

**Coal Oil Point Reserve North Shore Restoration Site  
First Monitoring Report  
July 1,2003  
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**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 main task was to remove weeds from the margin and plant native species appropriate for the various habitats found in the area.

**Methods**

We placed four 100 ft long transects within the project area to monitor the success of the restoration. On 9/23/02, 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. Approximately 6 months after the project began (4/15/03.), we again measured the percent cover of native and non-native species and also the percent cover of each plant species along these transects. The data was collected by Darlene Chirman, Ken Owen and restoration interns.

**Results**

**Table 1. Change in the percent of native species over a six month period after the removal of exotic species in each habitat**

Habitat	% of native species	% exotic species	% of bare soil
Upland margin			
9/23/02	62	45.5	3
4/15/03	34.1	42.4	33
Seasonal marsh			
9/23/02	46	53	31.5
4/15/03	47	85.5	17
Willow woodland			
9/23/02	142	114.5	16
4/15/03	101.5	69	40
Alluvial fan			
9/23/02	73.2	71	0
4/15/03	4.33	154.9	0

**Table 2. Percent cover of each plant species at baseline and on the first survey after planting. "species that were planted and not present at the site before the restoration."**

Alluvial fan 9/23/02

<b>Native</b>		<b>Non-native</b>		<b>Bare Soil</b>
Ambrosia psilostachya	60.00%	Conyza canadensis	49.40%	00.00%
Baccharis pilularis	02.00%	Cortaderia selloana	04.00%	
Gnaphalium sp.	02.60%	Picris echioides	49.00%	
Salicornia virginica	12.00%	Raphanus sativus	14.60%	
		Viciasp.	12.00%	
		Annual grasses	86.00%	

Alluvial fan 4/15/03

<b>Native</b>		<b>Non-native</b>		<b>Bare Soil</b>
Ambrosia psilostachya	04.08%	Anagallis arvensis	01.08%	00.00%
Lupinus sp.	01.00%	Carduus pycnocephalus	1.42%	
		Conyza canadensis	03.75%	
		Geranium sp.	01.00%	
		Melilotus indicus	25.17%	
		Raphanus sativus	14.75%	
		Sonchus sp.	05.00%	
		Viciasp.	55.25%	
		Annual grasses*	89.75%	
		*Annual grasses:		
		Bromus diandrus	47.00%	
		Vulpiasp.	23.08%	
		Lolium multiflorum	17.92%	
		Bromus hordeaceus	01.75%	

Upland margin 9/23/02

**Native**

Baccharis pilularis	34.50%
Calystegia macrostegia	14.00%
Distichlis spicata	03.00%
Frankenia salina	12.50%

**Non-native**

Brassica nigra	11.00%
Carduus pycnocephalus	11.00%
Phalaris aquatica	01.00%
Picris echioides	32.50%
Annual grasses*	29.00%

**Bare Soil**

03.00%

\* Annual grasses:

Avenasp.	15.00%
Others	14.00%

Upland margin 4/15/03

**Native**

Baccharis pilularis	23.50%
Calystegia macrostegia	05.75%
Distichlis spicata	04.08%
**Encelia californica	00.50%
**Eriogonum parvifolium	00.50%
**Isocoma menziesii	00.33%
**Scrophularia californica	00.25%

**Non-native**

Brassica nigra	04.00%
Carduus pycnocephalus	0.92%
Melilotus sp.	05.00%
Phalaris aquatica	05.66%
Picris echioides	07.83%
Sonchus sp.	01.83%
Viciasp.	00.50%
Annual grasses*	12.41%

**Bare Soil**

38.58%

\* Annual grasses:

Avenafatua	09.25%
Bromus diandrus	02.66%
Vulpiasp.	00.50%

Seasonal Marsh 9/23/02

**Native**

Ambrosia psilostachya	08.00%
Atriplex triangularis	07.83%
Aster subulatus v. ligulatus	00.50%
Baccharis pilularis	00.50%
Cressa truxillensis	07.17%
Distichlis spicata	12.17%
Jaumea carnososa	20.00%
Solanum douglasii	04.00%
Bare Soil	

**Non-native**

Anagallis arvensis	08.00%
Carduus pycnocephalus	12.00%
Cirsium vulgare	11.50%
Conyza canadensis	11.50%
Cortaderia selloana	08.00%
Phalaris aquatica	00.50%
Picris echioides	04.50%

**Bare Soil**

30.33%

Seasonal Marsh 4/17/03

**Native**

**Astragalus pycnostachyus v. lanosissimus	02.00%
Atriplex triangularis	01.50%
Baccharis pilularis	06.00%
Cressa truxillensis	00.50%
Distichlis spicata	09.50%
Jaumea carnososa	08.00%
Solanum douglasii	04.00%

**Non-native**

Anagallis arvensis	01.50%
Carduus pycnocephalus	22.50%
Conyza canadensis	14.00%
Melilotus species	45.00%
Picris echioides	01.00%
Raphanus sativus	01.00%
Annual grasses*	18.50%

**Bare Soil**

19.00%

\*Annual grasses:

Avenafatua	03.00%
Polypogon monspeliensis	15.50%

**Willow Woodland 9/23/02**

<b>Native</b>		<b>Non-native</b>		<b>Bare Soil</b>
Ambrosia psilostachya	09.00%	Cortaderia selloana	06.00%	17.00%
Baccharis pilularis	02.00%	Phalaris aquatica	66.00%	
Distichlis spicata	39.00%	Picris echioides	03.00%	
Frankenia salina	02.00%	Raphanus sativus	07.00%	
Populus fremontii	03.00%	Rubus species	27.50%	
Salix lasiolepis	90.00%	* Annual grasses:	01.00%	
		* Annual grasses:		
		Bromus species	01.00%	

**Willow Woodland 4/15/03**

<b>Native</b>		<b>Non-native</b>		<b>Bare Soil</b>
Ambrosia psilostachya	08.50%	Geranium species	19.00%	40.00%
Distichlis spicata	37.00%	Medicago polymorpha	1.50%	
Salix lasiolepis	56.00%	Melilotus species	04.50%	
		Phalaris aquatica	14.50%	
		Piptatherum miliaceum	3.00%	
		Raphanus sativus	06.00%	
		Rubus species	03.50%	
		Sonchus species	00.50%	
		* Annual grasses:	14.50%	
		* Annual grasses:		
		Bromus diandrus	07.50%	
		Bromus hordeaceus	08.00%	

**Discussion**

The percent of cover of weed species declined in some habitats and increased in others (Table 1 and 2). The native species are still at seedling stage for most species planted so there has not been a dramatic change in the percent cover of native species. A more pronounced increase in the percent of native species is expected in the next monitoring when the plants will reach maturity.

The protocol used in the baseline monitoring "lumped" species together when mixed. This technique seemed to be difficult to assess the native and non-native cover, so the protocol was changed for the second monitoring period. This made the data difficult to compare. This change may explain some of the apparently erratic results. Some data show a decline in native cover, which is puzzling, as native plants were not removed. The spring flush of weeds could explain the increase in non-native weed cover in some habitats.

***Upland margin***

Presence of several planted species in October-March is reflected in presence, but low vegetative cover at the time of data collection: Encelia californica, 00.50%;

Eriogonum parvifolium, 00.50%; Isocoma menziesii, 00.33%; Scrophularia californica, 00.25%. An increase in bare soil from 3% to 38.58% demonstrates the weed clearance; this site was "solarized" with black plastic for two months prior to planting.

#### **Seasonal Marsh**

Measured declines in native cover reflects the change in methodology, as none were removed. However some increased noted in non-native cover such as Melilotus species, not mentioned in the first data shows 45% cover in April—this is a seasonal change with increased cover of this and several weeds with spring flush, and possibly significant germination following site disturbance from weed removal.

Pampas grass cover declined from 8% to zero, with removal from the site.

Astragalus pycnostachyus v. lanosissimus was planted and showed 2% cover.

Bare soil declined from 31.5% to 17% with the explosion of Melilotus and other weeds.

#### **Willow Woodland**

Again the "lumping" skewed the results, making native cover higher in the first interval, whereas is probably did not recline; certainly we did not remove any native cover. The non-native cover also registered a decline, probably a combination of methodology and some actual removal of non-natives. Cortaderia selloana (Pampas grass declined from 6% to 0% due to our efforts. The non-native Rubus species declined in cover from 27.5% to 3.5% (however, it has flourished since with regrowth from retained roots).

#### **Alluvial fan**

Except for Pampas grass eradication (4% to 0%) the changes reflect seasonal variation and changed methodology. We have done little else on this part of the site; the goals were to remove species that are especially invasive and cause a threat to other parts of the reserve. The long-term goal would be removal of this delta, which is a sediment deposit from offsite erosional processes.

#### **Summary**

The monitoring has not been a good way to assess progress of the restoration to date. We will monitor again in September. In addition, we may do a census of all installed plantings for the first year to assess survival and vigor. Photographic monitoring is also being used.

- Not all surveying done at the same time
- Seasonal issues affected results; baseline conducted in dry season, and follow-on survey conducted in spring, so weeds were sprouting