated with gullies:

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

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

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

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

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

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

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:

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

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

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

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:

17. Perennial plant reproductive capability:
