



**San Diego Association of Governments
CA least tern predator monitoring by SDAS
Final Report
Project Period: September 1, 2013 - March 1, 2017
SANDAG Contract Number: 5001765**

Executive Summary

Predation is a major driver of California least tern (CLTE) reproductive success and, therefore, species recovery. USDA APHIS is currently funded to control predators to benefit the CLTE at Mission Bay Park, but it remains a challenge to accurately determine specific details of predation events (which species, time of day, etc.), and therefore how to effectively implement control efforts. CLTE nest sites are monitored only several times a week, leaving specific information on predation lacking, or based only on indirect evidence. Predator control is most effective when coupled with continuous monitoring of CLTE nest sites, providing direct observations of predators and predation events to improve management efforts. In order to address this critical information gap in CLTE management, San Diego Audubon was funded under a TransNet Environmental Management Program Land Management Grant in 2013 to conduct a predator-monitoring program in Mission Bay.

San Diego Audubon implemented a volunteer-based predator monitoring program to observe and document predation and disturbance occurrences during nesting season at California least tern (CLTE) nesting sites in Mission Bay Park. Volunteers monitored nests during the breeding season and collected information about predation events. Volunteers reported predation events in real time to agency predator control staff. Additionally, San Diego Audubon conducted public outreach via various communications platforms to raise the profile of CLTE as a conservation target in Mission Bay Park.

Through the course of this program, which was dubbed “Ternwatchers”, more than 90 San Diego Audubon volunteers donated over 1,200 of time monitoring for predators at CLTE colonies in Mission Bay. The first year of Ternwatchers, CLTE chicks were fledged from all four nesting sites in Mission Bay for the first time in ten years, and this continued through the two subsequent years of Ternwatchers. USDA APHIS’s annual reports cited the real-time communications from Ternwatchers during the nesting seasons as “instrumental” in conducting efficient and effective predator control in Mission Bay.

In terms of productivity, the fledgling per pair ratio in Mission Bay increased from an average of 0.17 from 2006-2013 to 0.51 between 2014-2016.

Given that the need for predator control will likely continue in future years in order to maintain these nesting colonies (and the importance of predator monitoring in increasing the efficacy of predator management in Mission Bay), the absence of future predator monitoring will likely negatively affect future nesting success unless funds are identified and secured.

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Project Background

The California least tern (*Sterna antillarum browni*), hereby referred to as CLTE, is a federally-listed endangered species, classified as “Fully Protected” by the California Department of Fish and Wildlife (CDFW), is a covered species within the Multiple Species Conservation Program (MSCP) and the San Diego Habitat Conservation Program (MHCP), and is designated as an “SO” species by the San Diego Management and Monitoring Program’s Management Strategic Plan (MSP). Through TransNet EMP and CDFW grants awarded in 2012, and follow up TransNet EMP grant in 2015, SD Audubon currently adaptively manages vegetation at coastal dune habitat sites in Mission Bay Park, including four CLTE nesting sites. USDA APHIS is under contract from the City of San Diego and SANDAG to perform predator control at these CLTE nesting sites. Although year-round predator management efforts have increased predator control effectiveness, it remains very difficult for APHIS staff to know what type of, and how much, predator control effort should be deployed without additional “eyes on the nests”. San Diego Audubon “Ternwatcher” volunteers provided those additional eyes on the colonies to observe and record predation events in order to provide recommendations for improving efficacy of predator management actions and in turn improve breeding productivity of CA least tern in Mission Bay Park.

Project Goals

From the original grant application:

- 1) Increase overall breeding productivity of CLTE population in Mission Bay Park
- 2) Document and report, with minimal lag time, predation and disturbance events at CLTE nesting sites;
- 3) Develop recommendations for land managers to assess predation risk (i.e. how disturbance, time of day, habitat, and CLTE behavior impact predation risk); [QUANTIFICATION OF THIS GOAL N/A DUE THE NEST ATTENDANCE/NEST TEMPERATURE/NEST VIDEO MONITORING PORTION OF THIS PROJECT NOT BEING FUNDED]
- 4) Increase efficacy of predator control measures at active nesting sites.

Work Performed by Task

Task 1- Volunteer predator monitoring program

Budget: \$37,084.83

Spent: \$37,157.85

Match for Task: \$32,835.96



Task 1: San Diego Audubon Society volunteers Padma Jagannathan and Sree Kandhadai and Rebecca Schwartz Lesberg, Audubon's director of conservation, watch least terns nesting at Mariner's Point in Mission Bay, June 5, 2014. Photo: Katie Schoolov, KPBS

Over the course of this project, 92 trained “Ternwatcher” volunteers donated 1,283.25 documented hours of monitoring time at CLTE nesting sites in Mission Bay (Appendices A and B), using specifically developed field protocols (Appendix C) and monitoring data sheets (Appendix D). This was above a target of 90 volunteers and 1,080 hours of monitoring effort. This task came in \$73 over budget, which was accommodated by Task 2.

This task fully satisfied the goals and objectives outlined in the grant agreement’s scope of work. The overall goal of this project was to improve breeding productivity of CLTE in Mission Bay Park, measured as the fledgling per pair ratio. We aimed to increase this ratio from 0.20 to 0.40 by the end of the three-year project term. From 2014-2016, there were 234 fledglings produced from 424 nests, with an average fledgling per pair ratio of 0.518 across the years. This exceeds our goal of a 0.4 fledgling per pair ratio. An additional goal of Task 1 was to improve the efficacy and timing of predator control by increase to ratio of predator control effort-hours to predators removed from 0.35 to 0.50 by the end of the three-

year project term. While this was not achieved (the ratio actually decreased to 0.22) the 2013 ratio was impacted by very high corvid presence, which did not dominate the sites so significantly in subsequent years.

Quantifiable results/deliverables identified in the grant agreement:

- Daytime predator monitoring design and protocol – See Appendices A and C
- Annual pre-nesting season volunteer training by staff and/or consultants – See Appendix B
- Oral reports to agency staff of predation events during nesting season – Completed via email through nesting seasons, referenced in USDA APHIS predator reports
- Post nesting-season survey of agency staff to receive feedback on monitoring and reporting – Completed in person at the end of each nesting season
- Website, social media and newsletter updates about volunteer program and CLTEs – See Appendix E

Given that the need for predator control will likely continue in future years in order to maintain these nesting colonies (and the importance of predator monitoring in increasing the efficacy of predator management in Mission Bay), future predator monitoring is needed to maintain the level of productivity achieved during this grant.

Task 2-Grant Administration and Reporting

Budget: \$10,403.53

Spent: \$10,330.52

Match for Task: \$0

Quarterly reports and invoices were submitted throughout the project. No issues were encountered with these reports. This task came in \$73 under budget, which was used by Task 1. In the grant agreement, the deliverables identified for this task include “all data, data analyses, and executive summary outlining recommendations to improve predator management at CLTE nesting sites”. However, data entry and analysis was not included as part of the funded project and was instead associated with the nest temperature/nest attendance portion of this project not funded by this grant agreement (and therefore not completed). Information from data relating to predation events was transferred to USDA APHIS in real-time, and batched weekly for their records but was not digitized and analyzed for long-term trends (that was not identified in the grant agreement). PDFs of these datasheets can be provided to SANDAG if requested (hundreds of pages). Alternately, an unanticipated benefit of this project was the collection of many hours worth of predator presence/absence information and data regarding predator species representation in Mission Bay. Entering and analyzing these data is being conducted by San Diego Audubon staff and volunteers outside of this grant. Any reports based off of these data will be provided to SANDAG when they are complete.

Conclusions

Overall, predator monitoring by San Diego Audubon volunteers was associated with a near-doubling of CA Least Tern nesting productivity in Mission Bay over the course of this project. This project accomplished the goals specified in our grant application and grant agreement. On-the-ground partners from the City of San Diego and USDA APHIS both stress that Ternwatchers are instrumental in conducting predator control efforts at these sites.

As these nesting colonies will need continued management to support successful recovery of this species, all possible efforts should be made to continue this work in the future.

Appendices:

Appendix A: Yearly volunteer Ternwatcher monitoring totals (used as match)

Appendix B: 2016 Ternwatcher training presentation

Appendix C: 2016 Ternwatcher field protocol

Appendix D: 2016 Ternwatcher datasheet

Appendix E: San Diego Audubon newsletter featuring this project

Appendix F: Presentation to SDMMP (2/24/16)