

# Cape Mohican Restoration Projects Annual Report



January 2009



# Cape Mohican Restoration Projects

## Annual Report

On October 28, 1996, the *SS Cape Mohican* discharged approximately 96,000 gallons of heavy bunker fuel oil into a floating dry dock at the San Francisco Drydock Shipyard. Approximately 40,000 gallons spilled into San Francisco Bay. Oil spread from Pier 70 south to Hunter's Point and north into the central Bay, extending to the Richmond-San Rafael Bridge and oiling shorelines of Alcatraz, Yerba Buena, Treasure, and Angel islands. The Tiburon Peninsula and San Francisco waterfront were also oiled. Oil traveled outside of the Golden Gate into the Gulf of the Farallones National Marine Sanctuary (GFNMS), oiling beaches as far north as Drakes Beach in the Point Reyes National Seashore (PRNS) and as far south as Pillar Point.



The Cape Mohican Trustee Council, composed of representatives from the National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), California Department of Fish and Game (CDFG), and California Department of Parks and Recreation (CDPR), selected projects to mitigate or restore the injured natural resources. This report includes summaries of the status of each of the projects listed below as well as a summary of project budget data.

### Bird Restoration:

- Shorebird Habitat Protection at the Golden Gate National Recreation Area (GGNRA)
- California Least Tern Habitat Enhancement at Alameda Point
- Restoration of Shorebird Foraging Habitat through Control of Exotic Cordgrass in San Francisco Bay Wetlands
- Farallon Seabird Restoration: Exotic Vegetation Control in Nesting Areas

### Fisheries and Water Quality:

- Pacific Herring Spawning Habitat Enhancement in San Francisco Bay
- Wetland Restoration at Pier 98, India Basin, San Francisco
- Steelhead Stream Habitat Enhancement at San Francisquito Creek

### Wetlands and Mudflats:

- Giacomini Coastal Wetlands Restoration

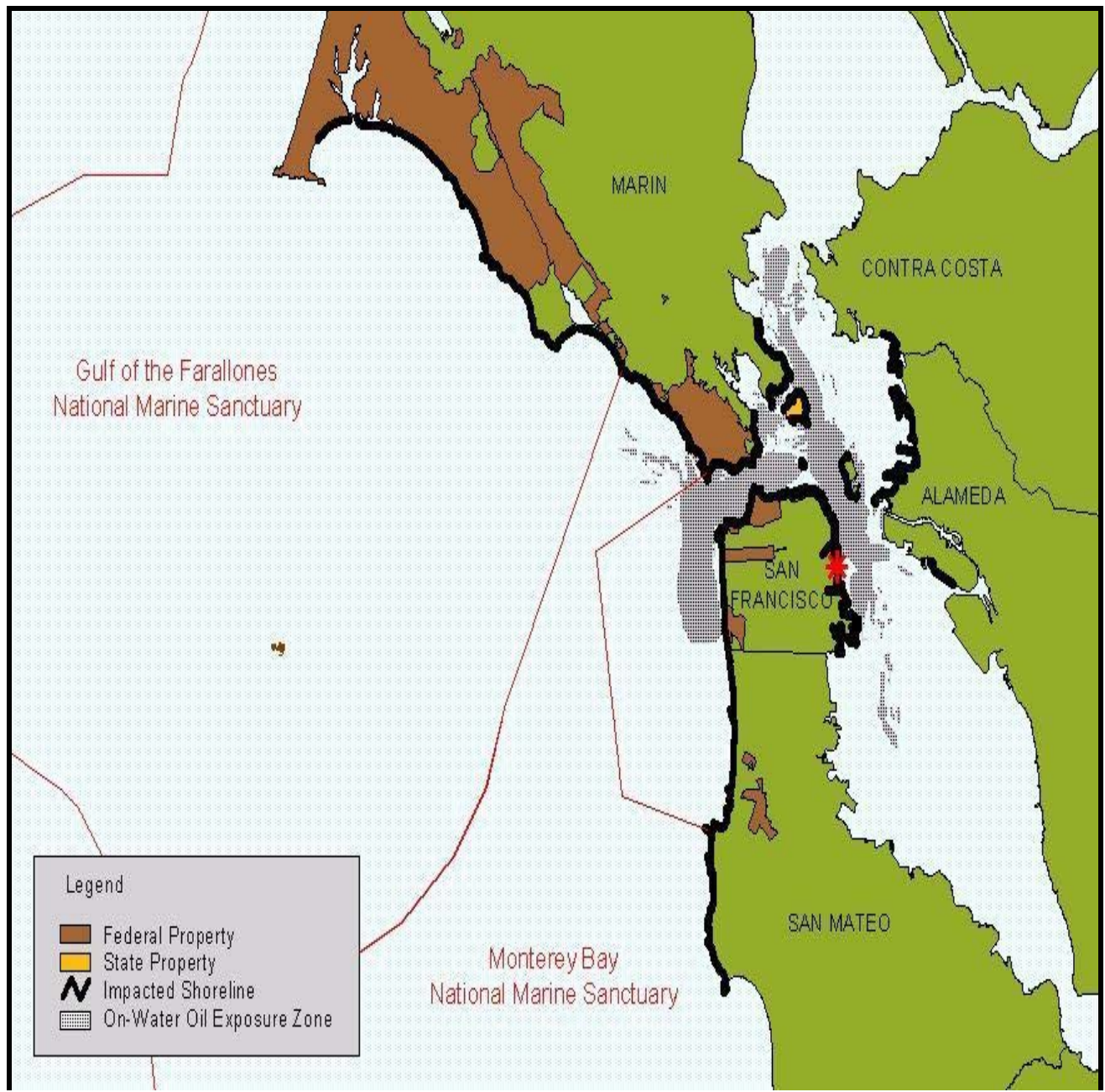
### Sandy Beach and Rocky Intertidal Habitat Projects:

- Sandy Beach Habitat Restoration at Point Reyes National Seashore
- Protection of Duxbury Reef through Education

### Human Use:

- Angel Island Foot Trail Enhancement
- Crissy Field Habitat Stewardship Program





***Boundaries of Cape Mohican oil spill. (Red star indicates site of spill.)***

## Bird Restoration Projects

### **Shorebird Habitat Protection at GGNRA (Lead Agency: NPS)**

#### Project Overview

Golden Gate National Recreation Area (GGNRA) previously installed 12 interpretive and regulatory signs at major beach entrances to inform the public of the presence of Western Snowy Plovers (*Charadrius alexandrinus*) and other shorebirds, and the vulnerability of the birds to disturbance by humans and recreational activities. In addition, an interpretive bulletin on protecting Western Snowy Plovers, shorebirds, and sandy beach habitat was distributed to the public. This project will allow updating and replacement of damaged or missing signs and updating and re-printing of interpretive bulletins for up to 10 years. This project has recently been updated to include design and installation of a broader range of signage and the implementation of a shorebird docent program.



*Western Snowy Plover.*

#### Project Status

GGNRA completed two printings of the plover/shorebird protection brochure and designed and installed portable windmaster signs. The brochures have been distributed by staff on park beaches. In 2008, we initiated a shorebird docent program with NPS interpretive staff leading a group of volunteer docents. We also had some original artwork developed for interpretive signage that will be installed in 2009.

#### Funding

Approved project budget:	\$23,500
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$7,000
Funds allocated in FY 2004:	\$0
Funds allocated in FY 2005:	\$8,000
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$8,500
Funds allocated in FY 2008:	\$0
Funds allocated in FY 2009:	\$0
Funds allocated through FY 2009:	\$23,500
Funds spent to date:	\$11,151

## California Least Tern Habitat Enhancement at Alameda Point (Lead Agency: USFWS)

### Project Overview

This project has created new nesting habitat at Alameda Point for the endangered California Least Tern (*Sternula antillarum browni*) by enlarging the nesting area and installing protective fences. The newly created habitat is being monitored by removing undesirable vegetation, repairing protective fencing, and adding nesting substrate where needed.



*California Least Tern on new substrate.*

### Project Status

Major enhancements to the colony site were completed in spring 2004: The nesting area was enlarged from 6 to 9.7 acres, and the original non-functioning electrical fence was replaced with a chain link fence designed to deter avian and mammalian predators. A new plastic chick fence with small rounded openings was added to the bottom of the fence, replacing the old metal hardware cloth that had caused injury and death to several terns. Nesting substrate (a mixture of sand, small pebbles, and shell fragments) was spread over the new nesting area, and the monitoring grid was reestablished to encompass the entire 9.7 acres. Oyster shells and driftwood were also added to the colony to finish the beach appearance and provide cover for the chicks. Site-preparation activities conducted annually from 2005 to 2007 to maintain habitat included repairing fence, replacing chick shelters, and removing invasive weeds by mechanical and chemical means. In 2007, volunteers accomplished many of these activities, resulting in cost savings carried over to 2008.

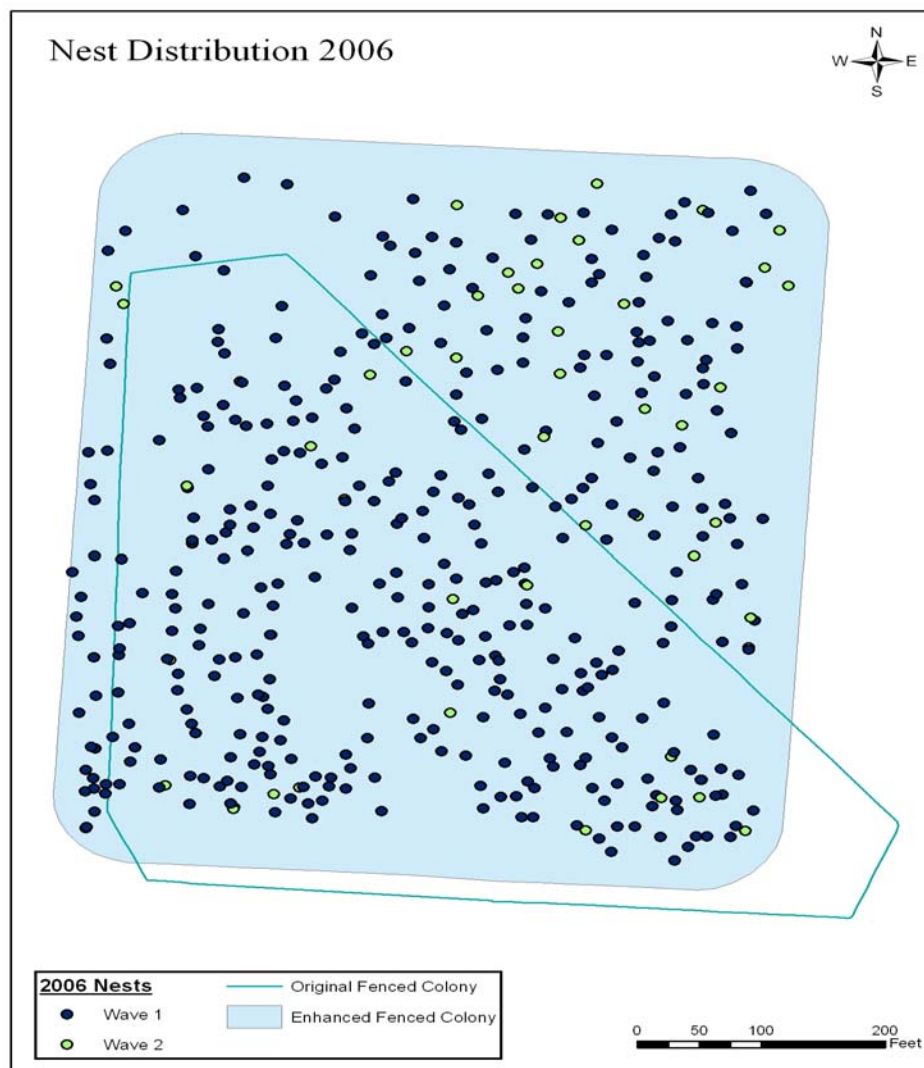
**Post Project Monitoring:** Cape Mohican funds have been used to monitor colonization of the new area, which occurred quite quickly. In 2005, 120 nests (22% of the total nests in the Alameda Colony) were found in the expanded area. Estimated nesting pairs in the colony increased from 379 to 424 in 2005, a 12-percent increase from 2004. In 2006, 160 nests (36% of the total nests in the Alameda Colony) were found in the expanded area. During 2007, terns continued to expand into the new substrate. The area contained 169 nests (43% of the total nests



in the Alameda Colony). In summary, a total of 449 nests have been made in the expanded area during the three years since the colony site was enlarged.

Volunteers and a student intern contributed a large portion of the weeding and tern monitoring, so there is carry over funding to pay for monitoring and more substrate enhancement in 2008 and 2009. Navy funds were used for the minimal enhancements conducted on the site. A new source for shell/sand material was sought during 2008 and the bulk of funds remaining in the Cape Mohican fund are expected to be spent in 2009 to apply a new layer of substrate over the entire site.

The initiation of a Tern Watch volunteer predatory monitoring program contributed to increased reproductive success this year. The terns had tremendous fledgling success in 2008 with 336 nests, 633 eggs laid and the average number of fledglings reached 432.



***Expanded California Least Tern nesting area (shaded rectangle) compared with original colony site (in hexagon) and nests.***

## **Funding**

Approved project budget:	\$141,000
Funds allocated in FY 2002:	\$88,000
Funds allocated in FY 2003:	\$0
Funds allocated in FY 2004:	\$19,000
Funds allocated in FY 2005:	\$0
Funds allocated in FY 2006:	\$17,000
Funds allocated in FY 2007:	\$17,000
Funds allocated in FY 2008:	\$0
Funds allocated in FY 2009:	\$0
Funds allocated through FY 2009:	\$141,000
Funds spent to date:	\$100,702

## **Restoration of Shorebird Foraging Habitat through Control of Exotic Cordgrass in San Francisco Bay Wetlands (Lead Agency: USFWS)**

### **Project Overview**

This project involves the eradication of the invasive Smooth Cordgrass (*Spartina alterniflora*) and its hybrids from mudflats and tidal salt marshes in the central and south portions of San Francisco Bay and between the Bay Bridge and the Dumbarton Bridge. Removal of Smooth Cordgrass from tidal marshes and tidal sloughs will allow native plants to reestablish on the tidal marsh plain and restore shorebird foraging and fish nursery habitat in the tidal sloughs.

### **Project Status**

In May 2005, the San Francisco Bay National Wildlife Refuge (Refuge) and California Coastal Conservancy completed Site-Specific Control Plans for each site targeted for control in 2005-2007. The Site-Specific Plans describe methods to be used at each site and summarize impacts and mitigation measures to be used during control. Information contained in the Site-Specific Plans was used to prepare an Environmental Assessment for the implementation of the Site Specific Plans, which tiered off the Programmatic EIR/EIS. An Internal Formal Section 7 consultation was also conducted with the USFWS resulting in issuance of a Biological Opinion with a non-jeopardy determination for listed species in the project area.

In 2008, an Internal Formal Section 7 consultation was conducted with the USFWS to amend the Biological Opinion for control activities to be conducted in 2008-2010. This action will allow both helicopter and ground control work to be initiated as early as June 1 in subsequent years, even in marsh habitat occupied by Clapper rail.

Habitat® herbicide, with the active ingredient imazapyr, was used for all control work in 2008. In July through September 2008, the fifth consecutive year of control work was conducted in the Southeast San Francisco Sub Areas (Site 12), totaling 3.0 acres of non-native *Spartina* treatment. In addition, the fourth year of consecutive treatment was conducted at two sites: West San Francisco Bay (Site 19) and Alameda/San Leandro Bay (Site 17), totaling approximately 55 acres. A fourth site, Colma Creek/San Bruno Complex (Site 18), was treated for the third year, for a total of 50 acres controlled.



*Expanded foraging area available for clapper rail after invasive Spartina control.*

In 2009, follow-up control work will be conducted in all previously treated marshes under the scope of this project, and the next phase of treatment will occur in Colma Creek/San Bruno Complex (Site 18). In the 2009 control season, helicopter and ground control work is planned as early as June 1 in infested marshes.

In spring 2009, the Refuge will purchase additional equipment, materials, and contract labor to conduct the control work in targeted control areas for the 2009 season. Any equipment and materials purchased with funds allocated to this project will be stored at either the Coastal Conservancy or the Refuge for future use on this project. Coastal Conservancy or Refuge personnel will train land managers who conduct control work and will monitor the effectiveness of control.

**Funding**

Approved project budget:	\$430,905
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$50,000
Funds allocated in FY 2004:	\$0
Funds allocated in FY 2005:	\$0
Funds allocated in FY 2006:	\$110,000
Funds allocated in FY 2007:	\$86,000
Funds allocated in FY 2008:	\$89,775
Funds allocated in FY 2009:	\$50,675
Funds allocated through FY2009:	\$386,450
Funds spent to date:	\$245,402



## Farallon Seabird Restoration: Exotic Vegetation Control in Nesting Areas (Lead Agency: USFWS)

### Project Overview

This project involves restoring burrow nest habitat for Cassin's auklets (*Ptychoramphus aleuticus*), ash storm-petrels (*Oceanodroma homochroa*), and rhinoceros auklets (*Cerorhinca monocerata*) by controlling exotic vegetation, especially New Zealand Spinach (*Tetragonia tetragonoides*) and Cheeseweed (*Malva* spp.) at Farallon National Wildlife Refuge. These non-native species form dense mats inhibiting burrow nesters such as auklets from digging their burrows, and cover nesting crevices preventing petrels and other crevice nesters from entering nesting sites. Combinations of mechanical and chemical methods are being used to control exotic vegetation. Seeds collected from native Maritime Goldfields (*Lasthenia maritime*) are used to re-seed areas of bare soil created when large amounts of exotic plants are removed. The success of the reseeding efforts is highly important because the plants are used for nesting material by Brandt's cormorants (*Phalacrocorax penicillatus*) and other seabirds. Increased monitoring of the relative success of the treatments will allow us to select the vegetation removal option and time reseeding to be most effective and efficient.



*Cassin's Auklets (at burrow entrance, left) and Ashy Storm petrels (right) have benefited from this project. Invasive weeds cleared from nesting crevices and burrows allow Cassin's Auklets to find burrow entrances and enable nestling petrel chicks to flourish.*



*Test plot location. Lower portion reseeded with maritime goldfields.*



*USFWS spraying Habitat® herbicide on New Zealand Spinach.*

### **Project Status**

The year 2008 marks a transitional year in weed management on the Farallones. After experiencing high success in eradicating New Zealand Spinach with the use of the new herbicide (Habitat®), we found that there was no need to spray this year. Instead, a hand weed-pulling team was used to more specifically target the problem areas. In addition the test plots established previously were reexamined and the effectiveness of the varied treatments was compared. The activities of 2008 offer us a chance to juxtapose our historic means of weed eradication and habitat enhancement and really evaluate the effectiveness of those means.

A hand reseeding component added in 2005 has continued again into 2008. Native Maritime Goldfields plants were collected in August and September and are currently awaiting reseeding. Our study plots established in 2007 show that the reseeding is effective in increasing the proportion of Maritime Goldfields growing and available for nesting material. In addition, study areas reseeded last year show improved success for reestablishing natives and reducing the competition of non-natives. Unfortunately, this was only done on a small scale. Yet we have hopes that future years can allow us the ability to better quantify the effectiveness of these varied approaches.

As in 2007, the Cape Mohican funds will be combined with San Francisco Bay Coastal Program funding to expand the volunteer invasive plant hand-weeding effort during spring 2009. Though the process is highly intensive, the benefits and the success of the project justify the work. In addition, the hand control of non-native plants in the spring when they are intermixed with natives is advantageous to the growth of natives. Like last year, the Coastal Program will provide transportation and per diem for the volunteers.

### **Funding**

Approved project budget:	\$289,192
Funds allocated in FY 2002:	\$25,000
Funds allocated in FY 2003:	\$0
Funds allocated in FY 2004:	\$25,000
Funds allocated in FY 2005:	\$37,296
Funds allocated in FY 2006:	\$37,296
Funds allocated in FY 2007:	\$37,296
Funds allocated in FY 2008:	\$40,218
Funds allocated in FY 2009:	\$42,936
Funds allocated through FY 2009:	\$245,042
Funds spent to date:	\$174,500

## Fisheries and Water Quality Projects

### **Pacific Herring Spawning Habitat Enhancement in San Francisco Bay (Lead Agency: CDFG)**

#### **Project Overview**

The Cape Mohican oil spill affected aquatic organisms along the San Francisco waterfront, including rocky shore and piling communities. Pacific herring (*Clupea pallasii*), which spawn on these substrates, were also affected: the substrates were coated with oil only a few weeks before the start of spawning.

This project at the Port of San Francisco's Pier 45 involves enhancing water quality by removing creosote-covered pilings and replacing them with polymer-coated wood piles, which provide a non-toxic surface for encrusting organisms to attach to and enhance spawning of herring.



*The new polymer-coated wood piles, which replaced the creosote-covered pilings, provide a non-toxic surface to which encrusting organisms can attach. This will enhance the spawning of herring.*

#### **Project Status**

The pier piling replacement portion of the project has been completed. A total of 281 pilings were installed by the Port of San Francisco using Cape Mohican funds. The project is now in the process of evaluating the growth of encrusting marine organisms on vinyl-coated and ACZA-treated panels relative to controls, to provide an assessment of the value of treated pilings as habitat for encrusting organisms and as an indicator of potential toxicity to herring eggs. In the summer/fall of 2006, wood panels measuring 4" x 6" were manufactured with four different treatments: untreated (controls), vinyl-coated, uncoated ACZA-treated and vinyl-coated ACZA-treated. The panels were bolted to lengths of plastic timbers to form vertical test arrays. Each array holds four panels, one of each type of treatment, with the vertical position of each treatment randomly assigned. In early January of 2007, four test arrays were lag-bolted to each of five pilings within bents 60-62 at Pier 45 (providing 5 replicates), with the arrays positioned so that the panels are located between -1.0 m and -1.6 m MLLW. Each array was labeled with a number-punched aluminum disk. The Port of San Francisco assisted with the manufacture and deployment of the test panels. Enough additional panels and timbers were manufactured to allow for replacement of at least three replicate sets (that is, with each replicate set consisting of 5 vertical arrays of four panels each).



The study design calls for retrieval and replacement of a replicate set at approximately 1-year intervals, and retrieval of all remaining sets at 4 years after initial deployment. This study design allows assessment over seven exposure periods: two 1-year exposures (t = years 0-1 and 3-4), two 2-year exposures (years 0-2 and 2-4), two 3-year exposures (years 0-3 and 1-4) and one 4-year exposure (years 0-4); and thus provides two sets for comparison for each of 3 exposure periods (1-, 2- and 3-year periods), and two “successional” sets: panels deployed in year 0 for 1, 2, 3 and 4 years, and panels retrieved in year 4 after 1, 2, 3 and 4 years of deployment. Each retrieved replicate set will be fully analyzed at the time it is retrieved. Timing and number of replacements/retrievals can be amended as budget and project period require.

During the past year, with the assistance of the Port of San Francisco divers, the first set of panel arrays at Pier 41 were retrieved and replaced with a new set. After removal from the pilings, each panel was photographed in the field and the percent cover of each distinct taxon on each panel was estimated by direct visual examination. In the laboratory, each distinct taxon was identified to lowest possible taxonomic level and the species richness calculated. The biomass of each taxon and total biomass were measured, and the percent cover of each taxon was estimated from the field photographs for comparison with the field estimates. The data are being analyzed for statistically-significant differences between treatments. Preliminary examination of the results suggests that it is unlikely that statistically significant differences will be found between the three analyzable treatments (untreated and vinyl-coated wood, ACZA-treated and uncoated wood, ACZA-treated and vinyl-coated wood).

Because the untreated and uncoated wood panels were largely eaten away by shipworms (e.g., *Teredo* sp.) and *Limnoria* (and in some cases missing entirely), the wood panels do not serve as meaningful experimental controls. The study is being redesigned and will probably substitute Plexiglas or plastic panels for the wood panels. Estimating percent cover in the field by direct visual examination proved feasible and provides results that are similar, but in the researcher’s judgment slightly superior, to those obtained estimating percent cover from photographs. Biomass measurement appears to provide information similar to obtained from estimates of percent cover, but requires time-consuming separation of each taxon. For the remaining panel retrievals, the study will (1) photograph each panel in the field, to provide a record; (2) estimate the percent cover of each distinct taxon on each panel by direct visual examination in the field; (3) measure total biomass on each panel in the lab; and (4) identify each distinct taxon to the lowest possible taxonomic level and calculate the species richness for each panel.

**Funding**

Approved project budget:	\$456,500
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$408,500
Funds allocated in FY 2004:	\$0
Funds allocated in FY 2005:	\$0
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$0
Funds allocated in FY 2008:	\$0
Funds allocated in FY 2009:	\$48,000*
Funds allocated through FY 2009:	\$456,500
Funds spent to date:	\$378,145

\* Funds allocated to CDFG in FY06 (\$16,000), FY07 (\$16,000), and FY08 (\$16,000), were later returned to the NRDAR fund. In FY09 those funds (a total of \$48,000) were transferred to

NOAA to fund contracts to complete this project through a cooperative agreement with the National Fish and Wildlife Foundation.

## **Wetland Restoration at Pier 98 (Heron's Head Park), India Basin, San Francisco (Lead Agency: CDFG)**

### **Project Overview**

This project, at the Port of San Francisco's Heron's Head Park near Pier 98 at India Basin, will enhance a new saltmarsh. The primary goals are to propagate, plant, and promote establishment of native transition-zone species and to remove non-native plant species. Community volunteer involvement is a key element of the project.

### **Project Status**

During August and September 2006, the Port completed a competitive process to select a contractor to execute the transition-zone habitat enhancement, maintenance, monitoring, and reporting to be funded by the San Francisco Bay Natural Resources Restoration Fund (a.k.a. Cape Mohican Restoration Fund) through a contract between the Port and the National Fish and Wildlife Foundation (NFWF) serving as the fiscal agent. This work will be conducted in conjunction with environmental education activities at Heron's Head Park. The Port awarded a 4-year contract, beginning October 1, 2006, to Literacy for Environmental Justice (LEJ), a non-profit organization with experience and qualifications in environmental education, native plant cultivation, and habitat restoration. Under the terms of the contract between the Port and LEJ, the detailed schedule and cost for specific tasks vary somewhat from the original proposal included in the Cape Mohican Final Restoration Plan (approved 3/21/02). The scope of work is consistent with the original proposal, but the fees are substantially higher. The contract includes installation of 2,000 transition-zone plants within the first two years of the contract, and ongoing maintenance and monitoring of the enhancement area over the 4-year contract term. The Port is committed to completing the scope of work and will fund any expenses that exceed funds available from the Cape Mohican Restoration Fund.



*A new salt marsh is enhanced by propagating and planting rare transition-zone native plant species.*

There was some delay in beginning the project due to staff changes, but the project is presently active. To date, LEJ has:

1. Collected seed and cultivated transition zone plants needed for out-planting at Heron's Head Park.
2. Prepared the substrate by removing debris and loosening highly compacted soil.
3. Developed a Heron's Head Park Transition Zone Planting Plan.
4. Installed 600 plants.

The Maintenance & Monitoring Plan is currently being prepared, and more site restoration activities are planned for the upcoming year.

### **Funding**

Approved project budget:	\$146,920
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$70,648
Funds allocated in FY 2004:	\$0
Funds allocated in FY 2005:	\$0
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$0
Funds allocated in FY 2008:	\$0
Funds allocated in FY 2009:	\$76,272*
Funds allocated through FY 2009:	\$146,920
Funds spent to date:	\$6,200

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\* Funds allocated to CDFG in FY06 (\$25,424), FY07 (\$25,424), and FY08 (\$25,424), were later returned to the NRDAR fund. In FY09 those funds (a total of \$76,272) were transferred to NOAA to fund contracts to complete this project through a cooperative agreement with the National Fish and Wildlife Foundation.

## **Steelhead Stream Habitat Enhancement at San Francisquito Creek (Lead Agency: CDFG)**

### **Project Overview**

This project will increase the size and quality of habitat available for Steelhead trout (*Oncorhynchus mykiss*) spawning in the Bay Area by rehabilitating Steelhead spawning habitat in the San Francisquito Creek watershed. This will be accomplished through fish barrier removal and native plant revegetation.

### **Project Status**

The subprojects that compose the "Steelhead Stream Habitat Enhancement at San Francisquito Creek" project include conducting volunteer-based habitat restoration workdays and completing designs, permits, and environmental reviews for fish-passage improvement projects at two sites. The Watershed Council holds about 15 habitat restoration workdays per year and conducts visual monitoring and site maintenance (weeding and watering as needed) year-round. The funding from the Cape Mohican Restoration Fund was part of the total funding needed to



operate this program. Other funding sources currently include the NOAA Community-based Restoration Fund, the California Coastal Conservancy, and the Nature Restoration Trust.

The Watershed Council is also working on completing designs, permitting, and environmental review at four barriers to Steelhead. Funding from this grant is partially supporting the work on two of these barriers (culvert replacement at McGarvey Gulch and installation of baffles in a box culvert on Los Trancos Creek). Other funds supporting the Watershed Council's overall fish passage improvement work include the San Francisco Bay Salmonid Habitat Restoration Fund, the California Coastal Conservancy, and the Bella Vista Foundation.

### **Task I: Fish Migration Barrier Modifications**

**McGarvey Gulch:** The McGarvey Gulch culvert replacement was completed in 2007. Final designs, CEQA, and permits were finished in the spring, and the culvert was built in September 2007.



*Culvert replacement at McGarvey Gulch to improve Steelhead passage.*

**Los Trancos Creek Box Culvert:** The project implementers were unable to move forward with the Los Trancos Creek double-box culvert modification because of insufficient support from key landowners, uncertainties about property ownership, and the lack of a public agency willing to do construction. The decision to terminate the Los Trancos Project could not have been made before project designs were completed because landowners used those designs as the basis for deciding whether to sign permit applications. The same was true of the public agencies, who would not decide whether or not to serve as construction lead until they evaluated project designs. The Trustee Council approved redirecting the balance of project funds to invasives removal and native revegetation work.

### **Task II: Riparian Vegetation Restoration Projects**

The task as originally defined has been completed: 16 workdays were partially funded by the Cape Mohican Restoration Fund. At these workdays, almost 300 volunteers planted approximately 2,300 native creekside plants in the riparian corridor at sites throughout the watershed. This native vegetation is helping to stabilize the banks of the creek, shade and cool the water, and provide habitat structure and food for wildlife. In addition, the invasives removal and native revegetation work funded by the reprogrammed funds from Task I are complete as of May 2008.

In 2007, the Trustee Council approved funding for two additional riparian corridor projects: \$1,505 for *Arundo* (*Arundo donax*) mapping and removal and \$7,190 for Habitat Improvement

Workdays, for a total of \$8,695. These dollars will fund approximately 16 volunteer workdays, from September 2008 to May 2009, at five revegetation sites and two invasives-removal sites. The goals of this effort are to:

1. Plant 15,000 square feet of native plants in new areas and as infill planting to increase plant cover and species diversity in previously planted areas. As of Nov.15 2008, approximately 900 plants and 1300 grass plugs have been planted on Sausal Creek in the town of Portola Valley.
2. Maintain (weed, water, replace dead plants) 45,000 square feet of previously planted native plants to achieve well-established native plants.
3. Remove targeted invasive weeds from 40,000 square feet of riparian corridor.
4. Discourage establishment of invasive species to less than 10% cover on planting sites and less than 20% cover on invasive removal sites by the end of the project period.

This work is currently in progress. Recognizing that the Watershed Council will not be able to manage this project in perpetuity without empowering local government agencies to continue the work, the Arundo removal has focused mainly on coordination with the San Francisquito Creek Joint Powers Authority (SF Creek JPA), the Santa Clara Valley Water District (SCVWD), and the City of Menlo Park. The SF Creek JPA and SCVWD have been very effective partners in this project.

On Nov. 17 & 18, Acterra and the SFCJPA in cooperation of the City of Menlo Park started work to remove Arundo on a 5,000 square foot plot in the city of Menlo Park with approximately 85% coverage. Approximately 75% of the Arundo was removed, leaving the remaining 25% in place to act as a bank stabilizer until new bank stabilization measures can be put in place. Willow stakes were placed at the toe of the slope, and Acterra, who is performing the work, expects to finish the stabilization measures and remove the remaining Arundo in Spring 2009. Follow up measures will be taken to prevent reinfestation. Habitat improvement workdays were conducted beginning again in the fall season of 2008, and will continue through spring 2009.



***Riparian restoration through removal of invasives and planting native vegetation.***

## **Funding**

Approved project budget:	\$48,695
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$40,000
Funds allocated in FY 2004:	\$0
Funds allocated in FY 2005:	\$0
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$0
Funds allocated in FY 2008:	\$8,695
Funds allocated in FY 2009:	\$0
Funds allocated through FY 2009:	\$48,695
Funds spent to date:	\$40,767

## **Wetlands and Mudflats Projects**

### **Giacomini Coastal Wetlands Restoration Project (Lead Agency: NPS)**



### **Project Overview**

This project has restored tidal connection and hydrologic function to approximately 550 acres of former coastal salt marsh in Tomales Bay, which was diked in the 1940s to provide pasture for dairy cattle. Planning on the proposed project started in 2001, shortly after the purchase of the land in 2000. NPS and its partners, the Point Reyes National Seashore Association, California State Lands Commission, and Audubon Canyon Ranch, conducted extensive studies to characterize existing and potential future conditions in the project area, as well as extensive public scoping through meetings and workshops.



*Excavator removes final portion of levee, allowing creekwaters to flow into the Giacomini Ranch's East Pasture.*

Construction of the first phase of the restoration component was completed in fall 2007, with construction of Phase II expected to conclude by mid-December 2008. Cape Mohican funds have been used in conjunction with funds from other sources to finalize planning, prepare construction specifications and final design, and construct Alternative D, which was the environmentally preferred alternative that was ultimately selected for implementation through the environmental review process.



## **Project Status**

The Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was finalized in June 2006. The EIR was approved for certification by the board of the State Lands Commission on June 28, 2007, and the Record of Decision for the EIS was approved by the NPS Regional Director on August 16, 2006. Construction of Phase I of the restoration component was conducted in fall 2007. Phase I involves removal of agricultural buildings and infrastructure (e.g., pipelines, fencing), shallow excavation of areas used for manure disposal, close-out of manure ponds used for dairy waste, and construction of freshwater marsh and ponds as habitat for the federally threatened California red-legged frog (*Rana aurora draytonii*).

Phase II of the restoration component, the larger of the two phases, focused on marshplain and floodplain enhancement. Levees were removed, with small berms left to keep out tides until construction was completed. The material from levee removal was used to fill drainage ditches used for pasture irrigation when it was operated as a ranch and to restore more natural topographic conditions to the Dairy Mesa, where barns were located. The remaining soils are being hauled to quarries in another portion of the Seashore. The plan is for these quarries to be restored to more natural landscapes. One of the smaller leveed creeks was taken out of its leveed alignment and routed into a new tidal channel slough network that moves through the restored pasture and connects to Lagunitas Creek. Some of the areas filled to improve pasturelands were excavated to lower elevations to improve hydrologic connectivity of marshplain and floodplain areas with Lagunitas Creek. The southernmost perimeter of the ranch has undergone a number of activities designed to improve riparian and creek habitat, including laying back the overly steepened banks to a more stable profile, removing riprap, and creating a low-elevation bench or terrace adjacent to the creek. Lastly, the spur trail that runs along the southern edge of the ranch is being rerouted 100 feet away from the creek to provide more room for riparian habitat and greater buffer for Lagunitas Creek.

By mid-November 2008, the final portion of the levees had been removed allowing tides to enter the former coastal wetlands area for the first time in 60 years (see photos). The only construction tasks currently being conducted are the recontouring of the Dairy Mesa, realignment and fencing of the new spur trail alignment, fencing of selected other areas, and completion of hauling to the quarries. Simultaneously, active revegetation is being conducted in some areas to promote establishment of native vegetation communities. This work being is being conducted primarily by a revegetation contractor with volunteer help from schools, organizations, and individuals. Invasives removal will also continue in December with re-treatment of areas where cape ivy (*Delairea odorata*) was removed in 2007.



*Giacomini Ranch after levees were breached in the end of October 2008.  
(Photo courtesy of Robert Campbell Aerial Photography, Sonoma, CA.).*

In the future, the park and its partners will continue to look for opportunities to (1) perform some expansion of restoration efforts in the East Pasture (e.g., lowering more filled areas to hydrologically interactive elevations) and Olema Marsh (an adjacent impounded freshwater system that is being adaptively restored), (2) expand invasives removal efforts or conduct re-treatment of areas already treated, followed eventually by revegetation with native plant species; and (3) expand revegetation efforts in other areas. The park will also move forward with post-restoration monitoring as part of its efforts to evaluate how successful these activities have been in restoring natural conditions, processes, and functions to the Giacomini Ranch, as well as improving conditions in the larger Tomales Bay Watershed system.

**Funding**

Approved project budget:	\$435,000
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$0
Funds allocated in FY 2004:	\$0
Funds allocated in FY 2005:	\$435,000
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$0
Funds allocated in FY 2008:	\$0
Funds allocated in FY 2009:	\$0
Funds allocated through FY 2009:	\$435,000
Funds spent to date:	\$435,000

## **Sandy Beach and Rocky Intertidal Habitat Projects**

### **Sandy Beach Habitat Restoration at Point Reyes National Seashore (Lead Agency: NPS)**

#### **Project Overview**

This project is restoring sandy beach and native sand dune habitat as well as increasing nesting habitat and reproductive success of shorebirds, especially Western Snowy Plover (*Charadrius alexandrinus*), at Point Reyes National Seashore (PRNS). This objective is being accomplished by increasing habitat for shorebird foraging and nesting through the removal of non-native European beachgrass and iceplant.

#### **Project Status**

Follow-up re-sprout removal continues throughout the entire 50 acres of the project through volunteer efforts coordinated by a PRNS Marin Conservation Corps AmeriCorps habitat restoration volunteer coordinator partially funded through the Sandy Beach project. Invasive removal work done in 2008 focused on approximately 10 acres immediately north and south of the mouth of Abbott's Lagoon.



The site shows excellent progress towards bringing European beachgrass to controlled status in the areas funded for follow-up through this project. Washington University assisted again this year in re-reading monitoring plots (summer 2008), finding an average of less than 5% cover of European beachgrass in removal plots; they expect to publish their findings in 2008. Upcoming work includes (1) continued monitoring of vegetation, dune formation profiles, Snowy Plover breeding; and (2) continued annual follow-up treatment of 50 acres to remove any remaining beachgrass re-sprouts (scheduled through March 2009, then resuming in September 2009 after plovers have finished breeding). Funds available in FY08 provided partial support for a FY09 volunteer coordinator. Remaining funds will support a vehicle for the FY09 volunteer coordinator and volunteer supplies.

Snowy Plovers were documented using restored dune habitat for the fifth consecutive year. In 2008 Snowy Plovers were documented using restored dune habitat for the sixth consecutive Year; 4 nests were initiated in restored areas, 2 in the hand-treated area north of Abbott's Lagoon and 2 in the mechanically treated area south of the lagoon. This is the same number of nests initiated in restored areas in 2007 and 2006. Although no chicks fledged in the restored area in 2008, of the 24 chicks fledged in 2007, 11 were raised in restoration areas—4 in the hand-treated area and 7 in the mechanically treated area. Of the 23 chicks fledged in 2006, 13 were raised in restoration areas—3 in the hand-treated area, 10 in the mechanically treated area.



## **Funding**

Approved project budget:	\$330,000
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$60,000
Funds allocated in FY 2004:	\$80,000
Funds allocated in FY 2005:	\$190,000
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$0
Funds allocated in FY 2008:	\$0
Funds allocated in FY 2009:	\$0
Funds allocated through FY 2009:	\$330,000
Funds spent to date:	\$326,498

## **Protection of Duxbury Reef through Education (Lead Agency: NOAA)**

### **Project Overview**

This project will help prevent further injury to, and facilitate the natural recovery of intertidal rocky habitat at Duxbury Reef Marine Reserve. This will be achieved through an environmental education and stewardship program aimed at increasing public awareness of this sensitive habitat and controlling the large number of visitors to the area. The project will create opportunities for intertidal populations to recover from human-induced disturbances.



*Environmental education at Duxbury Reef Tidepool.*

### **Project Status**

The Gulf of the Farallones National Marine Sanctuary (GFNMS) awarded a contract to Tenera Consulting for Phase I of this project. Tenera will complete a habitat and impact assessment that will guide restoration of Duxbury Reef.

The first field site visit to review the site and scope of work occurred in June 2005. Tenera collected information to prepare maps, took photos, and surveyed zones for the visitor census

surveys. Carol Preston and Jan Roletto developed protocols for a preliminary visitor use study to determine the locations of high and low use and to control visitor use through sampling plots.

On October 26, 2006, staff from Tenera, GFNMS, and the NOAA Restoration Center met with local researchers, resource managers and marine educators and researchers to discuss the Duxbury Reef restoration program and potential collaborations. Presentations included:

- Review of the Cape Mohican oil spill, NRDA, and the restoration project goals and objectives.
- Review of the Duxbury Reef habitat and zonal communities, past and current data and visitor use patterns.
- Review of the Duxbury Reef Study Plan, monitoring plan, and proposed docent lead and self-guided tour program and trail system.
- Suggested collaborations: LIMPETS, California Academy of Sciences, home schooling programs, volunteers - adults and kids, resource monitoring programs - Point Reyes National Seashore, GFNMS, Marin County Open Space, College of Marin, Marin Storm Water Prevention Program, etc.
- Next phase of the restoration project - Phase II community outreach, proposed docent lead and self-guided tour program and trail system and funding requirements and opportunities.

Phase II objectives include developing docent and interpretation programs, and integrating sampling methods from various education programs (i.e., LIMPETS, California Academy of Sciences docent programs, etc.) with science information needs to address specific management issues (i.e., assessing effectiveness of trail routing plan and stewardship program for tide pool etiquette).

In 2007, Phase I work included completing regularly scheduled transect surveys in early spring and late summer. Completed sampling consists of two years of data collections (four baseline surveys) prior to implementing Phase II. The trail routing plan for Phase II has been completed but not implemented. Visitor count surveys associated with Phase II continued in 2007 with analysis in progress. The request for proposals to implement the Phase II managed access docent program remained in preparation in 2007.



*Sea Stars at Duxbury Reef Marine Reserve.*

## **Funding**

Approved project budget:	\$487,000
Funds allocated in FY 2002:	\$0
Funds allocated in FY 2003:	\$90,000
Funds allocated in FY 2004:	\$90,000
Funds allocated in FY 2005:	\$0
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$90,000
Funds allocated in FY 2008:	\$93,000
Funds allocated in FY 2009:	\$49,100
Funds allocated through FY 2009:	\$412,100
Funds spent through FY 2008:	\$149,838

## **Human Use Projects**

### **Angel Island Foot Trail Enhancement (Lead Agency: CDPR)**

#### **Project Overview**

This project involves the construction of stairways, walkways, and trail improvements to enhance public access to beaches on Angel Island that were closed to the public because of the oil spill.



*Stairs to Perle's Beach.*

#### **Project Status**

The Quarry Beach access has been completed. The additional work needed on the trail leading to the Perle's Beach stairs as well as stabilization at the top of the stairs will be performed pending the scheduling of other work in the area.





*ADA ramp construction at Quarry Beach.*

**Funding**

Approved project budget:	\$180,000
Funds allocated in FY 2002:	\$180,000
Funds allocated in FY 2003:	\$0
Funds allocated in FY 2004:	\$0
Funds allocated in FY 2005:	\$0
Funds allocated in FY 2006:	\$0
Funds allocated in FY 2007:	\$0
Funds allocated in FY 2008:	\$0
Funds allocated in FY 2009:	\$0
Funds allocated through FY 2009:	\$180,000
Funds spent to date:	\$162,536

**Crissy Field Habitat Stewardship Program (Lead Agency: NPS)**

**Project Overview**

This project consists of developing and operating a 4-year public stewardship and biological monitoring program whereby staff and participants will visually and quantitatively measure the biological and physical changes of the newly restored habitats and participate in a variety of habitat restoration activities. Specifically, the Cape Mohican funds will support an Ecologist, as the Stewardship and Monitoring Program Coordinator, a Restoration and Public Programs Coordinator, a Field Monitoring Coordinator, and career development internships.





**Project Status**

Cape Mohican funds that had been used to support a four-year stewardship and monitoring program at Crissy Field have been nearly expended. Remaining funds are being used to support one career development internship at Crissy Field. In FY08, this position assisted with water quality monitoring and stewardship activities at Crissy Field. Stewardship activities included volunteer coordination, exotic plant removal, planting and seeding to enhance restored areas, fence repair, and trash and debris removal from the restored marsh. Funds were also used to support NPS maintenance personnel in replacing dilapidated post and cable fencing around sensitive dunes.



**Funding**

Approved project budget:	\$850,000
Funds allocated in FY 2002	\$200,653
Funds allocated in FY 2003	\$215,330
Funds allocated in FY 2004	\$213,143
Funds allocated in FY 2005	\$220,874
Funds allocated in FY 2006	\$0
Funds allocated in FY 2007	\$0
Funds allocated in FY 2008	\$0
Funds allocated in FY 2009:	\$0
Funds allocated through FY 2009:	\$850,000
Funds spent to date:	\$850,000

**Cape Mohican  
Financial Summary – January 2009**

<b>Funds from Settlement</b>	\$3,625,000
<b>Interest earnings (as of 1/30/09)</b>	\$679,735
<b>Total</b>	<b>\$4,304,735</b>

**Project funds allocated through FY2009:**

Shorebird Habitat Protection (NPS)	\$23,500
California Least Tern Habitat (USFWS)	\$141,000
Restoration of Shorebird Foraging Habitat/Cordgrass (USFWS)	\$386,450
Farallon Seabird Restoration (USFWS)	\$245,042
Pacific Herring Spawning Habitat Enhancement (CDFG)	\$456,500
Wetland Restoration at Pier 98 (CDFG)	\$146,920
Steelhead Stream Habitat Enhancement (CDFG)	\$48,695
Giacomini Coastal Wetlands Restoration (NPS)	\$435,000
Sandy Beach Habitat Restoration at PRNS (NPS)	\$330,000
Protection of Duxbury Reef through Education (NOAA)	\$412,100
Angel Island Foot Trail Enhancement (CDPR)	\$180,000
Crissy Field Habitat Stewardship Program (NPS)	\$850,000
<b>Total</b>	<b>\$3,655,207</b>

**Administrative funds disbursed for restoration planning  
and council activities through FY2009:**

National Park Service	\$217,000*
U. S. Fish and Wildlife Service	\$61,500
National Oceanic and Atmospheric Administration	\$79,800
California Department of Fish and Game	\$99,174**
California Department of Parks and Recreation	\$8,000
<b>Total</b>	<b>\$465,474</b>

**Remaining (Unallocated) funds from settlement: \$184,054**

\* Includes \$146,000 for development of RP/EA under contract to Harding Lawson/ESE.

\*\* Includes \$8,874 for newspaper reimbursement and \$20,000 for land appraisal.