

**Coal Oil Point Reserve North Shore Restoration Site
Second Monitoring Report
November 27, 2003**

Introduction.

The Santa Barbara Audubon Society received a \$28,820 grant from the Wetlands Recovery Project to restore the north shore of the Devereux Slough at Coal Oil Point Reserve. The project tasks were to remove weeds from the margin and plant native species appropriate to the various habitats found in the area. The project was begun late September 2002, with the first year's plantings installed during the winter rainy season.

Given the uncertainty of this method of measuring success of the restoration project with transect data at this project site, we also did a plant census of installed plants.

Methods.

We placed four 100-foot long transects within the project area to monitor the success of the restoration. On 9/23/2002, before the project began, we measured the percent cover of native and exotic vegetation along these transects to determine the pre-project condition of the site. We repeated the measurements on 4/15/2003 and again 11/11/2003. The data was collected by Darlene Chirman, Ken Owen and restoration interns.

Plant census data--% survival of installed native plants, and comments on growth and natural expansion of pre-existing plant species—was collected on November 4, 2003. The number of plants installed between November 2002 and April 2003 was compared with the number found that appeared to be planted (most flagged). Data collected by Darlene Chirman, Ken Owen and restoration interns.

Results.

Table 1. Change in the percent of native species over one year and six months, after removal of exotics species and planting of natives, in each habitat. Note: Percentages add to more than 10% because plants may overlap, such as canopy willow with understory Saltgrass and non-native Harding grass.

Habitat	% native species	% exotic species	% bare soil
Upland Margin			
9/23/02	62	45.5	3
4/15/03	34.1	42.4	33
11/11/03	56.5	3.5	37.5
Seasonal Marsh			
9/23/02	46	53	31.5
4/15/03	47	85.5	17
11/11/03	54.5	4.0	57

Willow Woodland			
9/23/02	142	114.5	16
4/15/03	101.5	69	40
11/11/03	76	25.5	31
Alluvial Fan			
9/23/02	73.2	215*	0
4/15/03	4.33	154.9	0
11/11/03	0	185	3.5

*This value was incorrect in the July 1 Table 1.

Table 2. Percent cover of each plant species on the second survey after planting. Compare with Table 2 in first Monitoring Report, July 1, 2003.

Upland Margin		Native	Non-native	Bare Ground
Native Species	Non-native Species	%	%	%
Artemisia californica		3.5		
Baccharis pilularis		29.0		
Calystegia macrostegia		7.5		
Distichlis spicata		6.0		
Encelia californica		9.5		
Isocoma menziesii		0.5		
	Phalaris aquatica		1.5	
	Picris echioides		1.5	
	Plantago lanceolata		0.5	
Scrophularia californica		0.5		
Bare Ground				37.5
Total Native		56.5		
Total Nonnative			3.5	

Seasonal Marsh		Native	Non-native	Bare Ground
Native Species	Non-native Species	%	%	%
Ambrosia psilostachya		3.5		
Astragalus pycnostachyus v. lanosissimus		10.5		
Atriplex triangularis		2.5		
Baccharis pilularis		14.0		
Distichlis spicata		9.5		
Jaumea carnosa		11.0		
	Polypogon monspeliensis		2.0	

Seasonal Marsh		Native	Non-native	Bare Ground
	Raphanus sativus		2.0	
	Solanum douglasii	3.5		
	Bare Ground			57.0
	Total Native	54.5		
	Total Nonnative		4.0	

Alluvial Fan		Native	Non-native	Bare Ground
Native Species	Non-native Species	%	%	%
	Carduus pycnocephalus		2.0	
	Conyza canadensis		8.0	
	Melilotus sp.		17.5	
	Raphanus sativus		29.5	
	Rumex crispus		0.5	
	Sonchus sp.		5.0	
	Vicia sp.		26.5	
	Annual Grasses		96.0	
	Bare Ground			3.5
	Total Native	0		
	Total Nonnative		185	

Willow Woodland		Native	Non-native	Bare Ground
Native Species	Non-native Species	%	%	%
	Ambrosia psilostachya	11.5		
	Distichlis spicata	34.0		
	Frankenia salina	0.5		
	Phalaris aquatica		23.0	
	Picris echioides		1.5	
	Polygonum monspeliensis		1.0	
	Populus fremontii	0.5		
	Salix lasiolepis	29.5		
	Bare Ground			31.0
	Total Native	76		
	Total Nonnative		25.5	

Table 3. Plant Census November 4, 2003. Survival of installed plants, planted between November 2002 and April 2004.

Botanical Name	Common Name	Planted	Counted 11/4/2003	% survival	Comments
<i>Artemisia californica</i>	California Sagebrush	62	53	85%	Robust, mostly large
<i>Artemisia douglasiana</i>	Mugwort	15	7	47%	small
<i>Astragalus pycnostachyus</i> <i>v. lanosissimus</i>	Ventura Milkvetch	8 +seeds	6 + 5 from seed	75%	In seed. Clay soil: flower & seed
<i>Atriplex lentiformis</i>	Quail bush	25	13	52%	Most robust, some small
<i>Baccharis pilularis</i>	Coyote Bush	6	3	50%	Large (in as tiny seedlings)
<i>Baccharis salicifolia</i>	Mulefat	15	13	87%	
<i>Distichlis spicata</i>	Saltgrass	12 trans- located	11	92%	Edge plantings overrun By natural expansion Distichlis & jaumea
<i>Encelia californica</i>	California Sunflower	64	45	70%	Most robust; flowering & in seed
<i>Eriogonum parvifolium</i>	Seacliff Buckwheat	76	51	67%	Most robust; Flowers & seed
<i>Frankenia salina</i>	Alkali Heath	9 trans.	1?	11%	Can't really tell, due To natural expansion of Frankenia
<i>Isocoma menziesii</i>	Coast Goldenbush	111	90	81%	Robust; flower & seed
<i>Jaumea carnosa</i>	Marsh Jaumea	48 trans.	29	60%	Can't tell due to natural Expansion of jaumea
<i>Juncus patens</i>	Common Rush	6	5	83%	
<i>Leymus condensatus</i>	Giant Ryegrass	78	26	33%	~ 1/3 well-established
<i>Lonicera subspicata</i> <i>subspicata</i>	Santa Barbara Honeysuckle	1	1	100%	Fruit noted
<i>Salicornia (Anthrocnemum)</i> <i>subterminalis</i>	Parish's Glasswort	62?	3	<1%	Poor establishment
<i>Sambucus mexicana</i>	Blue Elderberry	11 direct cuts + 4	Direct 0% Container 3	75%	Poor growth
<i>Scirpus maritimus</i>	Shore Bulrush	8 trans.	8	100%	Natural expansion
<i>Scrophularia californica</i>	Beeplant	84	39	46%	Uncertain. Summer Dormancy, just recovering
<i>Stachys bullata</i>	Wood Mint/ Hedge Nettle	22	4	18%	Poor
TOTAL		697 + ?	411	60%	Generally good coverage
<i>Ambrosia psilostachya</i>	Western Ragweed	----			Expanded
<i>Atriplex triangularis</i>	Spearscale	----			
<i>Calystegia macrostegia</i> ssp. <i>cyclostegia</i>	Coastal Morning- Glory	----			Expanded ~200%
<i>Cressa truxillensis</i>	Alkali Weed	----			Expanded ~ 1000%
<i>Salix lasiolepis</i>	Arroyo Willow	----			Growth across closed path

Discussion.

The percent cover of native species increased in some habitats and declined in others. The percent cover of weed species declined in some habitats and increased in the alluvial fan. Explanations are described below. Despite the increase of weeds in some areas according to the monitoring results, this project can be considered a success because many native species are now well established and reproducing on their own (see pictures below)

The increase in native cover in the upland margin and seasonal marsh appear to reflect the growth of installed native plants and expansion of native ground cover which may be a response to control of weedy competitors. The decline in native cover in the willow woodland is primarily a reduction in Arroyo willow cover. This may be due to three factors: 1) some branch pruning in September to provide access for non-native blackberry removal in this habitat area, 2) seasonal changes in foliage cover, and 3) possible variation in transect location, as the rebar markers had been removed (vandalism) in this transect and we estimated the transect line location. The willows are expected to regrow. The alluvial fan was little changed; our only action was removal of Pampas grass. The decline in native species was likely seasonal—Lupine is an annual and not yet germinated; absence of Ambrosia is unclear, since it is present on the other transects, and was not removed.

The protocol used in data collection for the baseline condition was different, and is not directly comparable to the later survey data. We grouped species together for measurements when they were found together, but this was not effective in determining cover for any particular species. We abandoned this protocol, but cannot make useful comparisons with this data set and subsequent transect surveys. Seasonal differences in vegetative growth can dramatically influence the values between April and November surveys.

Non-native cover declined in all transects, except in the alluvial fan when compared with April data. This reflects the weed control efforts of the project. However, there is extensive cover of seedlings of grasses and dicots which are not reflected in this data, as species are not yet identifiable. Without extensive weed control efforts of the next few months, the non-native cover would be expected to increase dramatically. We do plan weed control, as soon as species are identifiable and native seedlings can be protected. In the alluvial fan, high non-native cover was recorded with no native cover, this is a natural process, as we have essentially only removed Pampas grass from the site. The long-term goal of COPR for this sediment plug is removal to restore wetland habitat. In the willow woodland, Harding grass is still a significant invader: 14.5 feet of the transect. This will be a target of our weed control efforts this winter and spring.

The transect data at the first monitoring period was not particularly helpful in accessing the success of the restoration project, in part due to the poor protocol used for baseline

data collection and seasonal differences. So, in addition to repeated transect data collection, we collected survival data on the installed native plants. Overall, we found 60% survival. Some species survived very poorly; however, 12 species had high survival, ranging between 60% and 100%, with robust growth, which have provided good native cover for the site, especially on the upland margin. In addition, several species of rhizomatous wetland vegetation expanded dramatically, in conjunction with reduced disturbance from a closed trail and, we hope, due to reduced competition as weeds were removed. The wetland species are not shade tolerant, in general, and grow more vigorously without weedy cover.

In December of 2003, seedlings from the native plants that flowered last spring were observed under California sagebrush, coyote bush, Coast goldenbush and California sunflower. This indicates the restored area will be self-sustaining and able to recruit new plants on its own. This is perhaps the best indicator of the success of this restoration.

Summary.

The combination of transect monitoring and installed plant survival give good indicators of the success of the restoration progress to date. The restoration has been very successful, as reflected in the photos.

I switched the 2 pictures with before picture on the left and added a new one



Photo 1 on left. Restoration site before the project began. Notice the high cover of weeds.
Photo 2 on right. Upland margin November 11, 2003, with good native cover, approximately same photopoint.



Photo 3. Restoration site in June 2003. Notice vigorous growth of native plants and few visible weeds. Black plastic was used to control weeds without using herbicides.