

Mission Bay IBA Conservation Planning Workshop Summary



San Diego Audubon Society
2012

Acknowledgements

San Diego Audubon Society thanks the following individuals and organizations for their participation and enthusiasm during the conservation planning process:

Julie Byford, SeaWorld San Diego
Roxy Carter, San Diego Audubon Society
Kevin Clark, California Native Plant Society
Laurie Conrad, SeaWorld San Diego
Stephanie Costelow, SeaWorld San Diego
Richard Dhu, San Diego River Park Foundation
Shannon Dougherty, San Diego Audubon Society
Nancy Frost, California Department of Fish and Game
Lori Charett Gerbac, City of San Diego—Parks & Recreation
Virginia Johnson, DFG Monitor
Andrea Jones, Audubon California
Isabelle Kay, UC Natural Reserve System—Kendall Frost Reserve
Brooke Langston, Audubon California
Carolyn Leiberman, US Fish and Wildlife Service—Coastal Program
Elizabeth Lucas, California Department of Fish and Game
Betsy Miller, City of San Diego—Open Space Division
Yvonne Moore, San Diego Management and Monitoring Program
Jim Peugh, San Diego Audubon Society and Friends of Famosa Slough
Chris Redfern, San Diego Audubon Society
Ron Rempel, San Diego Management and Monitoring Program
Richard Sardena, SeaWorld San Diego
Sandy Vissman, US Fish and Wildlife Service
Lisa Wilson, City of San Diego—Parks and Recreation

EXECUTIVE SUMMARY

Over the last two decades, the San Diego Audubon Society has led the implementation of several community-based conservation projects within the Mission Bay Important Bird Area (IBA). Many of these projects have focused on increasing the nesting productivity of endangered California Least Tern colonies through improved vegetation management and outreach programs to the public to minimize human disturbance of nesting colonies and shorebirds. In recent years, SDAS developed an interest in facilitating closer collaboration with stakeholders in order to more strategically prioritize conservation work in the Mission Bay IBA and maximize the effectiveness of our collective efforts.

In August and December of 2011, the San Diego Audubon Society—in collaboration with Audubon California—hosted two conservation planning workshops based on the Conservation Measurement Partnership’s (CMP’s) *Open Standards* and *Miradi* software. CMP’s *Open Standards* was the ideal framework for conservation planning in Mission Bay because it brought together key land managers, regulators, funders and other actors to strengthen working relationships by sharing opinions and expertise. See “Open Standards” in Appendix A for more information on this conservation planning tool. See “Acknowledgements” below for a complete list of participants.

Workshop participants chose seven targets for the Mission Bay IBA: CA Least Tern; Light-footed Clapper Rail; Salt Marsh; Coastal Dunes/Sandy Beach; Nuttall’s Lotus; Migratory Birds/Mud Flats; and Eelgrass. In August, participants began to identify Key Ecological Attributes (KEAs) for each target. KEAs are attributes that, if missing, indicate a particular target is in danger of loss over time. Participants then identified practical and measurable indicators of KEAs that could be used to track the health of each target. Finally, participants identified major threats to each target and ranked each by scope, severity and permanence. Information produced at the August workshop was entered into the *Miradi* software to create conceptual models and a Threats Assessment Matrix. Key unknowns remaining are the current status of KEA Indicators (which should be ranked as either Poor; Fair; Good or Very Good) and a set goal or desired rating for each.

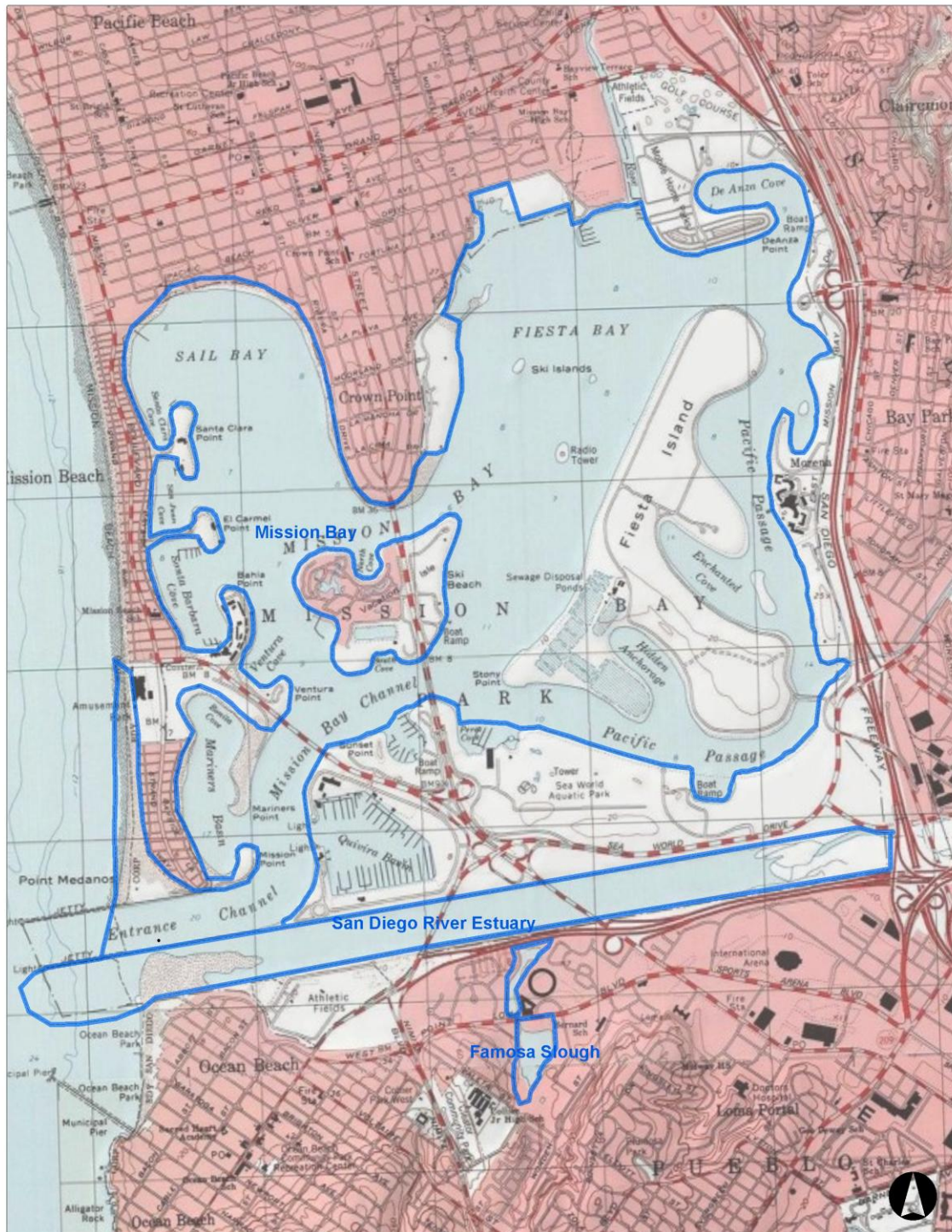
In December, the group reconvened and reviewed the *Miradi* reports and made manual adjustments, as warranted. The participants then broke into smaller working groups and began to rank conservation strategies and objectives by potential impact and feasibility. As a result of this analysis, the top three ranked conservation strategies were: removal/control of invasive plant species; establishing better habitat for dunes and snowy plovers; and predator control and removal.

In July 2012, we will begin establishing working groups for each target that will reconvene to focus on creating action plans for their assigned target. The groups will assess the current status of each KEA indicator and create goals for each target. After goals are set, groups will review relevant conservation strategies and begin to draft action plans that include specific objectives, timelines, and budgets. Once action plans are drafted, we will work with stakeholders to assign ownership for implementing projects that address objectives outlined in the plans.

TABLE OF CONTENTS

<u>Acknowledgements</u>	<u>ii</u>
<u>Executive Summary</u>	<u>iii</u>
<u>Map of Mission Bay Important Bird Area</u>	<u>1</u>
<u>Overview of Mission Bay</u>	<u>2</u>
Scope of Conservation Planning	2
Site Description	3
<u>Targets</u>	<u>4</u>
Table 1.0: KEAs and Indicators	4
Viability Analysis	6
<u>Threats</u>	<u>7</u>
Table 2.0: Threats Assessment Matrix	7
<u>Strategies, Objectives and Activities</u>	<u>9</u>
Table 3.0: Conservation Strategies	9
<u>Next Steps</u>	<u>14</u>
Developing a Monitoring Plan	14
Adaptive Management	14
<u>APPENDICES</u>	<u>A</u>
About this Document	A
Mission Bay Targets Descriptions	C
Current Projects	F

Audubon California Mission Bay Important Bird Area



OVERVIEW OF MISSION BAY IMPORTANT BIRD AREA

The Important Bird Area Program is a BirdLife International initiative to identify and conserve areas that are vital to birds and other biodiversity. The National Audubon Society is BirdLife International's implementation partner in the United States, and San Diego Audubon Society works closely with National Audubon and Audubon California to coordinate efforts for identified Important Bird Areas (IBAs) in San Diego County.

The Mission Bay IBA was designated of Global Significance¹ because the local area supports:

- Over one percent of the global population of California Least Tern
- Nine sensitive species (*Brant*, *Western Snowy Plover*, *Light-footed Clapper Rail*, *Long-billed Curlew*, *Least Tern*, *Loggerhead Shrike*, *Clark's Marsh Wren*, *Belding's Savannah Sparrow*, *Large-billed Savannah Sparrow*)
- Special habitat (1,220 acres of eelgrass, 10 acres exposed shoreline/sandy and alkali flats, and 240 acres of salt marsh)

Scope of Conservation Planning

During 2011 planning workshops, the participating individuals and organizations working in Mission Bay decided on the following scope for Mission Bay Conservation Planning:

Mission Bay - San Diego River Estuary Important Bird Area, which includes Mission Bay Park, the San Diego River Estuary, and Famosa Slough.

¹ According to BirdLife International, a site that meets at least one Global criteria is termed a *Global Important Bird Area*.

Global Criteria:

- Species of Global Conservation Concern
- Assemblage of Restricted-range species
- Assemblage of Biome-restricted species
- ≥1% biogeographic (N. Am.) population of a waterbird simultaneously; ≥5% over a season
- ≥1% global population of a seabird or terrestrial species simultaneously; ≥5% over a season
- ≥ 20,000 waterbirds/ ≥10,000 seabirds [*not currently applied in the U.S.*]
- Aerial bottleneck where ≥ 5% N.Am. population of a migratory waterbird, or ≥ 5% global population of a migratory seabird or terrestrial species passes during a season.

Site Description²

Mission Bay - San Diego River Estuary			
Status: Recognized		State: California	
Priority: Global		Country: US	
Latitude: 32.7783		Elevation (m):	
Longitude: -117.2302	Area (ha): 1189.0	Min 1.0 Max 11.0 Avg 0.0	
Bird Conservation Region Coastal California		Endemic Bird Area	
Site Description Mission Bay is a highly-altered estuarine complex within the City of San Diego that is currently developed primarily for aquatic vehicle recreation, with large hotels and vacation homes built atop former saltmarsh. Aside from the open water (which includes 1220 acres of eelgrass), the exposed shoreline of the bay and several scattered sandy and alkali flats (c. 10 acres), the most ecologically valuable habitat, saltmarsh, is restricted to two areas: the 40-acre Northern Wildlife Reserve (City of San Diego; University of California Reserve) and the 200-acre wetland that has developed along the soft-bottomed stretch of the San Diego River channel on the south side of Mission Bay.			
Ornithological Significance Both the Northern Wildlife Reserve and the San Diego River channel support thousands of waterfowl, shorebirds (over 5000 in winter, Page and Shuford 2000), and waders during migration and winter, along with small populations of Belding's Savannah Sparrow and (river channel only) Light-footed Clapper Rail. Least Terns have begun nesting on specially-constructed sandbars and alkali flats around the Bay, and Brant appear in small numbers in winter and spring, feeding on eelgrass beds as on nearby San Diego Bay.			
Ownership The most ecologically valuable habitat, saltmarsh, is restricted to two areas: the 40-acre Northern Wildlife Reserve (City of San Diego; University of California Reserve) and the 200-acre wetland that has developed along the soft-bottomed stretch of the San Diego River channel on the south side of Mission Bay.			
Conservation Issues Virtually all of the available open space in and around Mission Bay is addressed in the 1994 Mission Bay Park Master Plan (fide J. Martin), which lays out guidelines for restoration and enhancement of remaining and potential saltmarsh and wetland habitat. Though the tiny reserves of Mission Bay and the flood control channel are secure from development, direct human disturbance remains a constant threat, particularly near the mouth of the channel, which has been designated an official off-leash dog area by San Diego Dept. of Parks and Recreation. This results in harassment to roosting birds (often encouraged by dog owners), especially to several dozen Snowy Plover that roost principally on dry sand during fall and winter. Nightly fireworks displays during the summer from neighboring Sea World (a large amusement park) represent another potential source of disturbance (J. Martin, USFWS, via email).			
Citation: National Audubon Society 2012. Important Bird Areas in the U.S.			

² Adopted from National Audubon Society's IBA Program Website:
<http://iba.audubon.org/iba/profileReport.do?siteId=202>

TARGETS

Workshop participants chose seven targets for the Mission Bay IBA:

- 1) California Least Tern
- 2) Light Footed Clapper Rail
- 3) Salt Marsh
- 4) Coastal Dunes/Sandy Beach
- 5) Nuttall's Lotus
- 6) Migratory Birds/Mud Flats
- 7) Eelgrass

Table 1.0: Targets, Key Ecological Attributes and Indicators

The table below lists Mission Bay Conservation Targets, KEAs associated with each target and measurable indicators that can be used to assess the status of each KEA.

TARGET	KEY ECOLOGICAL ATTRIBUTE(S)	INDICATOR(S) OF KEA
California Least Tern	Population size, structure, and recruitment	Colony size
		Number of nesting pairs
		Age structure
		Number of fledglings per nesting pair (ratio)
	Depredation	Number of predator observations/ hour
		Number of eggs, chicks, fledglings depredated
		Number of predators removed from a site
	Vegetation density and composition of species	Vegetative species composition
		Vegetation height
		Percent vegetation cover
	Substrate and nest site	Percent coarse vs. fine sand
	Food availability	Time away from nest
		Number of chicks that died of starvation
	Recreational use within and adjacent to nest site	
	Number, size, and condition of nesting/roosting locations (i.e. Size and extent of characteristic communities and ecosystems)	
Light-footed Clapper Rail	Intactness of ecological systems	Food availability
		Water quality contaminants
	High density spartina	Vegetation composition, height, cover
		High tide refugia
	Tidal channel structure	

	Acreage of available habitat	Habitat availability
	Species composition	Male/female ratio
		Number of fledglings (breeding success)
		Genetic diversity
	Depredation	Number/type of predators
	Active breeding	Active breeding/pairing
	Population size and dynamics	Egg counts
Salt Marsh	Size/extent	Native/non-native vegetation cover
		Historical extent vs. current extent
	Characteristic species	Species composition and density
		Native/non-native vegetation cover
	Hydrologic regime	Tidal prism
		Changes in tide over time
	Appropriate geomorphology	Tidal creek network
		Appropriate drainage
		Grain size composition
	Water chemistry	Salinity level
		Presence of contaminants
	Intactness of system	Edge to area ratio
		Connectivity to adjacent native habitats
		Level of protection
Coastal Dunes/sandy beach	Presence of key indicator avian species	Success of breeding: Least Terns or presence: snowy plover; horned larks
	Size/extent/composition	Dune topography
		Acreage of dunes
		Connectivity between dunes and beach
	Characteristic plant communities	Coastal dune composition (ambrosia, evening primrose, etc)
	Soil/sediment, erosion/deposition regime	Sand transport (aeolian, flood, storm surge)
		Grain size composition
	Species composition and abundance	Species richness (compare nearby functional dune habitats and historic records)
	natural deposition of wrack and associated invertebrates	Presence and availability of wrack/invertebrates
Nuttall's Lotus	Intactness of ecological systems	Presence of assoc. native dune species
		Presence/absence of invasive species

		Species diversity/percent cover
	Population size and dynamics	Presence of Pollinators
		Areal extent of population (includes presence/absence)
	Size and extent of characteristic communities and ecosystems	Suitable habitat (number of locations, acreage, sandy soils)
		Correct substrate and extent; salinity?
		Specific soil types
Migratory Shorebirds/ Mudflats	Water level fluctuations (foraging availability, loafing)	Depth/bathymetry (use tidal charts)
	Size and extent of characteristic habitat	Acreage of available mudflats
	Key functional guilds (prey, shorebirds, fish)	Population surveys of shorebirds and their prey (invertebrates)
	Connectivity among communities and ecosystems (nesting, loafing, foraging, high tide refugia)	Distance between protected areas and walking areas/trails
		Amount and location of high-tide refugia
	Soil/sediment structure and chemistry	Correct component of sand vs. silt vs. clay
		Measurement of contaminants
	Lack of anthropogenic disturbance	Time of day/type of event and level of protection (rangers, monitoring, etc)
		Presence of loafing birds/frequency of disturbance (flushing)
Eelgrass	Presence/abundance of key guilds	Health of pipe fish, top smelt, halibut, waterfowl, Brant
	Hydrologic regime	Depth/light (eelgrass is limited by these factors)
	Area and density	Area and density
	Water quality	Presence of contaminants
		Turbidity

Viability Analysis

Due to time constraints and lack of information for many indicators of Key Ecological Attributes, the Mission Bay group was unable to perform a true “Viability Analysis,” whereby we would first rate the current health/status of KEA Indicators as either: Poor; Fair; Good; Very Good, then set a goal or desired rating for each.

Because the current status and information is missing for many targets, our next step is for participants to engage in working groups who can set relevant goals for each target.

THREATS

Threat Ratings

Workshop participants worked together to rate threats according to the following factors:

- **Scope** – the proportion or area of the target that will likely be affected by the threat under the current circumstances;
- **Severity**- the level of damage to the conservation target expected; and
- **Permanence** – the degree to which the effects of a threat can be reversed and the affected target restored, if the threat no longer existed.

Each target was assigned a rating (Low, Medium, High, or Very High) for each threat, and the results were entered into the *Miradi* software to create a preliminary threats assessment matrix. At the December 2011 workshop, participants reviewed the *Miradi* output and made manual adjustments as needed to match the current situation in Mission Bay.

Table 2.0 Threats Assessment Ranking

Threats \ Targets	CA Least Tern	Salt Marsh	Nuttall's Lotus	Coastal Dunes	Migratory Shorebirds/ Mud Flats	Eelgrass	Light-footed Clapper Rail	Summary Threat Rating
Heavy foot traffic by people & unleashed dogs	High	Low	Medium	Low	High		Low	High
Degraded water quality/ turbidity		Low			Medium	Medium	Low	Medium
Boat Activity within sensitive/ preserve areas	Medium	Medium			Low	High	Medium	High
Dredging	Low	Low			Low	Low	Low	Medium
Lack of high tide refugia		Medium			Low		Medium	Medium
Impaired/ unnatural sand transport system	Medium	Medium	High	High	Low		Medium	Medium
Scraping for LETE management	Low		Low	Medium				Low

Lack of containment/management of non-native invasive plant species	High	Low	High	Medium			Low	High
Restricted tidal flows at Kendall Frost/N. Wildlife Preserve/ altered hydrology		High					High	Medium
Light and noise pollution	High	Medium			Low		Medium	Medium
Limited/fragmented habitat	Medium	High	High	High	Medium		Medium	High
Excessive native vegetation cover	High		Low					Medium
Food availability	*Not Specified							Need more info.
Predation (avian and mammalian)	High						High	Medium
Dock/pier encroachment		Low				Low		Low
Predation by cats	Medium						Medium	Medium
Foraging limited by boats/ motorized watercraft	Medium				Low			Low
Beach grooming	Low		Low	Medium	Medium			Medium
Climate change/sea level rise	Low	Low	Low	Low	Low	Low	Low	Medium
Summary Target Ratings:	High	Medium	Medium	Medium	Medium	Medium	Medium	High

STRATEGIES, OBJECTIVES AND ACTIVITIES

During the 2011 workshops, participants created a list of potential conservation activities and assessed each action by ranking both its feasibility and potential impact. The following criteria were used to qualify each conservation activity:

POTENTIAL IMPACT:

If implemented, will the strategy lead to desired changes in the situation at your project site?

- 1) Low – The strategy will probably not contribute to meaningful threat mitigation or target restoration.
- 2) Medium – The strategy may help mitigate a threat or restore a target.
- 3) High – The strategy is likely to help mitigate a threat or restore a target.
- 4) Very High – The strategy is very likely to completely mitigate a threat or restore a target.

FEASIBILITY: Would your project team be able to implement the strategy within likely time, financial, staffing, ethical, and other constraints?

- 1) Low – The strategy is not ethically, technically, or financially feasible.
- 2) Medium – the strategy is ethically feasible, but either technically OR financially difficult without substantial additional resources.
- 3) High – The strategy is ethically and technically feasible, but may require some additional financial resources.
- 4) Very High – The strategy is ethically, technically, AND financially feasible.

As a result of this analysis, the group created a list of activities for an action plan that could be sorted according to rank. The table below has conservation actions grouped by main strategy, from highest to lowest in Total Rank.

Table 3.0 Conservation Strategies

STRATEGY	Objectives	Activities	Targets	Potential Impact	Feasibility	Total Rank
Remove/control invasive plant species						8
Remove/control invasive plant species	Monitor to maintain absence of invasive species	Continue monitoring of invasives and remove as necessary (marsh walk for mangroves)	Lotus/ dunes	4	4	8
Remove/control invasive plant species	Remove invasive plants where lotus/sensitive plants occur	Hand manage Fiesta Island and other sites suitable for Nuttall's Lotus	Lotus/ dunes	4	4	8

Establish better habitat for dunes and snowy plovers						7
Establish better habitat for dunes and snowy plovers	Reduce/eliminate grooming	Designate a no-groom area, prevent or stop grooming in South Mission Beach where Snowy Plover roost. Provide for potential for dune veg.	Sand dunes/ migratory shorebirds	4	3.5	7.5
Establish better habitat for dunes and snowy plovers	Educating public	Create Audubon docent program (Share the Shore MB)	Sand dunes/ migratory shorebirds	4	3	7
Establish better habitat for dunes and snowy plovers	Reducing disturbance	Establish symbolic fencing with volunteers	Sand dunes/ migratory shorebirds	4	2.5	6.5
Predator control/removal						6.67
Predator control/removal	Year-round predator control at all LETE/LFCR nesting sites	Initiate USDA contract to determine sites for types/ frequency of predators to inform predator management	LETE/ LFCR	3	4	7
Predator control/removal	Year-round predator control at all LETE/LFCR nesting sites	Initiate annual assessment to determine if annual predator controls are established	LETE/ LFCR	4	3	7
Predator control/removal	Year-round predator control at all LETE/LFCR nesting sites	Remove supplemental food, pick up trash with a volunteer/docent program; ask city to add lidded trashcans	LETE/ LFCR	3	3	6
Create high tide salt marsh habitat						6.38
Create high tide salt marsh habitat	Restore frost properties to salt marsh	Conduct feasibility study (including cost analysis)	Rail/ shorebirds	4	3	7
Create high tide salt marsh habitat	Restore shoreline vegetation at Southern Wildlife Preserve	Fill in/cover rip rap with shoreline vegetation	Rail/ shorebirds	4	2.5	6.5

Create high tide salt marsh habitat	Restore Campland properties to salt marsh	Apply political pressure	Rail/shorebirds	4	2.5	6.5
Create high tide salt marsh habitat	Restore Campland properties to salt marsh	Develop science based restoration vision and feasibility study	Rail/shorebirds	4	1.5	5.5
Create/connect habitat where feasible						6.25
Create/connect habitat where feasible	Increase coastal dune habitat and Nuttall's Lotus restoration sites	Introduce Nuttall's Lotus to areas where non-natives have been eradicated	Rail/lotus/marsh/dunes	4	4	8
Create/connect habitat where feasible	Increase coastal dune habitat and Nuttall's Lotus restoration sites	Create maps of areas where lotus currently occurs and identify areas that could be restored	Rail/lotus/marsh/dunes	2	4	6
Create/connect habitat where feasible	Complete habitat mapping	Map/delineate mud flats within mission bay park	Rail/lotus/marsh/dunes	2	4	6
Create/connect habitat where feasible	Increase quality cordgrass/salt marsh habitat	Reconnect Rose Creek	Rail/lotus/marsh/dunes	4	1.5	5
Ecosystem-based management approach for coastal dune habitat - terns						6.12
Ecosystem-based management approach for coastal dune habitat - lotus/dune	Work within Mission Bay NRMP to change management of sites to accommodate ecosystem-based approach that manages for LETE and Nuttall's Lotus/dune plants	Manage sites that can be managed with hand-pulling/herbicide	Tern/dunes/lotus	4	2	6
Ecosystem-based management approach for coastal dune habitat - terns	Work within Mission Bay NRMP to change management of sites to accommodate ecosystem-based approach that manages for LETE and Nuttall's Lotus/dune plants	Establish experiment to determine desirable management regime	Tern/dunes/lotus	3	3.5	6.5

Ecosystem-based management approach for coastal dune habitat - terns	Work within Mission Bay NRMP to change management of sites to accommodate ecosystem-based approach that manages for LETE and Nuttall's Lotus/dune plants	Monitor vegetation and LETE productivity to determine the affects of varying weed management regimes (weed pulling)	Tern/dunes/lotus	3	3.5	6.5
Ecosystem-based management approach for coastal dune habitat - terns	Work within mission bay NRMP to change management of sites to accommodate ecosystem-based approach that manages for LETE and Nuttall's Lotus/dune plants	Manage sites that can be managed with hand-pulling/ herbicide	Tern/dunes/lotus	2.5	3	5.5
Education and signage for boating community						5.67
Education and signage for boating community	Reduce boating impacts to birds and other targets	Delineate preserve areas with buoy system or signage (where boating is not permitted)	Tern/rail/ eelgrass/ shorebirds/ marsh	3	3	6
Education and signage for boating community	Reduce boating impacts to birds and other targets	Establish docent/ education program to promote responsible boating behavior	Tern/rail/ eelgrass/ shorebirds/ marsh	2	4	6
Education and signage for boating community	Reduce boating impacts to birds and other targets	Explore feasibility of seasonal marine sanctuaries	Tern/rail/ eelgrass/ shorebirds/ marsh	4	1	5
Create treatment wetlands where appropriate to increase salt marsh habitat and improve water quality						5.6
Create treatment wetlands where appropriate to increase salt marsh habitat and improve water quality	Explore potential to create creek wetlands/salt marshes at creek mouths that treat/filter water	Create treatment wetlands - Tecolote Creek	Eelgrass/ shorebirds/ mudflats	4	3	7
Create treatment wetlands where appropriate to increase salt marsh habitat and improve water quality	Explore potential to create creek wetlands/salt marshes at creek mouths that treat/filter water	Create treatment wetlands - Cudehy Creek	Eelgrass/ shorebirds/ mudflats	4	3	7

Create treatment wetlands where appropriate to increase salt marsh habitat and improve water quality	Explore potential to create creek wetlands/salt marshes at creek mouths that treat/filter water	Identify locations for treatment wetlands	Eelgrass/shorebirds/mudflats	1	4	5
Create treatment wetlands where appropriate to increase salt marsh habitat and improve water quality	Explore potential to create creek wetlands/salt marshes at creek mouths that treat/filter water	Create treatment wetlands - rose creek	Eelgrass/shorebirds/mudflats	4	1	5
Create treatment wetlands where appropriate to increase salt marsh habitat and improve water quality	Explore potential to create creek wetlands/salt marshes at creek mouths that treat/filter water	Research food availability and correlate with LETE productivity	Eelgrass/shorebirds/mudflats	1	3	4
Feral and domestic roaming cat management						5.5
Feral and domestic roaming cat management	Educate nearby residents about keeping cats indoors	Distribute pamphlets (ABC materials); develop outreach plan	Terns/rails	2	4	6
Feral and domestic roaming cat management	Keep feral cats from being re-released near sensitive parts of mission bay	Determine if there is a lobbying/county ordinance; if not, develop one	Terns/rails	4	2	6
Feral and domestic roaming cat management	Implement year round cat control around Nat. Wildlife Preserve/Kendall Frost Reserve	Trapping cats	Terns/rails	3	1.5	4.5
Increase public outreach and education to reduce disturbances						5
Increase public outreach and education to reduce disturbances		Evaluate signage and fencing needs in and around LETE sites	Tern/rail/dune/marsh/lotus/mudflat	2	4	6
Increase public outreach and education to reduce disturbances	Reduce dog/foot traffic through increased education/signage around sensitive dune/mudflat areas	Develop a docent program for monitoring/outreach at beaches (dog beach area)	Tern/rail/dune/marsh/lotus/mudflat	2	3	5
Increase public outreach and education to reduce disturbances		Targeted outreach to dog walking community	Tern/rail/dune/marsh/lotus/mudflat	1	3	4

Manage sand to sustain dune habitat						5
Manage sand to sustain dune habitat	Supplement/replenish sand dune habitat areas with appropriate sand grain size	Develop plan to study and direct sand dredging and deposition throughout the bay (Sandag)	Dunes/ lotus	2	3	5
Enhance captive breeding program						4
Enhance captive breeding program	Determine degree of genetic diversity within Mission Bay and San Diego County to inform captive breeding program	Work with recovery team and SeaWorld to develop and fund a genetic study (need to look within the recovery and captive program)	Rail	2	2	4
Assess/reduce lighting and noise impacts						3.25
Assess/reduce lighting and noise impacts	Investigate impacts of edge effects (light, noise, etc) on LETA colonies and LFCR	Shield tern and rail nesting sites from lighting	Rail/tern	1	3	4
Assess/reduce lighting and noise impacts	Investigate impacts of edge effects (light, noise, etc) on LETA colonies and LFCR	Develop a study to investigate impacts of lighting and noise and develop subsequent actions	Rail/tern	1	1.5	2.5

NEXT STEPS

In July 2012, we plan to reconnect with participants and invite them to participate in working groups for each conservation target. The first tasks for each working group will be to complete the viability analysis and rate each KEA indicator, then set a concrete and tangible goal that represents what the group hopes to achieve within the Mission Bay IBA.

Once goals are set, working groups will create action plans for each conservation target and outline a strategy to achieve set goals for each target—including budgeting, timelines, working partnerships and prioritization.

Because monitoring is important to track progress and recognize indicators of success, monitoring plans should be developed by each working group as they begin to implement any of the strategies aimed at their specific conservation target.

Working groups and participants plan to meet on a regular basis to track progress of the group in achieving projects and revise goals as appropriate. This is an organic document that is meant to be constantly reviewed and amended to reflect current updates, successes and lessons learned. Thank you to all who continue to contribute!

APPENDIX A: About This Document

Open Standards

The Open Standards of Conservation Planning were developed by the Conservation Measures Partnership (CMP)—which includes members such as National Audubon Society, Conservation International and The Nature Conservancy—to “bring together common concepts, approaches, and terminology in conservation project design, management, and monitoring in order to help practitioners improve the practice of conservation.”³ While each organization had its own internal version of Open Standards, the goal in creating the generic version was to combine the main principles, tasks and guidance into one step-by-step source for conservation organizations to learn and build from. Open Standards highlights five major steps in the Conservation Planning cycle: Conceptualize; Plan Actions and Monitoring; Implement Actions and Monitoring; Analyze, Use and Adapt; and Capture and Share Learning. While steps appear in linear fashion, the CMP stresses that conservation planning should be a cycle that is repeated regularly to manage resources adaptively.

Miradi

The Miradi open-source software was an initiative of the CMP that is based on Open Standards. The software guides practitioners through the steps outlined in Open Standards for the Practice of Conservation and allows practitioners to outline the project scope, define targets, prioritize threats, develop objectives and identify strategies.⁴ The program asks questions related to each step in the project and is able to compile reports and assist in creating and prioritizing work plans based on real-world factors.

Definitions

Targets

CMP Open Standards defines *conservation targets* (or simply *targets*) as “specific species, ecological systems/habitats, or ecological processes that are chosen to represent and encompass the full suite of biodiversity in the project area for place-based conservation or the focus of a thematic program.”

Selection Criteria

According to The Nature Conservancy’s Conservation Action Planning Handbook (June 2007), less than eight conservation targets should be selected according to the following criteria:

- **Represent the biodiversity at the site.** The focal targets should represent or capture the array of ecological systems, communities and species at the project area and the multiple spatial scales at which they occur. A target that complements other focal targets in this respect is more desirable.
- **Reflect ecoregion or other existing conservation goals.** Focal targets should reflect efforts at the regional, national or state level where they exist such as

³ <https://miradi.org/openstandards>

⁴ <http://www.conservationmeasures.org/initiatives/miradi-software>

Ecoregional Assessments, State Comprehensive Wildlife Conservation Plans, a protected area gap assessment or a national biodiversity action plan. Focal targets that are grounded in the reasons for the project area's inclusion in existing plans are desirable.

- **Are viable or at least feasibly restorable.** Viability (or integrity) indicates the ability of a conservation target to persist for many generations. If a target is on the threshold of collapse, or conserving a proposed target requires extraordinary human intervention, it may not represent the best use of limited conservation resources.
- **Are highly threatened.** All else being equal, focusing on highly threatened targets will help ensure that critical threats are identified and addressed through conservation actions.

Key Ecological Attributes

In the Nature Conservancy's Conservation Planning Handbook, Key Ecological Attributes (KEAs) are defined as:

“Aspects of a target's biology or ecology that, if missing or altered, would lead to the loss of that target over time. As such, KEAs define the target's viability or integrity. More technically, the most critical components of biological composition, structure, interactions and processes, environmental regimes, and landscape configuration that sustain a target's viability or ecological integrity over space and time. The word “attribute” is sometimes used as shorthand for KEA in this document.”

Threats

Threats are activities—usually caused by humans—that either directly or indirectly “degrades one or more targets.”⁵

Mission Bay IBA Assessment Workshops

In an effort to strategically prioritize conservation work within Mission Bay, The San Diego Audubon Society collaborated with Audubon California staff to host two Mission Bay Important Bird Area Assessment Workshops to guide conservation planning efforts for colleagues working in Mission Bay. The workshops were based on Open Standards principles, and the data generated from each workshop was input into Miradi software for analysis and reports. The workshops were held in August and December 2011. On August 2, 2011, the group chose seven targets; discussed Key Ecological Attributes (KEAs) of each target; rated the scope, severity and permanence of threats affecting chosen targets; and began identifying conservation objectives and actions. The group's work was then processed through the Miradi Software to create a Threats Assessment Matrix and Conceptual Models. On December 7, 2011, the group reconvened to review and discuss Targets, KEA's and the Miradi reports, then prioritized conservation objectives and activities to help in developing a strategic action plan. This document is a reflection of the work done by all participants and organizations involved in the planning workshops thus far.

⁵ CMP Open Standards: http://www.conservationmeasures.org/wp-content/uploads/2010/04/CMP_Open_Standards_Version_2.0.pdf

APPENDIX B: Mission Bay Targets

California Least Tern⁶ ***Sterna antillarum browni***

The California Least Tern is a state and federally endangered migratory shorebird that nests on our beaches within a limited range from northern Baja California to San Francisco Bay. The Least Tern needs cleared, sandy areas for nesting and depends on estuaries, lagoons, and other open water areas for hunting small fish. Terns nest in colonies which helps them work together to defend nests and chicks from predators such as American Crows, gulls, cats, and snakes. San Diego County supports approximately 60% of the breeding population of this bird at 12 sites including the Tijuana Estuary, the Sweetwater Marsh National Wildlife Refuge, Mission Bay, and our coastal lagoons.

Light-footed Clapper Rail⁷ ***Rallus longirostris levipes***

“The Light-footed Clapper Rail, state and federally endangered, is a year round resident of San Diego County’s coastal salt marshes. As a result of the loss of over 90% of southern California’s coastal wetlands, this species has been listed as federally-endangered for over 40 years. Clapper Rails prefer to nest in tidal marshes dominated by cordgrass. There are an estimated 100 pairs in San Diego County with breeding populations scattered throughout coastal lagoons and estuaries. The Tijuana River estuary is an especially critical site, supporting a record 80 pairs in 1999.”

Salt Marsh⁸

“Salt marshes are coastal wetlands that form where rivers empty into the sea. Because of the influx of fresh water into the system, the salinity in salt marshes changes seasonally as river flow increases in winter and decreases in summer. Salt marshes are affected by the rise and fall of the tides. As they recede, tides carry some of the living and dead matter from the marsh to the ocean where the matter becomes food for many ocean animals. When the tide comes back in, it brings minerals and salts from the ocean. Minerals and salts fertilize the plant life in the marsh. Salt marshes are among the most productive habitats in the world. Many marine animals spend part or all of their lives in a salt marsh.”

⁶ Excerpt from San Diego Audubon Society: <http://www.sandiegoaudubon.org/our-work/conservation/endangered-a-threatened-species>

⁷ Excerpt from San Diego Audubon Society: <http://www.sandiegoaudubon.org/our-work/conservation/endangered-a-threatened-species>

⁸ Excerpt from SeaWorld San Diego: <http://www.seaworld.org/swc/wetlands/whatarewetlands.htm>

Coastal Dunes/Sandy Beach⁹

“Coastal sand dunes are scattered along the California coastline from the Oregon border south to San Diego. They are dynamic habitats that are affected by wave action, tides, wind and trampling. Dunes develop where there is a substantial amount of blown, dry sand. Their formation is often aided by pioneer dune species such as beach saltbush (*Atriplex leucophylla*). Plants found on coastal sand dunes are mostly prostrate herbs with creeping stems and long fleshy taproots. The leaves are usually small, somewhat succulent, and often hairy and grayish in color. These features aid the plants in tolerating drought, salt stress and intense sunlight. ... All dunes in California have been greatly reduced by development, off road vehicle use and exotic species invasion.”

Nuttall’s Lotus

Lotus Nuttallianus Greene

Nuttall’s Lotus is an annual herb that grows in coastal dunes and sandy coastal scrub. This sensitive plant blooms March through July. The plant is considered seriously endangered in California and its main threats are invasive species, land development, and trampling.¹⁰

Migratory Shorebirds/Mud Flats

Between 5,000-10,000 migratory shorebirds use the Mission Bay site.¹¹
Migratory shorebirds depend on mud flats for foraging and resting.¹²

Eelgrass¹³

“Eelgrass is a community structuring plant that forms expansive meadows or smaller beds in both subtidal and intertidal habitats in shallow coastal bays.... As a result, it is considered a “foundation”, or habitat forming species that creates unique biological, physical, and chemical values and environments. Eelgrass is a major source of primary production in

⁹ Excerpt from Cheadle Center for Biodiversity and Ecological Restoration, UC Santa Barbara:

<http://www.ccber.ucsb.edu/ecosystem/habitats/dune/>

¹⁰ Information extracted from California Native Plant Society’s Inventory Plant Details:

<http://www.rareplants.cnps.org/detail/1012.html>

¹¹ www.prbo.org/cms/docs/wetlands/SPSCPlan_010904.pdf

¹² <http://www.prbo.org/cms/print.php?mid=649>

1. ¹³ Excerpt from Southern California Coastal Water Research Project:

ftp://ftp.sccwrp.org/pub/download/.../632_EelgrassRMP.pdf

nearshore marine systems, ...[and] several organisms directly graze upon eelgrass or consume epiphytes and epifauna supported by eelgrass plant structures, thus contributing to the system at multiple trophic levels (Phillips and Watson 1984, Thayer *et al.* 1984). Eelgrass beds are also a source of secondary production and can have up to 15% greater secondary production (Heck *et al.* 1995) and greater species richness (Orth *et al.* 1984, Zieman and Zieman 1989) than mudflats, sandflats, and marshes. Eelgrass beds function as habitat and nursery areas for commercially and recreationally important open ocean marine fish and invertebrates, and provide critical structural environments for resident bay and estuarine species, including abundant fish and invertebrates (Hoffman 1986, Kitting 1994). ... Besides providing important habitat for fish, eelgrass is considered to be an important resource supporting migratory birds during critical migration periods... In addition to its habitat and resource value, eelgrass traps and removes suspended particulates, improves water clarity, and reduces erosion by stabilizing the sediment (Ward *et al.* 1984, Thayer *et al.* 1984, Wyllie-Echeverria and Rutten 1989, Merkel and Associates 2000). Eelgrass facilitates nutrient cycling, and oxygenates the water column during daylight hours.”

APPENDIX C: CURRENT PROJECTS

California Native Plant Society

The California Native Plant Society (CNPS) was involved in weeding around Lotus populations at Hospitality Point and at the Lotus Dunes area until recently. The Dunes area was planted with coastal sage scrub species that have outcompeted the Lotus. Currently no weeding is done at Hospitality Point or the Lotus Dunes area.

Strategies, Objectives and Activities Addressed:

- Ecosystem-based management approach for coastal dune habitat
 - Manage sites with hand-pulling and herbicide to accommodate an ecosystem based approach that manages for Least Terns and dune plants.

Project Timeline and Outcomes

- Due to an inability to receive City permits for volunteers to use herbicide and low hand-pulling volunteer numbers, this project became infeasible and was curtailed.
- There are no projected outcomes for this project.

While CNPS does not have any current projects in Mission Bay, they are willing to serve as potential partners on activities benefiting native plants at the bay.

The San Diego River Park Foundation

Friends of the River Mouth Program

This chapter of SDRPF meets six times per year to engage the public in caring for the coastal dune and wetland habitat at the mouth of the San Diego River. The group focuses on targeted invasive removal by hand, trail maintenance and education. The group engages school groups to take ownership of the site during off months.

Strategies, Objectives and Activities Addressed:

- Increased public outreach and education to reduce disturbances
 - Development of a docent program for outreach at the dog beach area to reduce dog and foot traffic around sensitive areas.
- Ecosystem-based management approach for coastal dune habitat—terns
 - Manage sites with hand-pulling and herbicide to accommodate an ecosystem based approach that manages for Least Terns and dune plants.

Project Timeline and Outcomes

- This program is ongoing and began in 2008.
- Group works the fourth Saturday of every odd-numbered month by holding public volunteer events at the site.
 - Avoids intertidal areas when Chloropyron is blooming (Spring/Summer)
- Positive outcomes/results are already evident and measured by presence of native vs. nonnative vegetation and resurgence of specific endangered plants.

Resources

- In Place
 - Ongoing support of SD River Park Foundation providing staff and tools.
 - Four year grant from USFWS from Sept. 2011 through Sept. 2015.
 - Support of MBP Rangers providing bags and disposal of weeds removed by volunteers.
- Needed
 - Technical assistance from trained biologists and botanists.
 - Larger core of regular volunteers.
 - Volunteer leaders.

City of San Diego

Park & Recreation Department

The City of San Diego's Parks & Recreation Department consists of both an Open Space and Developed Regional Parks Division. Their conservation and management approaches are multifaceted and address several strategies outlined in Mission Bay Conservation Planning.

Annual Weed Removal Projects

The City manages work forces in the removal of invasive/non-native vegetation throughout Mission Bay Park. Work forces include volunteers and contractual workers. Invasive plants that are encroaching on sensitive and endangered resources are a priority. Workers remove/control invasive plant species, monitor to maintain absence of invasive species and continue to remove as necessary (ex. marsh walk for mangroves). Manage Mariners Point by hand. North Fiesta Island, Stony Point, and Mariners Point are all treated with herbicide. Volunteers monitor vegetation and LETE productivity to determine the affects of varying weed management regimes (weed pulling).

Strategies, Objectives and Activities addressed:

- Remove/Control Invasive Plant Species
 - Hand manage coastal dune sites to Remove invasive plants where lotus/sensitive plants occur
- Ecosystem-based management approach for coastal dune habitat – terns
 - The City monitors vegetation and LETE productivity to determine the affects of varying weed management regimes (weed pulling) to work within Mission Bay NRMP to change management of sites to accommodate ecosystem-based approach that manages for LETE and Nuttall's Lotus/dune plants.

Project Timeline and Outcomes

- Project is on a continuing basis and relies on volunteer participation, staffing and budget.
- Positive results are dependent on frequency of volunteer participation, staffing and budget.

Resources

- In Place
 - We have strong volunteer participation, dedicated staff, and contracts in place
- Needed
 - More funding for additional contractual work

The Park Ranger Program collaborates with SDAS, SDRPF, other Friends groups, individual volunteers, California Conservation Corps and the County Probation Dept.

Predator Control Projects

The Park and Recreation Department funds the contract for predator control/removal for the following CLT sites: North Fiesta Island, Stony Point on Fiesta Island, Mariners Point and LFCR at the Northern Wildlife Preserve.

Strategies, Objectives and Activities Addressed

- Predator Control and Removal
 - The Park Ranger Program initiates USDA contracts to determine sites for types/frequency of predators to inform predator management to implement year-round predator control at all LETE/LFCR nesting sites.
 - The City initiates annual assessments to determine if annual predator controls are established.
 - The Rangers Program removes supplemental food and picks up trash with a volunteer/docent program and has asked the City to add lidded trashcans.

Project Timeline and Outcomes

- Predator Control is employed before and during the nesting seasons.
- Positive results are gauged at the end of the nesting season and it varies yearly.

Resources

- In Place
 - We have a contract with USDA Wildlife Services.
- Needed
 - More funding for additional contractual work.

For predator control, the Park Ranger Program collaborates with USDA and other funding sources.

Biological Monitoring Programs

City of San Diego Park & Recreation Department introduces Nuttall's Lotus to areas where non-natives have been eradicated, creates maps of areas where lotus currently occurs and identify areas that could be restored. The City has been collaborating with SDAS in their efforts to restore lotus habitat within Mission Bay Park through provision of NULO maps and similar in-kind support.

Strategies, Objectives and Activities Addressed

- Create/Connect habitat where feasible
 - The City creates maps of areas where lotus currently occurs to increase coastal dune habitat and Nuttall's Lotus restoration sites.

Project Timing and Outcomes

- Project is on a continuing basis and relies on volunteer participation, staffing and budget.
- Positive results are dependent on frequency of volunteer participation, staffing and budget.

Resources

- In Place
 - We have strong volunteer participation, dedicated staff, and contracts in place.
- Needed
 - More funding for additional contractual work.

Park Ranger Program collaborates with SDAS, SDRPF, other Friends groups, individual volunteers, Ca. Conservation Corps. and County Probation Dept.

Parks & Recreation Interpretive Program

The City of San Diego Park & Recreation Department monitors and maintain signage and effective fencing and security of LETE sites.

Strategies, Objectives and Activities Addressed

- City evaluates signage and fencing needs in and around LETE sites to increase public outreach and education to reduce disturbances

Project Timing and Outcomes

- The project is on a continuing basis and is initiated and maintained by Ranger staff.

Resources

- In Place
 - Park & Rec. Dept funding and staff support this project.
- Needs
 - Video monitoring for all sites.

Park Ranger Program and contractual staff collaborate for fence maintenance.

California Department of Fish and Game

Scientific Aides Program

CDFG has a Section 6 grant that we will use to employ the two Scientific Aides (Ginger Johnson and Jennifer Jackson) that monitor California Least Terns nesting at Mission Bay.

Strategies, Objectives and Activities Addressed

- Ecosystem-based management approach for coastal dune habitat – terns
 - DFG monitors LETE productivity.

Project Timing and Outcomes

- This project is ongoing and current funding covers the 2012 and 2013 field season.

Resources

- In Place
 - Section 6 grant for next two seasons.

San Diego Audubon Society*Adaptive Vegetation Management Projects*

San Diego Audubon (SDAS) has received a three year grant to adaptively manage vegetation around the Mission Bay IBA to improve coastal dune habitat and species, such as the Nuttall's Lotus. SDAS will continue to hand manage vegetation at Mariner's Point, as has been done for over 20 years, and will expand their efforts to North Fiesta Island, Stony Point and FAA Island. In these sites, experimental plots will be designed and adaptively managed with the hope of restoring a natural coastal dune habitat and increasing successful California Least Tern Nesting. Over seven acres of invasive iceplant will also be removed from South Shores, and this site will be adaptively managed to increase the population of Nuttall's lotus and other sensitive, native species.

Strategies, Objectives and Activities Addressed:

- Remove/Control Invasive Plant Species
 - We will hand pull and manage coastal dune sites to remove invasive plants where lotus/sensitive plants occur
- Ecosystem-based management approach for coastal dune habitat – terns
 - We will work with volunteers and coordinate with the DFG surveyors to monitor vegetation and LETE productivity and determine the affects of varying weed management regimes to work within Mission Bay NRMP to change management of sites to accommodate ecosystem-based approach that manages for LETE and Nuttall's Lotus/dune plants.

Project Timeline and Outcomes

- Hand management at Mariner's Point began over 20 years ago and is operating on a continuing annual basis in the months preceding LETE nesting season.
- Other sites will commence in February 2012 and will continue through February of 2015.
- We expect to see a decrease of iceplant by fall of 2012, with complete eradication by fall of 2013.
- We expect to begin management of other LETE nesting sites in September 2012 and will see outcomes of first round of managements post-nesting season in September 2013.

Resources

- In Place
 - Three year Transnet EMP Grant to manage Fiesta Island sites, Mariner's Point and South Shores.
 - Two year CDFG Grant to manage FAA Island.
- Needed
 - More funding for additional contractual work

To achieve adaptive management of vegetation in Mission Bay, SDAS is currently collaborating with: Mike Kelly of Kelly & Associates; SDSU's Institute of Ecological Monitoring and Management; the Soil Ecology and Restoration Group; San Diego Zoo's Institute for Conservation Research; CDFG Least Tern monitors; and the City of San Diego.