USDA Natural Resources Conservation Service

Ecological site R019XI118CA
Marine terraces 21-34" 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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R019XI116CA	**Clayey slopes 13-31" p.z.** This native grassland site is dominated by needlegrass and is often adjacent to and intertwined with the coastal grassland (salt grass) community.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Distichlis spicata* (2) *Nassella pulchra*

Physiographic features

This ecological site is found on all aspects of marine terraces with slopes ranging from 2 to 15 percent. Elevation ranges from just above 7 feet to 2624 feet, but is most common below 200 feet.

Table 2. Representative physiographic features

Landforms	(1) Marine terrace
Flooding duration	Extremely brief (0.1 to 4 hours)
Flooding frequency	Very rare
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	Rare
Elevation	0–800 m
Slope	1–15%
Ponding depth	0–3 cm
Aspect	Aspect is not a significant factor

Climatic features

This ecological site is found on two of the five northern Channel Islands—Santa Rosa and San Miguel. Each island has a different temperature and precipitation range, however for the purposes of this description, they have all been averaged together to capture the entire range of variance.

The average annual precipitation is 26 to 29 inches with a range between 24 to 34 inches, mostly in the form of rain in the winter months (November through April). The average annual air temperature is approximately 61 to 66 degrees Fahrenheit, and the frost-free (>32F) season is 365 days.

NOTE: Data collected for monthly precipitation and temperatures is only from one climate station, and may not capture the variance in climates on each of the five islands.

Table 3. Representative climatic features

Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	864 mm

Influencing water features

Soil features

This ecological site is found primarily on sandy or windblown alluvium derived from sandstone or calcareous sandstone. They are generally haploxerolls, and moderately deep to deep with loamy surface textures and sandy subsurface textures.

Mean annual soil temperatures (MAST) on Santa Cruz Island range from 59 to 71 degrees F, which are classified as thermic. And MAST on Santa Rosa Island ranges from 59 to 64 degrees F, which are also classifies as thermic.

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

SSA Map Unit Component
CA688 930 Fluventic Haploxerolls
CA688 670 Ironshot
CA688 950 Ironshot
CA688 660 Pachic Haploxerolls
CA688 900 Petrocalcic Palexeralfs

Table 4. Representative soil features

Surface texture	(1) Gravelly
Family particle size	(1) Sandy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately rapid
Soil depth	25–203 cm
Available water capacity (0-101.6cm)	4.32–14.48 cm
Calcium carbonate equivalent (0-101.6cm)	1–14%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4

Subsurface fragment volume <=3" (Depth not specified)	25%

Ecological dynamics

This ecological site is found on the coastal marine terraces of the Channel Islands. It is identified by the presence of inland saltgrass (*Distichlis spicata*), with beardless wildrye (*Leymus triticoides*) and tussock grass (*Poa flabellata*) as the most common associates. Non-native annual grasses are also present, although their cover is significantly lower.

Inland saltgrass (*Distichlis spicata*) is dominant in cover and production for this site. It spreads via rhizomes and forms a continuous cover with a deep litter layer. The saltgrass is fairly resistant to trampling and grazing by livestock, and is a course-textured grass which livestock will not eat until it is the only green plant left at the end of summer. These characteristics have caused this community to be less disturbed than the clayey slopes ecological site (R020XI116CA).

There is very little data about a fire regime in this grassland community. Fire probably does not play a major role in the maintenance of this site. Most vegetation with not thrive here, but the saltgrass is a pioneer that moves into areas exposed to salt deposition from the ocean. If fire were to ignite in this community during the late summer or fall the high amounts of continuous fuels would cause it to spread quickly. However, saltgrass is not significantly impacted by fires because of its rhizomatous nature. It is able to resprout from the underground rhizomes, which are also its primary source for reproduction, although it can reproduce by seed as well (Uchytil, 1990).

There could be scenarios that would leave this site susceptible to non-native annual grass invasions. An intense fire, followed by flooding could hinder growth by damaging the underground rhizomes. The growth and regeneration of saltgrass could also be severely inhibited by extreme overgrazing by livestock or wildlife, however this is highly unlikely.

State and transition model

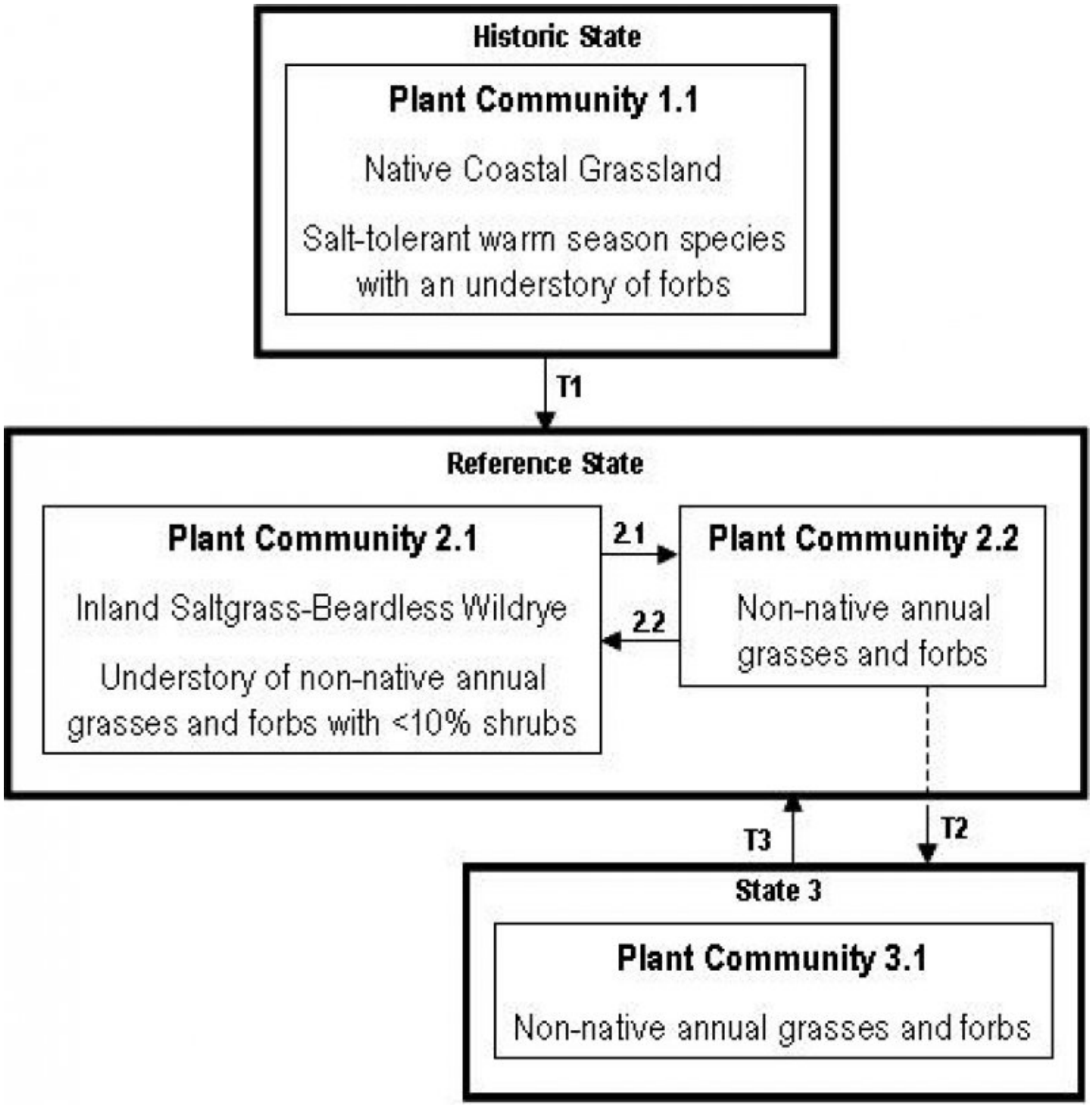

Figure 3. State Transition Model

State 1
Reference State - Plant Community 2.1

Community 1.1
Reference State - Plant Community 2.1

Figure 4. coastal grassland

This state is likely similar to the historic plant community. Total vegetative cover in this community is high, at about 85 to 90 percent, with a dense mulch of dead grass litter underneath. Overall there is very little plant diversity in this area, but it is dominated by inland saltgrass (*Distichlis spicata*), with beardless wildrye (*Leymus triticoides*), and tussock grass (*Poa flabellata*) as common associates. Non-native grasses, forbs, and shrubs are present at a lower cover percentage. The inland saltgrass spreads via rhizomes and forms a continuous cover with a deep litter layer. The saltgrass is fairly resistant to trampling and grazing by livestock, and is a course-textured grass which livestock will not eat until it is the only green plant left at the end of summer. These characteristics have caused this community to be less disturbed than the clayey slopes ecological site (R020XI116CA). Community Pathway 2.1 The shift to PC 2.2 occurs when fire spreads through PC 2.1. Natural, lightning-initiated fires are infrequent on the Channel Islands, which is similar to the southern California mainland. The introduction of non-native grasses, grazing, and intentional fires have changed the spatial distribution of the plant communities, in turn altering the natural fire regime. Fire frequencies may have increased since settlement due to the increase in fuel loads, the continuity of the annual grasses, and the addition of human caused fires (Klinger and Messer, 2000).

State 2
Plant Community 2.2

Community 2.1
Plant Community 2.2

If a seed source is available, some native annuals and perennials will germinate in the open areas after a fire. This is a short-lived state, as inland saltgrass (*Distichlis spicata*) resprouts from rhizomes and regains its previous cover fairly quickly, depending on fire intensity. Community Pathway 2.2: PC 2.2 will shift back to PC 2.1 after an extended period of time without disturbance. Inland saltgrass and beardless wildrye will resprout from the root crown with vigor, eventually reclaiming their dominance. The non-native grasses and forbs will be shaded out as the native grassland returns to its original pre-fire cover. Transition 2: The transition to state 3 can take place under frequent fire regimes or extreme grazing which put stress on the reference state. Disturbances can hinder the growth of the inland saltgrass by damaging the underground rhizomes. This can cause the non-native grasses and forbs seen in PC 2.2 to become a permanent state.

State 3
State 3 - Plant Community 3.1

Community 3.1
State 3 - Plant Community 3.1

The perennial grasslands do not compete well with the annual grasses, because they produce less seeds and grow slower. The annual grasses also germinate earlier in the season than do the perennial grasses and use more of the available soil water, leaving the soil profile drier by the time the perennial grasses begin to sprout. The increased amount of mulch from the annual grasses has been shown to be detrimental for the germination of most warm season native species (Young et al., 1972). This type of non-native annual grassland community is common

throughout California, and the Channel Islands are no exception. The primary species found on the islands includes slender oat (*Avena barbata*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft brome (*Bromus hordeaceus*), and Spanish brome (*Bromus madritensis*). Transition 3: Extensive restoration efforts or early spring fire could move PC 3.1 back to the reference state by reducing competition from non-native annual grasses.

State 4
Historic State - Plant Community 1.1

Community 4.1
Historic State - Plant Community 1.1

This community has been altered since Anglo-European settlement by the introduction of non-native livestock and crops. Consequently, there is not enough information to know how this site historically looked or how it responded to disturbances. Transition 1: Fires and non-natural grazing by livestock and non-native wildlife placed a stress on the historic state. This pressure gave an advantage to encroaching non-native plant species and led to the invasion of non-native annual grasslands and forbs.

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**grasses**			897–2018	
	saltgrass	DISP	*Distichlis spicata*	112–560	–
	beardless wildrye	LETR5	*Leymus triticoides*	11–448	–
	needlegrass	NASSE	*Nassella*	11–112	–
	wild oat	AVFA	*Avena fatua*	11–112	–

Inventory data references

The following NRCS plots were used to describe this ecological site:

SM-6 % and Lbs
SM-7 % and Lbs
SRV-5 Lbs
SRV-8 Lbs-Site location

Type locality

Location 1: Santa Barbara County, CA	
UTM zone	N
UTM northing	775810
UTM easting	3764094
General legal description	The site location is on Santa Rosa Island, on the marine terrace near the South East Anchorage, east of the Torrey Pines.

Other references

Cole, Kenneth L. and Liu, Geng-wu, 1994. Holocene Paleoecolog of an estuary on Santa Rosa Island, California. Quaternary Research 41, 326-335. University of Washington.

Corbin, Jeffrey D. and D'Antonio, Carla M. (2004). Competition Between Native Perennial and Exotic Annual Grasses: Implications for a Historical Invasion. Ecology, 85(5) 2004, pp. 1273-1283. The Ecological Society of

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Junak, Steve; Ayers, Tina; Scott, Randy; Wilken, Dieter; and Young, David (1995). A Flora of Santa Cruz Island. Santa Barbara Botanic Garden, Santa Barbara, CA.

Dyer, A.R. (2002). Burning and Grazing Management in a California Grassland: Effect on Bunchgrass Seed Viability. Restoration Ecology, March 2002, vol. 10, no.1, pp. 107-111(5). Blackwell Publishing.

Uchytil, Ronald J. 1990. *Distichlis spicata*. 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, July 14].

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:**

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

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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:**

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:**