Threatened and Endangered Species Stewardship

Threatened and Endangered Species Stewardship Program

The Port of San Diego's Threatened and Endangered Species Stewardship Program assists in the management and recovery of two federally listed species that occur at the D Street Fill; the California least tern and western snowy plover. The D Street Fill site is jointly managed by the Port and the San Diego Bay National Wildlife Refuge as habitat for these and other special-status species. Under joint management, land formerly disturbed and degraded by human activity and development has become a protected area with a special role in the ecosystem.

D Street Fill Then

In 1973, California least tern nesting was observed for the first time on the fill site. Fledgling success remained poor in the 70's and 80's due to human disturbance and avian predators, and the colony abandoned the area in the mid-1980's. The site was used regularly between 1994 and 2001 but nesting success was mixed.

T&E Species Stewardship Program

Recurring stewardship efforts at the fill site have been in place since 1997. These included annual site preparation, invasive plant removal, vegetation management, predator control, monitoring and reporting during the nesting season, and performing other tasks to assist with nesting success.

D Street Fill Today

The site functions as important habitat for California least terns and other listed species, migrating shorebirds, nesting sea birds, and foraging raptors. In 2017, 162 least tern chicks successfully hatched!

Benefits to Environmental Quality: Multiple sensitive species benefit from management of designated conservation space. The community is engaged through regular volunteer events. A formerly degraded area is restored and enhanced.

Level of Independent Involvement: Dedicated team consists of staff and contractors, and includes scientists, resource managers and other specialists.

The Creativity of the Program: Adaptive habitat management, constant vigilance, cross-agency collaboration, technical resources, and scientific expertise are required to successfully manage sensitive and imperiled species.

Program Results are Apparent: Least tern nesting success increased from sporadic nesting in the 70's and 80's to more than one hundred nests in each of the past 14 years under Port and Refuge management.

Cost Effectiveness: Program leverages existing internal resources, shared responsibilities between agencies, and successful application of grant funding to achieve maximum benefit to the species.

Transferability of the Program: Methods can be adapted or used by other government agencies. Banding of chicks provides for recapture and recovery of bands to document life history. Techniques and data collected are shared with other resources managers on a regional level to better assist in species management and recovery.

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PORT OF SAN DIEGO

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Table of Contents

I. Introduction

The Port of San Diego (Port) manages approximately 33 miles of San Diego's shoreline, including nearly 6,000 acres of tidelands and submerged lands. During its history, the Port has taken the lead in a variety of initiatives to enhance the environmental quality of San Diego Bay and its surrounding tidelands. These include wildlife and natural resources management and environmental partnerships. A Threatened and Endangered (T&E) Species Stewardship Program is voluntarily implemented by the Port in coordination with the San Diego Bay National Wildlife Refuge (Refuge) and other agencies and organizations. This report details program activities conducted at one site for the 2017 avian breeding season.

The Port's T&E Species Stewardship Program assists in the management and recovery of two federally listed species that occur at the D Street Fill, the California least tern (*Sterna antillarum browni*; CLT) and western snowy plover (*Charadrius alexandrines nivosus;* Plover). The D Street Fill is a 110 acre site located adjacent to San Diego Bay in Chula Vista, California across a channel from the Port's National City Marine Terminal. Creation of the fill site began in the 1960s with placement of dredge spoils from nearby development projects onto native marshland. Today, the D Street Fill consists of vegetated and unvegetated areas which support native and nonnative plant and animal species that have colonized the area. It is currently managed as important habitat for listed species, migrating shorebirds, nesting sea birds, and foraging raptors. A portion of the D Street Fill is Port tidelands and a portion is in the National Wildlife Refuge; therefore, the fill site is jointly managed by both agencies as habitat for these and other special-status species.

Under Port and Refuge management, CLT nesting success has increased from sporadic nesting in the 1970s and 1980s (zero to a few dozen nests) to over one hundred nests in each of the past 14 years! In 2017, at least 162 CLT chicks hatched successfully--partly due to implementation of the management actions outlined below.

Threatened and Endangered Species Stewardship Management Actions at D Street Fill

Site Preparation	Increase the quality and quantity of CLT and Plover nesting habitat by reducing vegetation density and height over approximately 30 acres. Manage vegetation by mechanical grading. Debris removal. Flag invasive plants for removal.
Management and Monitoring	Collect nesting bird data to determine management actions. 1) Prepare the site for an anticipated 125 to 150 CLT nests by setting monitoring system. Deploy ceramic tiles in grid intersections to assist in nest mapping and provide shelter for chicks. Use decoys to attract CLT to appropriate locations. 2) Perform monitoring of CLT. Collect nesting data. Prepare reports regarding the breeding season and the success of the CLT nesting colony. Record observations of presence and activities of Plover and other sensitive species.
Predator Management	Provide predator control services during the CLT and Plover breeding seasons. Conduct daily monitoring for mammal and avian predators, and implement appropriate means to reduce CLT and Plover predation. Prepare reports discussing the results of the predator control services.
Invasive Plant Control	Implement appropriate means to reduce or eliminate presence of new and existing invasive plant species at target areas on the D Street Fill site. Conduct manual weeding as part of site preparation and apply herbicide to identified target areas.
Volunteer Event	Host volunteer event in coordination with the Audubon Society to assist site prep for 2018 and to promote support for protection of San Diego Bay's natural resources.

II. Goals and Objectives

The program is conducted in accordance with the Port's San Diego Bay Integrated Natural Resources Management Plan (INRMP) and its goal to ensure the long-term health, restoration, and protection of San Diego Bay's ecosystem in concert with the

bay's economic, naval, navigational, recreational, and fisheries needs. The program is aligned with following INRMP objectives:

- Maintain, enhance, and restore habitats on San Diego Bay aimed at providing for the health of resident and migratory populations of birds that rely on the bay to complete their life cycle.
- Foster broader public knowledge and appreciation of the functional, aesthetic, recreational, and economic values of the bird resources of the bay.
- Contribute to the recovery of California least tern numbers based on population size, distribution, and secure nesting site numbers by providing clear benefit to the species in a cost-effective manner.
- Manage predators of the California least tern to maximize colony success as measured by fledgling productivity and pair numbers.
- Protect the listed western snowy plover population inhabiting San Diego Bay.

The T&E Species Stewardship Program had the following goals for 2017:

- Increase available nesting habitat for California least tern and western snowy plover during the 2017 breeding season and improve overall quality of habitat. The goal of site preparation management activities is to alter vegetation composition and structure to more resemble coastal strand habitat.
- Provide predator management for the protection of sensitive species.
- Implement management recommendations from 2016, and develop management recommendation for 2018 based on results.
- Track and monitor nesting success of T&E species.
- Reduce or eliminate target invasive weeds on site.
- Promote community awareness and support of San Diego Bay's natural resources.

III. Discussion

A. BACKGOUND

The D Street Fill consists of vegetated and unvegetated dredge spoil. This disturbed upland area provides habitat for several species of ground nesting birds including CLT, horned, larks, and killdeer. Plovers routinely use the site for foraging and Plover nests have been documented here in the past.

This area also provides high tide roosting opportunities for various shorebirds and other waterbirds, and supports sensitive plant species, various species of invertebrates, and some mammals.

Aerial view of Sweetwater Marsh, D Street Fill, and Sweetwater River

CLT once nested in large, loose colonies on beaches throughout Southern California. Increasing urbanization and habitat loss have led to the decline of its population, which shifted much of the nesting to less traditional colony sites such as landfills and airports. In 1973, the California population was thought to be as low as 300 nesting pairs; by 2009, it had grown to an estimated 7,130 nesting pairs. The breeding population in 2016 was estimated to be 3,989 to 4,661 pairs.

In 1973, CLT were first observed nesting on the sand-shell substrate of dredge spoil at the "D Street Fill", along the eastern shore of San Diego Bay. Colony size and reproductive success have varied widely from year to year depending on the availability of nesting habitat with low vegetation height and density; availability of prey fish; predation and predator presence; and human disturbance. Fledging success was poor during the 1970s and 1980s due to unregulated human disturbance, including disruption by off-road vehicles. The colony abandoned the area in the mid-1980s and did not return in substantial numbers until 1992. CLT regularly nested here from 1994 to 2002, with nesting pair numbers fluctuating between six and 38 pairs. Nesting occurrences have increased under intensive management efforts by the Port and Refuge, with more than one hundred nests in each of the past 14 years.

The Plover is among San Diego County's scarcest and most threatened breeding birds and it continues to experience a high risk of decline. Actions conducted by this program help achieve national and state management goals for the plover at the D Street Fill. Recently, highly invasive perennial pepperweed and Algerian sea-lavender have infested the site. The program includes invasive plant control is to prevent the spread of these species, prevent the introduction of new invasive species, and control all target invasive species, including but not limited to ice plant, chrysanthemum, and Russian thistle. The program involves site preparation, management and monitoring of high priority species, predator control, and invasive species removal at the D Street Fill.

Special-status species that occur at D Street Fill

Species	Status
California least tern	FE, SE
Western snowy plover	FT
Light-footed Ridgeway's rail	FE, SE
Salt-marsh bird's beak	FE, SE
Belding's savannah sparrow	SE
Peregrine falcon	FP
Northern harrier	SSC
Western burrowing owl	SSC
Black brant	SSC
San Diego black-tailed jackrabbit	SSC
Nuttall's lotus	CRPR 1.B.1
Estuary sea-blite	CRPR 1B.2
Palmer's frankenia	CRPR 2.1
Beach goldenaster	CRPR 1B.1
Coast woolly-heads	CRPR 1B.2
Woolly sea-blite	CRPR 4
California boxthorn	CRPR 4
Wandering skipper	*

FE – Federally Endangered, FT- Federally threatened, SE – State Endangered, FP – State Fully Protected, SSC –State Species of Special Concern, CRPR – California Rare Plant Rank, *locally sensitive butterfly

B. OBJECTIVES AND METHODOLOGY

CLT and Plover nest on sandy beaches with little to no vegetation. For successful breeding and nesting, they require low vegetation density and height, and low predator density. Appropriate sites with minimal human related disturbance are extremely limited in coastal southern California, making the D Street Fill an important site. Although these species are primarily present at the D Street Fill during the breeding and nesting seasons, managing the site is a year-round effort.

Site Preparation

Prior to any site preparation efforts, the site was surveyed for the presence, courting or nesting of Plovers, and for nests of other species. From late March to early April, Port staff conducted mechanical grading of the site to reduce vegetation and further enhance it for use by terns and plovers. Vegetation around the periphery of the cleared area was pruned back by contract monitors to limit predator perches and cover. Manual weeding is also conducted.

Management and Monitoring

Monitors surveyed a 30 m grid system and placed ceramic roofing tiles at each grid intersection to assist in nest mapping and provide shade and shelter for chicks. Existing perimeter signs indicating that the area is an endangered species nesting site were repaired or replaced. Decoys were placed in the central portion of the cleared site and in the western third where the majority of nests have occurred in the past. The site was monitored by biologists with extensive experience with nesting least terns, snowy plovers, and their young. Weekly monitoring for snowy plovers was conducted at D Street Fill beginning in early March. The site was monitored for terns and plovers. During the peak season of May through July, monitoring time was to accommodate nest location, marking, and chick banding and recapture. Due to the continued presence of terns, monitoring continued twice per week to early August until the terns departed. Monitoring was discontinued when no least terns had been observed for three consecutive visits. The final monitoring

visit for 2017 was on 29 August for D Street Fill. Records were maintained for each site for nests, chicks, or signs of disturbance. Monitors noted presence and location of predators. Conditions of nests and decoys were checked, and any abandoned eggs, eggshell fragments, bone, feathers, carcasses, or damaged decoys were collected. If tracks or other signs of predator presence were noted, predator management personnel were notified.

An attempt was made to band all chicks. Chicks were banded on the right leg with an individually numbered USFWS metal band. Band recapture data was used to estimate chick survival and fledging success, and band recovery data was used to quantify mortality and predation. In addition, banding of chicks provides for future recapture and recovery of bands to document longevity, dispersal, and to correlate age and colony of origin with breeding location, effort, success, and other factors.

Invasive Plant Control

In preparation for the 2017 nesting season at D Street Fill, Port staff and Refuge contractors applied herbicide to invasive plant species. Biological monitors under contract with the Port manually removed non-native invasive plants from the site, pruned back vegetation to reduce cover and potential raptor perches, surveyed the grid system, and placed decoys and ceramic tiles for chick shelters.

Predator Management

Predator management was conducted by personnel of U.S. Department of Agriculture (USDA) Wildlife Services. Cage traps were used to capture mammalian predators such as California ground squirrels, striped skunks, feral cats and opossums. Firearms were employed when trapping methods were unsuccessful, or when immediate removal of a

predator was necessary. Firearms were used to remove a feral cat, opossums, a striped skunk a harrier hawk, and an American crow on D Street Fill during the 2017 nesting season.

C. AWARDS CRITERIA

1. Benefits to Environment and Community

The Port champions environmental stewardship of San Diego's diverse ecosystems. Year after year T&E species management results are measured and analyzed to ensure that ongoing actions at the D Street Fill are effective. Successful implementation of the program requires participation and input from resource agencies. Multiple sensitive species benefit from environmental management and conservation. The local community is engaged through regular volunteer events. Everyone benefits when a formerly degraded area is restored and enhanced.

2. Independent Involvement and Effort

The D Street Fill requires a year-round management. The work is conducted by a dedicated team of Port and Refuge staff and contractors, and includes scientists, resource managers and other specialists. The Port's Environmental Conservation team provides guidance and manages contractors to conduct daily predator control services, avian monitoring, and reporting. The team organizes volunteer events on site and coordinates with the Refuge regularly to make joint-management decision. Annual grading or disking of the site occurs over 30-40 acres of both Refuge land and Port property, with each agency taking responsibility in alternating years. During odd years (including 2017), the site is "scraped" by Port staff operating a rented grader or tractor.

To conduct CLT and Plover monitoring, Port staff contracted with Robert Patton (USFWS permit-holder). Robert Patton and his staff performed most monitoring and management activities, including providing recommendations for future management actions for the 2018 nesting season, based on results of the 2017 effort. To control invasive species, Port staff (licensed applicator) applied herbicide under the direction of Port environmental staff at targeted locations on multiple occasions. To control predators, Port staff contracted with USDA Wildlife Services (USFWS permit-holder). USDA Wildlife Services staff performed predator management activities, including daily predator monitoring and trapping, discerning immediate and future predator impacts, and implementation of control measures. In February 2018, Port Environmental Conservation staff coordinated with the Audubon Society to conduct a volunteer clean-up and weeding event (timed to avoid the nesting bird season).

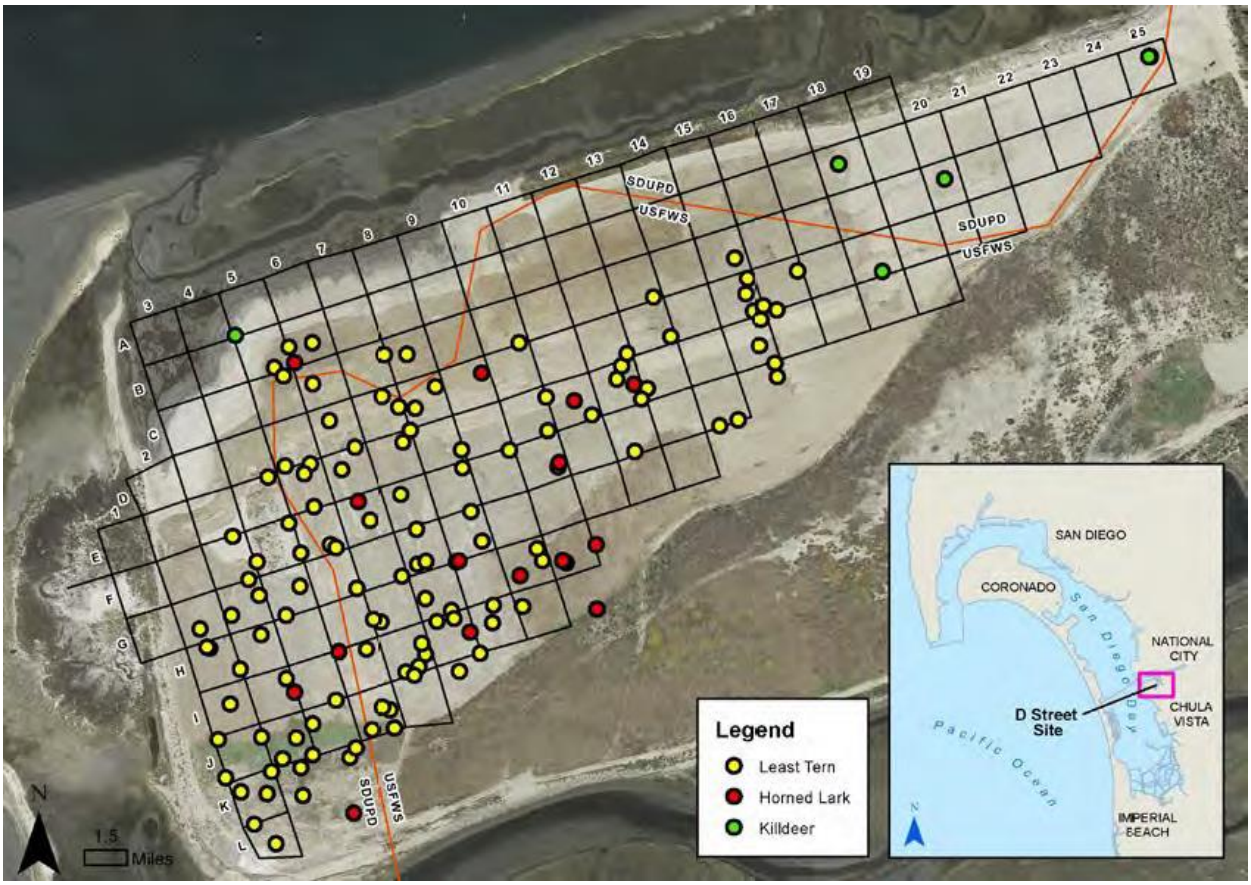
3. Creativity

Adaptive habitat management, constant vigilance, cross-agency collaboration, and scientific expertise are required to successfully manage the site. The D Street Fill is surrounded by water and saltmarsh on all sides, with no public access roads. The logistics required to mobilize heavy equipment or even coordinate site visits with volunteers or contractors is often a challenge. This shared property is traversed by a high transmission powerline facilities (including the sole access bridge), a railroad, with a marina and the National City Marine Terminal to the north. Balancing multi-purpose land uses often necessitates resourceful and innovative solutions—including making concessions or arrangements with multiple stakeholders. The location is highly sensitive, yet it's situated within a dense urban environment. Additionally, it requires an

effective strategy to coordinate the approvals required for depredation in compliance with legislative and regulatory mandates.

4. Project Results

Least terns were first observed at the D Street Fill on 11 April 2017. At least 127 nests were initiated by 93 to 112 estimated pairs between 28 April and 8 July. The maximum number of concurrently active nests and broods was 90 nests. At least 162 chicks from 96 nests hatched successfully. It is estimated that 29 to 31 chicks reached fledgling age and 25 to 27 survived to fledge from the site.



Least tern nest distribution in 2017.

At least six nests with six eggs were depredated by common raven, and additional abandoned eggs were scavenged by ravens. Additionally, 99 plovers were observed foraging on adjacent mudflats during ebbing or low tides prior to nesting season. Detailed monitoring results are included in a Final Monitoring Report. The disappearance of up to 88 to 91 chicks coincided with documented depredation. A total of 36 known and potential predators were removed from D Street Fill during the 2017 season. Detailed predator management results are included in a Final Predator Management Report.

2017 Least Tern Nest Outcomes

	Hatched	Abandoned Pre-term	Abandoned Post-term (Failed to Hatch)	Died Hatching	Uncertain Outcome	Predation	Non-predation Mortality
Nests	96	18	10	6	2	6	
Eggs	162	23	10	7	2	6	
Chicks						4-5	33
Fledglings						6	3
Adults						0	0

Control of invasive plants was conducted by flagging perennial pepperweed, non-native iceplant, Algerian sea-lavendar, Bermuda grass, garland chrysanthemum, mustard species and Russian thistle. Herbicide was applied to invasive plants which are scattered around the site. Manual weeding was also conducted.

The February 2017 volunteer clean-up event resulted in 25 volunteers removing nearly 1000 pounds of debris from the shoreline. Volunteers also conducted a focused and careful weeding effort to control the spread of Algerian sea-lavendar.

5. Cost-Effectiveness

The program leverages existing internal resources, shared responsibilities between agencies, and successful application of grant funding to achieve maximum benefit to the species. Joint implementation of this program provides the Port and the Refuge with a

cost effective solution to sensitive species stewardship at the D Street Fill. Efficiencies are achieved through management of two separate properties as a single site. While focusing stewardship efforts on one or two imperiled species, and favorable habit conditions are maintained or enhanced that simultaneously benefits many more sensitive species and scores of other native plants and animals.

6. Transferability

Site management methods can be adapted or used by other land managers with similar resource scenarios. Banding of chicks provides for recapture and recovery to document life history throughout their range. Techniques refined, problems solved, and data collected add to scientific knowledge of the species and are shared with other resources managers on a regional level to better assist in species management and recovery.

IV. Conclusion

The Threatened and Endangered Species Stewardship Program is achieves multiple benefits for the region. Currently, available upland habitat may be the most threatened habitat on San Diego Bay. The D Street fill is the largest parcel of undeveloped acreage and as such has enhancement potential available nowhere else for species that depend on adjacent uplands. CLT nesting sites around the bay are intensively managed and protected, and must continue to do so in order to ensure their survival. Each year the Port implements its program at the D Street Fill is essential to T&E species recovery.