Ecological site R019XI103CA
Riparian Areas 13-31" 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.

Table 1. Dominant plant species

Tree	(1) *Populus*
Shrub	(1) *Salix* (2) *Baccharis salicifolia*
Herbaceous	(1) *Distichlis spicata* (2) *Schoenoplectus pungens*

Physiographic features

This ecological site is found in the river valleys, floodplains, and stream terraces of Santa Cruz and Santa Rosa Islands. It is found on all aspects, with slopes ranging from 0 to 8 percent. The elevation ranges from sea level to 1968 feet.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Stream (3) Terrace
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	Very rare to frequent
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	Occasional
Elevation	3–1,968 ft
Slope	0–8%
Ponding depth	0–1 in
Aspect	Aspect is not a significant factor

Climatic features

This ecological site is found on two of the five northern Channel Islands—Santa Cruz and Santa Rosa. 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 inches with a range between 13 to 31 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.

NOTE: Data collected for monthly precipitation and temperatures is from one climate station/island, 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)	31 in

Influencing water features

This site is located in a mostly intermittent stream bed and terrace. The streams are perennial near their mouths that reach the ocean. The streams generally have multiple braided channels with gravels and cobbles on the surface. This ecological site can be classified as intertwined riverine and palustrine wetlands, but in some areas it may not meet the wetland criteria.

Soil features

The soils are derived from alluvium originating from volcanic, metamorphic, and sedimentary rock. The soils are deep, with a sandy or silty loam A horizon from 0 to 35 inches, with fine sandy loams to extremely gravelly sand and extremely cobbly sand below.

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

SSA Map Unit Component
CA688 190 Typic Xerofluvents
CA688 300 Cumulic Haploxeralfs

Table 4. Representative soil features

Surface texture	(1) Extremely gravelly silt loam (2) Extremely cobbly fine sandy loam (3) Sandy loam
Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	0–80 in
Available water capacity (0-40in)	3.6–8.3 in
Calcium carbonate equivalent (0-40in)	0–1%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	5–70%

Subsurface fragment volume >3" (Depth not specified)	40%

Ecological dynamics

This ecological site is found in the river valleys, floodplains, stream terraces, and along both ephemeral and perennial stream channels in the riparian zones of Santa Cruz and Santa Rosa Islands. The riparian areas of this site vary considerably in size, substrate, and vegetation composition. The historic natural community for this ecological site is a mix of cottonwoods (Populus spp.) and willows (Salix spp.), as well as an herbaceous cover of native bentgrasses (Agrostis spp.), spikerushes (Eleocharis spp.), sedges (Carex spp.) and rushes (Juncus spp.).

The reference state for this site is primarily dominated by mule-fat (*Baccharis salicifolia*), with a scattered groundcover of mostly non-native, upland, annual grasses. Other common plants include Santa Cruz Island Buckwheat (*Eriogonum arborescens*), Island Buckwheat (*Eriogonum grande*), cudweed (Gnaphalium spp.), island deerweed (*Lotus dendroideus* var. dendroideus), California brome (*Bromus carinatus*) and inland saltgrass (*Distichlis spicata*). In the drier zones, the water table may be too low for Willow (Salix spp.), however they are present in wetter areas.

Riparian areas are dynamic ecosystems, driven primarily by flood events. Floods help revitalize a riparian system by depositing new sediment, and by opening up the site for new growth, both vegetatively and by seed. Many riparian species, such as cottonwoods, prefer bare sediment and may have difficulties regenerating along streams where flood events are not significant enough to create new sandbars.

This site has been impacted quite severely by the heavy grazing of both domestic livestock and ungulates. According to the BLM Proper Functioning Condition (PFC) assessments conducted in 1995, this disturbance has caused many of the streams to drop into the non-functional category in stream and riparian health. In 1995, the California Central Coast Regional Water Quality Board directed the Channel Islands National Park to correct the cattle grazing and water quality problems. This prompted the eventual removal of cattle from the island in 1998, as well as a significant reduction in deer. Since many of the herbivores have been removed from the islands, many of the streams have shown signs of returning to PFC (Wagner et al 2004). several of the streams showed signs of an upward trend rather quickly, with willows (Salix spp.) and mule-fat (*Baccharis salicifolia*) beginning to establish. Some other streams have shown slower signs of recovery, gaining primarily herbaceous species with substantial rooting masses to assist in bank stabilization (Wagner et al 2004).

State and transition model

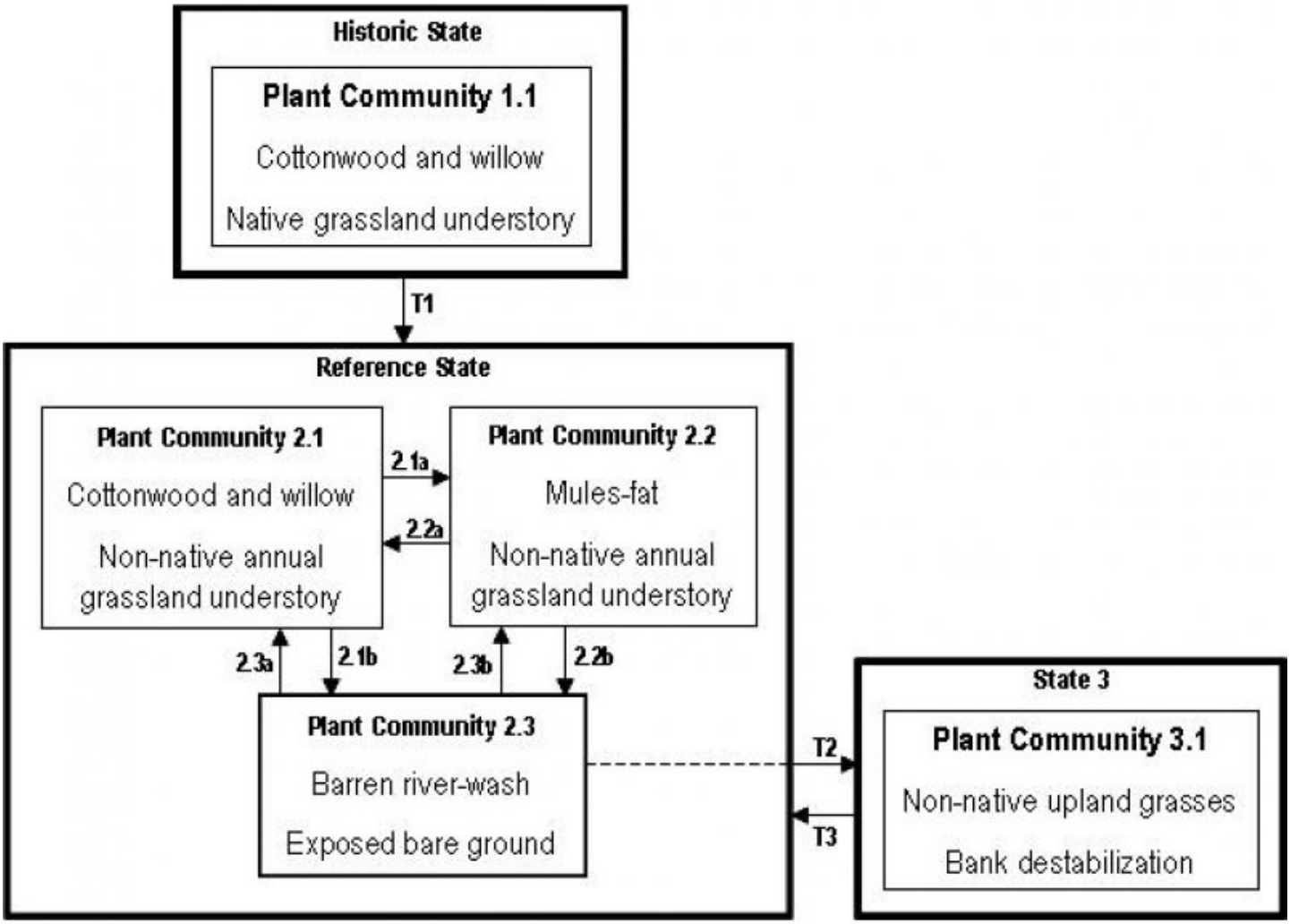

Figure 3. State Transition Model

State 1
Plant Community 2.3

Community 1.1
Plant Community 2.3

This community results from large flooding events. High volumes of water will rush through a stream system moving sediments and often uprooting vegetation. This community is primarily a mix of sands, gravels, and cobbles with either none or very little vegetative cover. Generally, in a healthy stream system, new vegetative growth soon sprouts, offering substantial root systems to stabilize the loose sediments. Community Pathway 2.3a: The shift from PC 2.3 back to PC 2.1 occurs after an extended period of time without disturbance from grazing or floods. Grasses, rushes and other forbs will regain dominance as root systems increase channel stability and available water. New cottonwood and willow will began to re-sprout if there is a seed source available. Community Pathway 2.3b: The shift from PC 2.3 back to PC 2.2 occurs after an extended period of time without disturbance from grazing or floods. In the absence of the native willow and cottonwood seedlings, mules-fat (*Baccharis salicifolia*) will often colonize first and become the primary shrub species. Grasses, rushes and other forbs will regain dominance as root systems increase channel stability and available water. Transition 2 The transition to State 3 can take place under extreme grazing or flooding which puts stress on the community. Disturbances can hinder the growth of the new vegetation and may cause the barren river-wash seen in PC 2.3 to become a permanent, grassland state.

State 2
Historic State - Plant Community 1.1

Community 2.1
Historic State - Plant Community 1.1

The historic natural community for riparian areas on the Channel Islands was a mix of cottonwood (Populus spp.) and willow (Salix spp.), as well as an herbaceous cover of native grasses (Agrostis spp. and Eleocharis spp.), sedges (Carex spp.) and rushes (Juncus spp.). Before the introduction of grazing to the islands, there were likely dense stands of trees on a relatively flat, broad floodplain along the streams. However, heavy utilization for many years by domestic livestock and wildlife, due to their highly palatable nature, has caused a significant decline to complete removal in their cover (Wagner et. al). Transition 1 Extensive grazing by livestock and non-native wildlife placed a stress on the historic state. This pressure gives an advantage to encroaching non-native plant species and will lead to the invasion of non-native annual grasslands.

State 3
Reference State - Plant Community 2.1

Community 3.1
Reference State - Plant Community 2.1

This state is similar to the historic plant community. There is a mix of cottonwoods and willows on the site, with an understory primarily dominated by non-native species such as oats (Avena spp.) and bromes (Bromus spp.). Community Pathway 2.1a: The shift from PC 2.1 to PC 2.2 occurs when widespread grazing by livestock and non-native wildlife remove the cottonwood and willow. This shift can also occur if there is a lack of flooding. Cottonwoods prefer bare sediment and may have difficulties regenerating along streams where flood events are not significant enough to create new sandbars. As the cottonwoods and willows disappear, so will their rooting systems that kept the water table high, offering water later into the growing season. Without these extensive roots, the water table begins to drop, leaving less water for new seedlings to regenerate. Over time, this process causes a great deal of stress on the shrub species, which slowly began to disappear from the system. This will leave the banks exposed to erosion and bank slumping, as well as stimulate the invasion of non-native and upland species. This also causes the streams to hold water for shorter periods during the year, drying up many sections. Community Pathway 2.1b: The shift from PC 2.1 to PC 2.3 will occur during flood events. High volumes of water will rush through a stream system moving sediments and often uprooting vegetation. Once the waters have receded, they leave behind large, open areas of river-wash which is an exposed, mostly bare ground composed of sands, gravels, and cobbles.

State 4
Plant Community 2.2

Community 4.1
Plant Community 2.2

In the absence of the native willow and cottonwood seedlings, mules-fat (*Baccharis salicifolia*) will often colonize first and become the primary shrub species. It can often be associated with buckwheat (Eriogonum spp.), cudweed (Pseudognaphalium spp.), Lotus species and annual grasses (Bromus spp.) in the understory. Community Pathway 2.2a: The shift from PC 2.2 back to PC 2.1 occurs after an extended period of time without disturbance from grazing or floods. Since the removal of livestock and many large ungulates like deer and elk, some of these streams are showing signs of regeneration. The release from grazing pressure has given the cottonwood and willow species time to grow and reproduce from seed, bringing back some of the important bank-stabilizing elements lost from excessive utilization. Community Pathway 2.2b: The shift from PC 2.2 to PC 2.3 will occur during flood events. High volumes of water will rush through a stream system moving sediments and often uprooting vegetation. Once the waters have receded, they leave behind large, open areas of river-wash or exposed, mostly bare ground composed of sands, gravels, and cobbles.

State 5
State 3 - Plant Community 3.1

Community 5.1
State 3 - Plant Community 3.1

The lack of vegetation destabilizes the site and leads to a permanent state of non-native annual upland grasses. As

the cottonwoods and willows disappear, so do their rooting systems that keep the water table high, offering water later into the growing season. Without these extensive roots, the water table begins to drop, leaving less water for new seedlings to regenerate. Over time, this process causes stress on the shrub species, which slowly began to disappear from the system. This will leave the banks exposed to erosion and bank slumping and also cause the streams to hold water for shorter periods during the year, drying up many sections of the streams. Transition 3 Extensive restoration efforts can re-stabilize the site and move it back to the reference state by allowing the cottonwood and willow species time to grow and reproduce from seed, bringing back some of the important bank-stabilizing elements lost from excessive utilization. Since much of the herbivores have been removed from the islands, many of the streams have shown signs of returning to Proper Functioning Condition (PFC), (Wagner et al 2004). Many of the streams showed signs of an upward trend rather quickly with willows (Salix spp.) and mules-fat (*Baccharis salicifolia*) beginning to establish, while some other streams have shown slower signs of recovery, gaining primarily herbaceous species with substantial rooting masses to assist in bank stabilization (Wagner et al 2004).

Additional community tables

Inventory data references

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

SCV-3 % and Lbs
SRV-13 %
SR-087 %

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):**

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:**