Coal Oil Point Reserve North Shore Restoration Site
Final Monitoring Report
September 27, 2004

Introduction.
The Santa Barbara Audubon Society received a $28,820 grant from the Wetlands Recovery Project to restore 1.5 acres of 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. Maintenance was completed in September 2004.

The final monitoring for measuring success in September 2004 utilized the transect method, which has been conducted approximately every 6 months during the two year project. No plant census was taken during the final monitoring.

Methods.
We utilized the four 100-foot long transects placed on 9/23/2002, within the project area to monitor the success of the restoration. The transect markers were missing in the willow woodland, so the transect location was approximated. 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, 11/11/2003, and 4/16/2004. The most recent data was collected 9/14/2004 by Darlene Chirman, Project Assistant Julie Love and COPR restoration intern Ben Shallant.

Results.
Table 1. Change in the percent of native species over 2 years, 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**
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
4/16/04	63.5	9.0	29.0
9/14/04	81.5	1.0	25.0
Seasonal Marsh			
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
9/14/04	71.5	1.0	39.0

Habitat	**% native species**	**% exotic species**	**% bare soil**
Willow Woodland			
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
9/14/04	120.0	4.5	14.0

Alluvial Fan	% native species	% exotic species	% bare soil
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
9/14/04	23.5	0.0	76.5

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

Table 2. Percent cover of each plant species on the final (fourth) survey after planting. Compare with Table 2 in prior Monitoring Reports.

UPLAND MARGIN				
NATIVE	NON-NATIVE	NATIVE %	NON-NATIVE %	BARE GROUND %
Artemisia californica		20.0%		
Baccharis pilularis		17.5%		
Calystegia macrostegia ssp. Cyclostegia		5.5%		
Distichlis spicata		1.0%		
Encelia californica		26.0%		
Gnaphaleum sp.		0.5%		
Isocoma menziesii		11.0%		
	Piptatherum miliaceum		1.0%	
Bare				25.0%
TOTALS		81.5%	1.0%	25.0%
BIODIVERSITY				
# OF NATIVES	# OF NON-NATIVES			
7	1			

SEASONAL MARSH				
NATIVE	**NON-NATIVE**	**NATIVE %**	**NON-NATIVE %**	**BARE GROUND %**
Ambrosia psilostachya		11.5%		
Astragalus pychostachyus var. lanosissimus		7.5%		
Baccharis pilularis		28.5%		
Distichlis spicata		10.0%		
Jaumea carnosa		14.0%		
	Polypogon monspeliensis		1.0%	
Bare				39.0%
TOTALS		71.5%	1.0%	39.0%
BIODIVERSITY				
# OF NATIVES	**# OF NON-NATIVES**			
5	1			

WILLOW WOODLAND				
NATIVE	NON-NATIVE	NATIVE %	NON-NATIVE %	BARE GROUND %
Ambrosia psilostachya		3.5%		
Distichlis spicata		40.0%		
Salix lasiolepis		76.5%		
	Pichris echioides		2.5%	
	Piptatherum miliaceum		0.5%	
	Polypogon monspeliensis		1.0%	
	Rubus sp.		0.5%	
Bare				14.0%
TOTALS		120.0%	4.5%	14.0%
BIODIVERSITY				
# OF NATIVES	**# OF NON-NATIVES**			
3	4			

ALLUVIAN FAN				
NATIVE	NON-NATIVE	NATIVE %	NON-NATIVE %	DEAD MATTER %
Ambrosia psilostachya		14.5%		
Baccharis pilularis		1.0%		
Conyza canadensis		8.0%		
Dead				76.5%
TOTALS		23.5%	0.0%	76.5%
GRAND TOTAL 100%				
BIODIVERSITY				
# OF NATIVES	**# OF NON-NATIVES**			
3	0			

Table 3. A summary of the 3 transects of Upland Margin, Seasonal Marsh, and Willow Woodland. These 3 habitats comprised most of the weed control and all of the planting during the project.

THREE TRANSECTS COMBINED				
NATIVE	NON-NATIVE	% NATIVE Cover	% NON-NATIVE Cover	% BARE/ DEAD Cover
Ambrosia psilostachya		5.0%		
Artemisia californica		6.7%		
Astragalus pychostachyus var. lanosissimus		2.5%		
Baccharis pilularis		15.3%		
Calystegia macrostegia ssp. cyclostegia		1.8%		
Conyza canadensis		0.0%		
Distichlis spicata		16.7%		
Encelia californica		6.5%		
Gnaphaleum sp.		0.2%		
Isocoma menziesii		3.7%		
Jaumea carnosa		4.7%		
Salix lasiolepis		25.5%		
	Rubus sp.		0.2%	
	Pichris echioides		0.8%	
	Polypogon monspeliensis		0.7%	
	Piptatherum miliaceum		0.5%	
Bare/Dead				26.0%
TOTAL		**88.5%**	**2.2%**	**26.0%**
# OF NATIVES	**# OF NON-NATIVES**			
11	4			

Discussion.

The percent cover of native species increased in most habitats, although declined slightly in the alluvial fan compared to April 2004. 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, and percent weed cover declined in all habitats since April 2004 and since project inception The project can be considered a success because many native species are now well established and reproducing on their own (see attached photos).

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 reduction of non-native cover in the willow woodland reflects

the recent control efforts of Harding grass and non-native blackberry. The alluvial fan appears to change dramatically with seasonal plant phenology and climatic patterns; this appears to be unrelated to our restoration efforts, which were restricted on the alluvial fan to removal of highly invasive species such as 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 native cover is strongly influenced by the Arroyo willow canopy, which has remained fairly constant since April 2004.

The data for the four 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 April and November surveys. Thus comparing September 2004 and November 2003 is the most valuable. In any case, the native cover has gradually increased, especially in the seasonal marsh and the upland berm transects, and the non-native cover was dramatically decreased.

An average of the three habitats where most of the restoration efforts were concentrated-- upland margin, seasonal marsh and willow woodland—gives us 88.5% native cover and 4.5% non-native species cover. This is an excellent outcome. This appears to reflect the overall sites as well as the transects. We observed 11 native species and 4 non-native species in the transect lines; this is a healthy proportion of native to non-native species.

While winter rains will germinate weed seeds, the good native cover and control of contribution to the seedbank over the past two years should minimize the new weeds recruited on the site. Complete control of the non-native blackberry and Harding grass has not been achieved, and the Coal Oil Point Reserve is committed to follow-up maintenance to control these invasive weeds on the restoration site.

There is significant natural recruitment of native seedlings, in general from the seed production of installed plants. Many seedlings and new plants have been observed on site from these species: Coast goldenbush, California sagebrush, and California sunflower. Expensive spread of rhizomatous wetland plants, from existing and planted plugs, has been observed: Saltgrass, Frankenia, Jaumea, Cressa, and Ragweed.

We were unsuccessful in establishing new plants of Parish's glasswort, despite two attempts of planting young container plants. We now have larger, healthy-looking container plants in the COPR plant nursery, and some will be outplanted to this site during the winter rainy season. We have established several plants of *Suaeda taxifolia* on site, grown in our propagation bed, but none of them have grown robustly as yet. These are still being watered occasionally to promote establishment.

The Department of Fish and Game staff has planted the endangered Ventura milkvetch, *Astragalus pychostachyus* var. *lanosissimus*, on this site—container plants and seed the first year, and container plants the second year—and are monitoring survival, growth and soil moisture. We have provided weed control, and were monitoring for seedlings, since the established plants flowered and set seed last year. We were initially disappointed that no seedlings were seen. Dr. Dieter Wilkin of the Santa Barbara Botanic Garden, who has been involved in the recovery of this endangered plant, said that given the low rainfall of the past year he was not surprised. We were very pleased to find one seedling on 8/28/2004; this was flagged and photographed and the CDFG was notified.

Photographs from the same photopoints over time are included with this report, and demonstrate the native plant establishment achieved

Wildlife usage of the area was identified as an indicator of restoration success. Both marsh-dependent butterflies, the Pygmy Blue Butterfly and Wandering Skipper, have been observed on the restoration site for the first time since our restoration efforts began. We have looked for but not yet seen Belding's Savannah Sparrow foraging on site. We have established the shrub cover on the slough margin that has been identified as foraging habitat for this state-endangered species to find insects. COPR staff will continue to monitor the site for wildlife usage.

The Wetland Recovery Project Small Grant Program has funded restoration on the adjacent slough margin area in the east end of Devereux Slough. The combination of the numerous restoration project sites at the Coal Oil Point Reserve should provide additional benefit to the "Audubon" restoration site over time.

Summary.
The Final Monitoring Session of September 14, 2004 when the 4 transects within the four habitat types in the project area give good indication of the success of the restoration progress initiated two years ago. A self-sustaining site of native habitats has been established.

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