

**Coal Oil Point Reserve North Shore Restoration Site  
Third Monitoring Report  
May 10, 2004**

**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. The second year's infill plantings were installed December 2003-April 2004.

Two methods of measuring success of the restoration project were employed: sequential transect data at this project site at approximately 6 month intervals, and plant censuses 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 most recent transect data was collected on 4/16/2004. The most recent data was collected by Darlene Chirman, Reserve Steward Julie Love and restoration interns.

Plant census data of plants installed during the second season (with color-coded plant flags)--% survival of installed native plants, and comments on growth and natural expansion of pre-existing plant species—was collected on April 22, 2004. The number of plants installed between December 2003 and April 2004 was compared with the number found that appeared to be planted (most flagged). Data collected by Darlene Chirman, Julie Love and restoration interns.

**Results.**

**Table 1. Change in the percent of native species over 1½ years, one year and six months, after removal of exotics species and planting of natives, in each habitat. Note: Percentages add to more than 100% because plants may overlap, such as canopy willow with understory Saltgrass and non-native Harding grass.**

Habitat	% native species	% exotic species	% bare soil
<b>Upland Margin</b>			
9/23/02*	62	45.5	3
4/15/03	34.1	42.4	33
11/11/03	56.5	3.5	37.5
4/16/04	63.5	9.0	29.0
<b>Seasonal Marsh</b>			
9/23/02*	46	53	31.5
4/15/03	47	85.5	17
11/11/03	54.5	4.0	57
4/16/04	49.5	21.0	37.0

<b>Willow Woodland</b>			
9/23/02*	142	114.5	16
4/15/03	101.5	69	40
11/11/03	76	25.5	31
4/16/04	121.0	49.5	1.5
<b>Alluvial Fan</b>			
9/23/02*	73.2	215	0
4/15/03	4.33	154.9	0
11/11/03	0	185	3.5
4/16/04	34.0	131.0	0.5

\* The protocol for data collection was poor for the first transect data period, with lumping of groups of plant species. Comparison to 1 year and 6 months ago better reflects changes on the site.

**Table 2. Percent cover of each plant species on the third survey after planting. Compare with Table 2 in first Monitoring Report, July 1, 2003 and the second report November 27, 2003.**

<b>Upland Margin</b>		<b>Native</b>	<b>Non-Native</b>	<b>Bare Ground</b>
<b>Native Species</b>	<b>Non-Native Species</b>	<b>%</b>	<b>%</b>	<b>%</b>
	<b>Annual grasses</b>		5	
<b>Artemisia californica</b>		2		
<b>Atriplex lentiformis</b>		2.5		
<b>Baccharis pilularis</b>		22.5		
	<b>Brassica nigra</b>		1.5	
<b>Calystegia macrostegia ssp. cyclostegia</b>		6		
<b>Distichlis spicata</b>		7.5		
<b>Encelia californica</b>		18		
<b>Eriogonum parviflorum</b>		1.5		
<b>Isocoma menziesii</b>		1		
	<b>Picris echioides</b>		1	
<b>Scrophularia californica</b>		2.5		
	<b>Sonchus sp.</b>		1.5	
<b>Bare Ground</b>				29
<b>Total Native</b>		63.5		
<b>Total Non-Native</b>			9	

Seasonal Marsh		Native	Non-Native	Bare Ground
Native Species	Non-Native Species	%	%	%
Ambrosia psilostachya		1.5		
	Annual grasses		19	
Astragalus pycnostachyus var. lanosissimus		7.5		
Baccharis pilularis		18.5		
	Carduus pycnocephalus		1	
	Conyza canadensis		0.5	
Cressa truxillensis		0.5		
Distichlis spicata		10		
Jaumea carnosa		11.5		
	Melilotus sp.		0.5	
	Polypogon monspeliensis		1	
Bare Ground				37
Total Native		49.5		
Total Non-Native			22	

Alluvial Fan		Native	Non-Native	Bare Ground
Native Species	Non-Native Species	%	%	%
Ambrosia psilostachya		4.0		
	Annual grasses		86.0	
Baccharis pilularis		1.0		
	Brassica nigra		21.5	
	Carduus pycnocephalus		0.5	
Gnaphalium sp		29.0		
	Raphanus sativus		4.5	
	Sonchus sp.		19.0	
Bare Ground				0.5
Total Native		34.0		
Total Non-Native			131.5	

<b>Willow Woodland</b>		<b>Native</b>	<b>Non-Native</b>	<b>Bare Ground</b>
<b>Native Species</b>	<b>Non-Native Species</b>	<b>%</b>	<b>%</b>	<b>%</b>
<b>Ambrosia psilostachya</b>		<b>3.5</b>		
	<b>Annual Grasses</b>		<b>13.5</b>	
<b>Baccharis pilularis</b>		<b>1.5</b>		
<b>Distichlis spicata</b>		<b>47.5</b>		
	<b>Geranium sp.</b>		<b>9</b>	
	<b>Phalaris aquatica</b>		<b>20.5</b>	
	<b>Picris echioides</b>		<b>1.5</b>	
	<b>Raphanus sativus</b>		<b>3</b>	
	<b>Rubus sp.</b>		<b>1.5</b>	
<b>Salix lasiolepis</b>		<b>68.5</b>		
	<b>Sonchus sp.</b>		<b>0.5</b>	
<b>Bare Ground</b>				<b>1.5</b>
<b>Total Native</b>		<b>121</b>		
<b>Total Non-Native</b>			<b>49.5</b>	

**Table 3. Plant Census April 22, 2004. Survival of installed plants, planted between December 2003 and April 2004. Includes November 2003 census data as well.**

Botanical Name	Common Name	Planted Year 1	Counted 11/4/03	% surv.	Planted Year 2	Count 4/16/04	Yr 2% surv.	Comments
<i>Artemisia californica</i>	California Sagebrush	62	53	85%	32	8	25%	Extensive seedlings
<i>Artemisia douglasiana</i>	Mugwort	15	7	47%				
<i>Astragalus pycnostachyus v. lanosissimus</i>	Ventura Milkvetch	8 +seeds	6 + 5 fr. seed	75%		50	100%	No seedlings observed
<i>Atriplex lentiformis</i>	Quail bush	25	13	52%	7	4		
<i>Baccharis pilularis</i>	Coyote Bush	6	3	50%				Many seedlings
<i>Baccharis salicifolia</i>	Mulefat	15	13	87%				Flowering
<i>Distichlis spicata</i>	Saltgrass	12 trans	11	92%	8 plugs	15	100%	Expansion; Which planted?
<i>Encelia californica</i>	California Sunflower	64	45	70%	5	0	0%	Volunteers; Mod #s
<i>Eriogonum parvifolium</i>	Seacliff Buckwheat	76	51	67%	28	11	39%	Flowering
<i>Frankenia salina</i>	Alkali Heath	9 trans.	1?	11%				Expansion
<i>Isocoma menziesii</i>	Coast Goldenbush	111	90	81%	42	15	36%	Many seedlings
<i>Jaumea carnosa</i>	Marsh Jaumea	48 trans.	29	60%				Expansion
<i>Juncus patens</i>	Common Rush	6	5	83%	24	23	96%	
<i>Leymus condensatus</i>	Giant Ryegrass	78	26	33%	11	7	64%	Some flowering
<i>Lonicera subspicata subspicata</i>	Santa Barbara Honeysuckle	1	1	100%				Still present
<i>Salicornia (Anthrocnemum) subterminalis</i>	Parish's Glasswort	62	3	<1%	~30	0	0%	Small transplants
<i>Sambucus mexicana</i>	Blue Elderberry	11 cuts + 4	Direct 0% + 3	75%	8	11	100%	Miscount
<i>Scirpus maritimus</i>	Shore Bulrush	8 trans.	8	100%	8 trans. + seed	4	50%	Expansion; From seed?
<i>Scrophularia californica</i>	Beeplant	84	39	46%	43	26	60%	Flowering
<i>Stachys bullata</i>	Wood Mint	22	4	18%				
<b>Planted Year 2 only</b>								
<i>Bromus carinatus</i>	California Brome				38	13	34%	Missed count Willows? Flws.
<i>Hordeum brancheotherum</i>					8	4	50%	
<i>Leymus triticoides</i>	Alkali Ryegrass				20+20 plugs	9 cont+ 5 rhiz	35%	Cont> rhizomes
<i>Lotus purshianus</i>	Spanish Clover				3 + seeds	1 + 0	33%	None from seed
<i>Suaeda taxifolia</i>	Woolly Seablight				13	9	69%	
<i>Verbena lasiostachys</i>	Vervain				31	32	100%	
<b>TOTAL</b>		<b>697 + ?</b>	<b>411</b>	<b>60%</b>	<b>429</b>	<b>247</b>	<b>58%</b>	
<b>On site, unplanted</b>								
<i>Ambrosia psilostachya</i>	Western Ragweed	----						Expansion
<i>Atriplex triangularis</i>	Spearscale	----						Expansion
<i>Calystegia macrostegia ssp. cyclostegia</i>	Coastal Morning-Glory	----						Expansion
<i>Cressa truxillensis</i>	Alkali Weed	----						Expansion
<i>Salix lasiolepis</i>	Arroyo Willow	----						Expansion

## **Discussion.**

The percent cover of native species increased in most habitats, although declined slightly in the seasonal marsh compared to November 2003. However, compared to one year ago, when the plant phenology was similar, native cover increased in all habitats. The percent cover of weed species declined in all habitats relative to one year ago, although percent weed cover increased since November in all but the alluvial fan. The 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 willow woodland 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. In addition, the relocation of the trail out of the wetland has allowed for native cover to infill the previously bare or weedy areas. The high percent cover of non-native species in the willow woodland does reflect the continued presence of Harding grass and non-native blackberry, upon which we will concentrate our control efforts. The alluvial fan has shown an increase in native cover, primarily due to the presence of *Gnaphalium*; this is a natural change, as we have done no additional control efforts in this area since the early removal of Pampas grass. . The long-term goal of COPR for this sediment plug is removal to restore wetland habitat. The accuracy of the data in the willow woodland is less due to the removal of the transect markers (vandalism).

The data for the three most recent measurement periods were collected using the same protocol and are comparable. 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 November and April surveys. Thus comparing April 2003 and April 2004 is the most valuable.

We also collected survival data on the plants installed during the second year, December 2003 through April 2004. These plants had color-coded flags, except where they were missing due to vandalism. Overall, we found 58% survival of this year's plants, which were infill plantings in areas with low native cover. Some species survived very poorly; such as Parish's glasswort, with no survival. However, 8 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 trail relocated out of the wetland 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.

Due to natural recruitment, it was difficult to accurately count the installed natives. Also, if plants grew rapidly and the plant flags were missing, it was difficult to tell if plants were "new" this year, or established from last year. These inaccuracies in data collection are good indicators of success of establishment of native cover!

In April 2004, seedlings from the native plants installed last year were observed for these species: California sagebrush, 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.

The Ventura Milkvetch installed in February 2003 as container plants and seed flowered and set seed. An additional 50 container plants were installed by CDFG in the last month. While we searched for seedlings, we were unable to locate any. Presence of seedlings that mature to set fruit would be an excellent indicator of successful establishment of a population at this site.

An additional indicator of success has been the observation of Wandering Skipper Butterflies at the site, by a researcher examining the Coal Oil Point Reserve for this species. Apparently, this is the first observation at this site, which may be related to the expanded Saltgrass habitat at the site, which is primary habitat for Wandering Skippers.

### **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. Below are the same photopoint November 11, 2003 and May 10, 2004, along the upland margin transect, showing the maturation of native cover plants.





The trail has been relocated along the “Venoco Road” and out of the wetland. This May 10, 2004 photo shows the infilling of the path with native rhizomatous wetland species, Saltgrass and Jaumea. The willow has expanded over the former trail, and the planted Mulefat has grown. In this general area, the Wandering Skipper has been observed since the implementation of the restoration.