



Population Studies for Predator Aversion Project at the Venice Beach Least Tern

Sternula antillarum Colony

Ian Wright, Oscar Repreza; Maria Curley, Dr. Peter Auger, Dr. E. Strauss, Emily Simso
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Abstract

In the Fall of 2017, the Loyola Marymount University (LMU) Center for Urban Resilience (CUREs) contracted with a consultant of the State of California Dept. of Fish & Game Wildlife Branch, Ryan Ecological Consulting, to collaborate on solutions to American crow *Corvus brachyrhynchos* predation on Least tern eggs and chicks in the Venice Beach Least tern colony. Least terns prefer nesting in low sand dunes with light vegetation. As a result of urban expansion and beach combing, Least terns, a federally endangered bird, have lost much of their preferred nesting habitat in Southern California and have become vulnerable to crow predation at the few remaining nesting sites like Venice Beach. The aim of the CUREs Venice Beach field study includes:

- trapping and banding crows in order to determine resident vs. transient crow populations
- using predator aversion strategies, including pseudo tern nests with mildly electrified decoy eggs, to deter the crows from entering the fenced-in enclosure
- monitoring Least tern populations as they arrive during the 2019 nesting season

The ultimate goal of the project is to increase Least tern reproductive output, which has been extremely low in the past decade.

Introduction

Crow predation on Least tern eggs hindered all reproductive success from 2002 to 2005. In 2006 a predator control system was practiced through crow observation, trapping, and removal from nesting site (Ryan, 2010). This system produced successful reproductive seasons in 2006, 2007, and 2008. However, in 2009, predation returned to 100%. In 2014, electrified pseudo egg traps were implemented as a behavioral aversion tactic. This tactic successfully conditioned crows against egg predation and resulted in the first fledging since 2008 (Velasco, 2015).

This nesting season, USFW and CUREs are conducting the project with a series of 5 phases:

1. Banding Crows
2. Studying Crow Populations
3. Applying Predator Aversion Tactics
4. Placing Tern Decoys
5. Studying Tern Reproductive Output

The project is currently under Phase 2. USFW and CUREs have been banding crows since 2013, totaling about 150 banded crows. An estimate of resident crows can be determined using the banded population. Knowing the ratio between resident vs transient crows allows for a better sense of the potential success of the aversion tactics, which will be most effective if applied on resident crows. Crows are known to have complex social groups and will communicate a negative experience, such as a non-lethal shock, thereby potentially dissuading them from entering the tern enclosure.

Question: How many resident vs transient crows are observed in the area?

Hypothesis: If there are more resident crows than transient crows, then the shocking aversion tactics will be more successful due to higher conditioning rates.



Figure 1: Crow banding



Figure 2: A banded crow with an un-banded crow



Figure 3: Satellite image of the Tern Nesting Site



Figure 4: Crows in the Australian crow trap

Methods

Phase 1 and 2: Banding and Tracking Crow Populations

- Trap and band crows within Least tern nesting site
 - For two weeks prior to trapping, bait the trap every other day *without* setting the trap
 - On banding date, bait *and* set the trap
 - Capture birds, record and affix ID bands, and measure weight/wing length of individuals (biometrics)
- Send out observation teams as frequently as possible to record:
 - Number of banded and unbanded birds
 - Identification numbers of the bands
 - Location of birds
 - Behavior of birds
- Correlate repeated observations of recorded band numbers to create a ratio of resident vs transient crows

Data Collection

American Crow (<i>Corvus brachyrhynchos</i>)												
Obs #	Date	Start Time	End Time	# Mins	Weather	Temp	Banded	Not Banded	Banded / Unbanded	Band #s	Band Colors	Loc
10	2/26/19	12:00pm	2:30pm	150	overcast, warm	65	6	24	0	A32, A33, A36, A79, A82, A84	none	Condos
14	3/4/19	3:40	4:40	60	sunny	65	7	15	1	A52, A58, A70, A83	W/R, NA, NA, W/S	Condos

Table 1: An example of recordings for two observation dates including time and dates completed, band numbers, band colors, and weather conditions; this data collection is ongoing

Band #	Freq Seen	Band #	Freq Seen	Band #	Freq Seen
A32	2	A68	1	A45	2
A33	1	A70	1	A75	2
A35	1	A73	2	A78	1
A36	1	A79	1		
A39	2	A82	3		
A46	2	A83	6		
A48	1	A84	2		
A52	1				
A53	2				
A58	1				
A63	2				
A66	1				
		Freq Summ of Band #s	11	9	1
			1x	2x	3x
					6x
					22

Table 2: Frequencies of each observed banded crow

Totals	Banded	Unbanded	Unidentified	Grand Total
	53	159	57	269

Table 3: Number of crows totaled from all observation outings

Results

- With an average ratio of banded to unbanded crows being 1:3.5, the total population of crows in the area of the tern site can be estimated at 270 crows
- From November 2018 to present:
 - 60 crows have been banded in the nesting site
 - Of these crows, 22 have been observed at least once after their banding, deeming them resident
 - This indicates a 36% residency rate of birds captured
 - These data are preliminary due to the high possibility of unobserved crows
 - When enough data has been collected, a Lincoln Index will be utilized to show whether or not all possible observations have been seen

Discussion

By finding the ratio of resident to transient crows, CUREs and USFW can have a better understanding of the effectiveness of aversion tactics. The higher the resident ratio, the more likely birds will be subject to successful conditioning. On the contrary, the higher the residency, the more quickly aversion tactics will be learned like in the case of Velasco's shocking stations.

This survey of crow populations, along with the effectiveness of the aversion tactics, will be used to help inform USFW predator management strategies.

CUREs is continuing to survey the Venice Beach crow population. In mid-April, when the Least terns return for nesting season, CUREs will employ aversion tactics, including non-lethal shocking stations. Game cameras will be set up around the site to record results of the conditioning strategies. The population and aversion data collected will provide for a better understanding of the endangered tern protection.



Figure 5: Adult Least Tern

Literature Cited

Velasco, Vanessa Nicole, "Investigation of Non-Lethal Electric Shock on American Crows as a Predator Aversion Treatment for Reducing Depredation on California Least Tern Eggs" (2015). LMU/LLS Theses and Dissertations. 178.

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