ENHANCING COASTAL STRAND HABITAT THROUGH INVASIVE SPECIES MANAGEMENT

SAN ELIJO LAGOON CONSERVANCY

COASTAL STRAND PROGRAM HISTORY | 2014-2017

Site Inventory

Site Prioritization Ranking:

- Special-status Plant Species Richness = absolute value of Invasive Plant Species Richness = absolute value 100%-51% access = 10 points
- 50% access = 5 points
- <50% access = 0 points
- Current funding = 25 points

Site	Special-Status Plant Species Richness	Invasive Plant Species Richness	Restoration Potential Summary	Completely Inundated at High Tide?	Access?	Current Funding for Implementation?	Rank
Seaside Terrace	2	15	N.A.	N	100%	Y	1
Cardiff Living Shorelines	0	0	N.A.	N	100%	Y	2
Torrey Pines State Reserve, Penasquitos Lagoon Area	10	15	Due to the small size of these areas, there is limited restoration potential. This site may offer restoration opportunities through weed management and the importation of sand to expand the dune into a larger complex.	N	100%	N	2
Torrey Pines State Reserve, Black's Beach	10	15	Although there are many unauthorized trails on the terrace, the vegetation is still dominated by native species, and may serve as an excellent reference site for restoration projects seeking to restore similar coastal bluff habitat elsewhere along the coast.	N	100%	N	2
South Carlsbad State Beach, Campground	4	20	The beach below the campground is inundated at high tide and provides no real opportunity for coastal dune restoration. Furthermore, although currently sandy, the sand on this beach has been completely replaced by cobble several times in recent decades. The majority of the bluffs below the campground may be too steep for restoration to be practical, but exotics control may be desirable as several highly invasive species such as pampas grass and Saltcedar (Tamarix sp.) are present. The area of bluffs near the parking area that supports Nuttall's acmispon needs management to ensure the survival of the population.	N	67%	N	3

Performance Standards for Dune Enhancement/Creation/ Restoration:

Goal	Performance Standards	Trigger Point for Maintenance
Vegetated dunes	Percent cover comparable to reference sites (0-25%)	+/- one standard deviation in native plant percent cover compared to reference sites.
Native plant cover	100% native plant cover	Presence of 5% non-native plant percent cover.
Stable dunes	Stable dune habitat area	Repeated loss of vegetated area.


N
0 2.5 5 10 15 20
Miles
Imagery Date: 2017
Map Date: OCT 2017
Data Sources: SELC & SANGIS
Cardiff Living Shorelines
West Basin
Seaside Terrace
Camp Pendleton
Ponto State Beach
Torrey Pines
Silver Strand
SAN ELIJO LAGOON CONSERVANCY

MANCHESTER AVE
COAST HIGHWAY 101
RAILROAD

Seaside Terrace | Pre-Treatment

Seaside Terrace | Pre-Treatment

Seaside Terrace | Treatment

Seaside Terrace

Salinity Monitoring

Sand Dune Creation, June 2016

Seaside Terrace

Seaside Terrace | Treatment

Seaside Terrace | Before & After

Seaside Terrace | Before & After

COAST HIGHWAY 101

San Elijo Lagoon West Basin Dunes

Arrow-weed Removal

San Elijo Lagoon West Basin Dunes

Arrow-weed Removal

San Elijo Lagoon West Basin Dunes

Post Sand-Sifting (Arrow-weed Removal)

San Elijo Lagoon West Basin Dunes

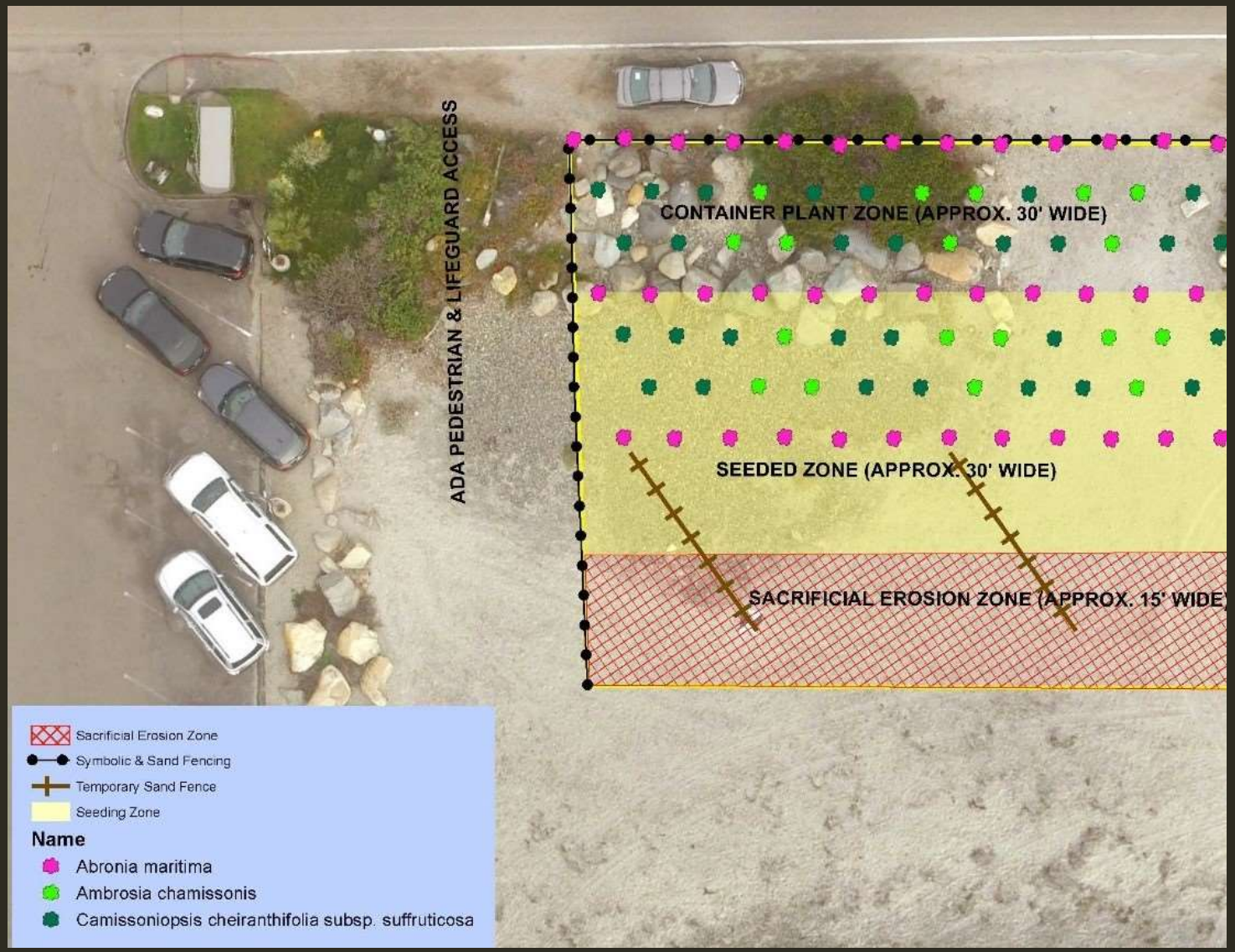
Before and after restoration efforts (2011vs. 2015).

Monitoring

Data Source	Frequency	Timing	Method	Raw Data	Post-processing
Sand Salinity Analysis	every three months for the first 24 months, or until the salinity leaches to the preferred value	After sand placement	Refractometer	Salinity (ppt)	N/A
Qualitative Ground-Based Vegetation Surveys	Quarterly	Quarterly	CNPS 2007 protocol for visual cover estimates	Visual estimates of vegetative cover, quality and composition; observations of any anthropomorphic disturbance; obvious need for adaptive management	Native plant cover estimates; non-native plant intrusion cover estimates
Quantitative Ground-Based Vegetation Surveys	Spring (during flowering period for majority of species); late fall	Annually	Plot cover estimates and species richness determinations; mortality counts	Percent cover of native and non-native plant species	Overall percent cover of each species across the site; mortality rates; plant composition
Photo Surveys	Quarterly	Quarterly	Photos taken at same bearing & camera angle	Georeferenced photographs	Georeferenced photographs

North County Dunes, Phase II

Cardiff State Beach Living Shorelines Project



Common Name	Scientific Name	Form	Seed (pounds)	Containers (gallons)
beach sun cup	Camissoniopsis cheiranthifolia subsp. suffruticosa	subshrub	6	1,000
Nuttall's acmispon	Acmispon prostratus	annual herb	8	0
beach sand verbena	Abronia umbellata	annual herb	4	0
Orcutt's pincushion	Chaenactis glabriuscula var. orcuttiana	annual herb	4	0
coast woolly heads	Nemacaulis denudata var. denudata	annual herb	4	0
beach bur-sage	Ambrosia chamissonis	perennial herb	0	350
red sand verbena	Abronia maritima	perennial herb	0	1,200

North County Dunes, Phase II

Cardiff State Beach Living Shorelines Project

LESSONS LEARNED:

- Clearly understand your seeding and out-growing needs, collect seed accordingly, and start communication with nurseries and botanic gardens as soon as possible;
- Dune plant populations will vary dramatically based on annual precipitation. Drought years may mean < 1% native plant cover;
- Don't over-seed or over-plant prolific species (with an intact seed bed) such as *Cammisoniopsis* in good rain years;
- Have a contingency plan for irrigation for projects with high cover value criteria mandates;
- Have a budget line-item for the irrigation contingency plan;
- Educate your community to reduce site vandalism;
- Don't over-think the monitoring, yet have a solid monitoring plan (I know). It comes down to – *are there plants there or not?*
- Expect to apply adaptive management;
- Communicate with other coastal strand project proponents;
- Utilize your volunteer base for maintenance.

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- The City of Encinitas
- ACS Habitat Management
- California State Parks
- The State Coastal Conservancy
- Moffatt & Nichol
- The communities of Solana Beach, Encinitas, Cardiff-by-the-Sea and Carlsbad

Photo Credit: Ryan Schain

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